



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist)-531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

**1.1.1: The Institution ensures effective curriculum planning and delivery through a well-planned and documented process including Academic calendar and conduct of continuous internal Assessment**

## INDEX

S.No	Description	Page No
1.	Academic Planning and Advisory Committee Meeting Minutes	3-7
	<b>Department Academic Committee Meeting Minutes</b>	
	a) Department of Pharmacy	8-11
	b) Department of Pharmacy Practice	12-15
2.	Program Assessment Committee Meeting Minutes	16
	a) Department of Pharmacy	17-27
	b) Department of Pharmacy Practice	28-37
3.	University Academic (JNTU-GV) Calendar	38-47
4.	Institute Academic (AIPS) Calendar	48-50
5.	College Academic Calendar	51-54
6.	Department of Pharmacy PCI Syllabus	55-291
	Department of Pharmacy Practice PCI Syllabus	292-388
7.	Faculty Work Load PG & UG	389-402
8.	<b>Time Tables</b>	
	a) Department of Pharmacy	403-426
	b) Department of Pharmacy Practice	427-431
9.	<b>Master Time Tables</b>	
	a) Department of Pharmacy	432-439
	b) Department of Pharmacy Practice	440-441

Avanathi Institute of Pharmaceutical Sciences



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist)-531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

10.	Department of Pharmacy Practice Sample Course File	442-565
11.	<b>MID Exam Time Tables</b>	
	Department of Pharmacy	566-585
12.	<b>MID Exam Circulars</b>	
	a) Department of Pharmacy	586-613
	b) Department of Pharmacy Practice	614-627
13.	Semester End Exam Time Tables	628-687



  
Principal

**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

AIPS/PO/APAC-2022/01

Date: 30-05-2022

## CIRCULAR

This is to inform all the staff members that Academic Planning and Advisory Committee will be meeting to discuss some important issues at 10.00 A.M in the Principals chamber on 01<sup>st</sup> June 2022. All members are requested to attend the meeting without fail.

### Agenda:

1. Preparation of institute academic calendar of 2022-23
2. Value added courses
3. Hospital training sessions and visits
4. Pharmacological and Analytical Project works
5. Research works and collaboration
6. Workshops/FDPs
7. Industrial visits
8. Training and Placements
9. Extracurricular/ Co-curricular activities
10. Sports/NSS activities
11. Any other issues

### Copy to

Dr. M. B. V. Raju	Principal
Mr. V. Uma sankar	Professor, M.Pharma, PGDCR, PGDAS, Ph.D, Vice principal
Prof.S.Satyanarayana	M.Pharma, Ph.D, Scientist emirates, Former Principal, Andhra University college of Pharmaceutical Sciences, Andhra University
Dr.S.Vijay Srinivas	Ph.D, Industrial Person
Shri.C.S.Mujebuddhin	M.Pharma, CEO, CLINISOL research pvt ltd
Dr.Ch.Hemasudha	MD Gynaecology & Obstetrics Sri Sai Aditya Hospital, Visakhapatnam
Dr.M.pavani	HOD – Department of Pharmacy
Dr.G.Prashanti	Professor, M.Pharm Pharmaceutical Technology
Mr.R.Ramana	Librarian
Mr.D.Koteswara Rao	Physical Director



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally, Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences





## **MINUTES OF THE ACADEMIC PLANNING AND ADVISORY COMMITTEE**

The Academic Planning and Advisory Committee meeting was held on 10:30AM at Principal

Sir's chamber.

The Principal gave a brief description on the above objective of the Academic Planning and Advisory Committee meeting. The principal started discussing about the academic issues and emphasized the need to follow the new University regulations.

### **Agenda Item 1:**

Preparation of Institute academic calendar of 2022-23.

#### **Resolution:**

- Mr. V. Uma Shankar, IQAC Coordinator, prepared the college Academic Calendar based on the Academic Calendar issues by the University and is handed over to the Head of the Department of Pharmacy.
- Department wise Academic Calendar was prepared by the Head of the Department basing on the Calendar issued by the Coordinator and was sent to the IQAC coordinator for his approval.
- Timetables were prepared and workloads were allotted to the faculty based on Academic Calendar of the institute as per the curriculum of the current semester.

### **Agenda Item 2:**

Value added Courses

#### **Resolution:**

The members of the committee have been proposed that value added courses should be included in each department though it's not included in the curriculum as it finds important for the development and employability of the students.

### **Agenda Item 3:**

Hospital training sessions and visits:

#### **Resolution:**

The members suggested that every student should complete atleast one internship per year.



  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



#### **Agenda Item 4:**

Pharmacological and Analytical Project works

##### **Resolution:**

The members of the committee assigned the faculty to guide the students in project works.

#### **Agenda Item 5:**

Research works

##### **Resolution:**

- Prof. S.Satyanarayana advised the faculty members to publish atleast one research paper per semester in High Indexed Journal. The entire remaining faculty were suggested to publish one paper in Scopus journal.
- Shri C.S.Mujebuddin advised all the faculty members to attend the FDP every year.
- Dr. S. Vijay Srinivas advised all the faculty members to undergo Internship Academic Interaction programmes.

#### **Agenda Item 6:**

Training and placements

##### **Resolution:**

- The Principal, AIPS staff members discussed and took a resolution and informed and the faculty members to implement the following from the academic year.
- Students who cleared all the subjects and secured CGPA above 7 should enroll for GPAT Programme.
- Students who cleared all the subjects and obtained CGPA between 6-7 should enroll for PGECET programme.
- All the remaining students should attend CRT classes conducted by the college.
- The coordinator Mr. S. Chandrasekhar informed the faculty members to organize various activities in the form of Competitions, Guest lectures, Career guidance, Entrepreneurship programmes etc for the students to improve their knowledge, skills and keep them abreast with the changing demands of the industries.

#### **Agenda Item 7:**

Workshops/FDPs

##### **Resolution:**

- Dr. Ch.Hema Sudha suggested the faculty to attend the FDP every year.



**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- She suggested the importance of providing training programmes to non-teaching staff in Ms Office, Ms Word and Excel which are very useful in drafting and for preparing documents.
- She also advised the English faculty to train the junior faculty and nonteaching staff to compose emails, notices, official letters, circulars which are necessary for the needs of their job and also for the professional development of the institution.

## Agenda Item 8:

Hospital Training and Rosters:

### Resolution:

- Dr. Ch. Hema sudha suggested the faculty to follow bedside teaching to the students in their hospital visits which is a main programme of the curriculum.

## Agenda Item 9:

Industrial Visits

### Resolution:

- Dr.S.Vijay Srinivas proposed an idea of organizing regular industrial visits for the students in reputed industries like Pfizer, Aurabindo.
- To acquire knowledge on the working of men and machinery in different pharmacy industries.
- Prof.S.Satyanarayana, suggested for arranging at least two guest lecturers to students in a semester.

## Agenda Item 10:

Sports/NSS Activities

### Resolution:

- Dr. M.B.V.RAJU proposed organizing Sports activities for the students and encourages the students to participate in competitions at the university, state or national level tournaments.
- He also informed the faculty members to conduct various technical events and NSS activities like Blood donation camps, Plantation drive, Swachh Bharat Campaign, Health check-up programs etc.

## Agenda Item 11:

Any other Issues

### Resolution:



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- The IQAC coordinator instructed all the staff members to maintain updated stock registers, Maintenance registers, Complaint registers etc of all the laboratories duly verified by the committee.
- It was also resolved after the discussion and should follow IQAC Audit Action Taken Report.

### Attendance Sheet:

S.No	Name	Designation	Signature
1.	Dr.M.B.V.Raju	Professor,M.Pharma, Ph.D,Principal	
2.	Mr. V Uma sankar	Professor, M.Pharma, PGDCR, PGDAS, Ph.D, Vice principal	
3.	Prof.S.Satyanarayana	M.Pharma, Ph.D, Scientist emirates, Former Principal, Andhra University college of Pharmaceutical Sciences, Andhra University	
4.	Dr.S.Vijay Srinivas	Ph.D, Industrial Person	
5.	Shri.C.S.Mujebuddhin	M.Pharma, CEO, CLINISOL research pvt ltd.	
6.	Dr.Ch.Hema Sudha	MD Gynaecology&Obstetrics Sri Sai Aditya Hospital, Visakhapatnam	
7.	Dr.M.Pavani	HOD-Department of Pharmacy	
8.	Dr.G.Prasanthi	Professor, M.Pharm Pharmaceutical Technology	
9.	Mr.R.Ramana	Librarian	
10.	Mr.D.Koteswara Rao	Physical Director	



Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**DEPARTMENT OF PHARMACY**

Date: 14-06-2022

**CIRCULAR**

This is to inform that the Department Academic Committee (DAC) will be held on 21<sup>st</sup> June 2022 10:30AM at Principal Sir's chamber.

**Agenda:**

1. Preparation of Department progress for the academic year 2022-23
2. Value added courses related to medical coding ,Clinical SAS
3. Certificate courses/ Internship programs on Instrumentation handling
4. Project works on Pharmacological activities and Analytical designs
5. Research works on Plant extracts and their Pharmacological action
6. Training and Placements with respect to Multinational Pharmaceutical Industry needs
7. Industrial visits to formulation Pharmaceutical Industries
8. Extracurricular/ Co-curricular activities
9. Sports/NSS activities
10. Any other issues

**Agenda Item 1:**

Preparation of Department progress for the academic year 2022-23

**Resolution:**

- HOD Pharmacy analysed the results of B.Pharmacy 2021-2022 academic year and expressed satisfaction for getting more than 85% of pass percentage.
- Committee congratulated the faculty who met the target of 90% or more.



  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### Agenda Item 2:

Value added Courses related to medical coding, Clinical SAS

#### Resolution:

- The members of the committee have been proposed that value added courses related to medical coding, medical scribing and clinical SAS related to be included in each department though it's not included in the curriculum as it finds important for the development and employability of the B.Pharmacy.
- The members of the committee have been proposed that value added courses related to Quality Assurance and Quality control, Pharmaceutical technology and Pharmacological Assays should be included in each department though its not included in the curriculum as it finds important for the development and employability of the M.Pharmacy students.

### Agenda Item 3:

Certificate courses/ Internship programs on Instrumentation handling

#### Resolution:

- The members suggested that every B.Pharmacy students should complete certification courses /Internship courses related to latest instrumentation handling, thesis writing courses.

### Agenda Item 4:

Project works on Pharmacological activities and Analytical designs

#### Resolution:

- The members of the committee assigned the faculty to guide the B.Pharmacy students in project works related to plant extracts and pharmacological activities, pharmaceuticals related projects and analytical projects.
- The members of the committee assigned the faculty to guide the students to perform real time projects related to drug design and drug development

### Agenda Item 5:

Research works on Plant extracts and their Pharmacological action

#### Resolution:

- Dr.M.B.V.RAJU Principal advised the faculty members to publish atleast one research Paper per semester in High Indexed Journal. The entire remaining faculty were suggested to publish one paper in Scopus journal



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- Mr. A. Nanaji advised all the faculty members to attend the FDP programs every year.
- Ms. D. Purnima Yadav advised all the faculty members to register in APTI.

### Agenda Item 6:

Training and placements with respect to Multinational Pharmaceutical Industry needs

#### Resolution:

- The Principal, AIPS staff members discussed and took a resolution and informed and the faculty members to implement the following from the academic year:
- Students who cleared all the subjects and secured CGPA above 7 should enroll for GPAT Programme
- Students who cleared all the subjects and obtained CGPA between 6-7 should enroll for PGECET programme.
- All the remaining students should attend CRT classes conducted by the college.
- The coordinator Y. Pavani informed the faculty members to organize various activities in the form of Competitions, Guest lectures, Career guidance, Entrepreneurship programmes etc for the students to improve their knowledge, skills and keep them abreast with the changing demands of the industries.

### Agenda Item 7:

Industrial Visits to formulation Pharmaceutical Industries

#### Resolution:

- Mr. A. Naga Srinivas proposed an idea of organizing regular industrial visits for the students in reputed multinational Pharmacy industries like Pfizer, Aurabindo, Dr.Reddys Laboratories, DIVIS Laboratories.
- To acquire knowledge on the working of men and machinery in different pharma industries.

Mr. S.Rama Krishna, suggested for arranging at least two guest lecturers to students in a Semester.

### Agenda Item 8:

Sports/NSS Activities

#### Resolution

- Mr.D.Koteswara Rao proposed organizing Sports activities for the students and encourages the students to participate in competitions at the university, state or national level

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

tournaments.

- He also informed the faculty members to conduct various technical events and NSS activities like Blood donation camps, Plantation drive, Swachh Bharat Campaign, Health check-up programs etc.

### Agenda Item 9:

Any other Issues

#### Resolution:

- The IQAC coordinator instructed all the staff members to maintain updated stock registers, Maintenance registers, Complaint registers etc of all the laboratories duly verified by the committee.
- It was also resolved after the discussion and should follow IQAC Audit Action Taken Report.

#### List of DAC members attended:

S.No	Name	Designation	Signature
1.	Dr. M. B. V. Raju	Principal	
2.	Mr. V. Uma Sankar	HOD- Department of Pharmacy	
3.	Mr.A.Nanaji	Associate Professor	
4.	Ms.D.Purnima Yadav	Associate Professor	
5.	Mr.Bhargav Krishna Raju	Associate Professor	
6.	Mr. V.H.S.Reddy	Associate Professor	
7.	Mr.M.Vasu	Associate Professor	
8.	Mr.Vamsi Krishna Yadav	Associate Professor	
9.	Ms.B.Mehree Jyothi	Assistant Professor	
10.	Mrs. Y. Anveshi Dhanunjaya	Assistant Professor	



Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**DEPARTMENT OF PHARMACY PRACTICE**

**CIRCULAR**

Date: 02-06-2022

This is to inform that the Department Academic Committee (DAC) will be held on 09<sup>th</sup> June 2022 10:30AM at Principal Sir's chamber.

**Agenda:**

1. Preparation of department academic calendar of 2022-23
2. Hospital training and Hospital visits
3. Clinical Project works
4. Community centers correlated training
5. Placement in Pharma - IT Sector Companies.
6. Value added courses
7. Research works
8. Sports/NSS activities
9. Any other issues

**Agenda Item 1:**

Preparation of Department progress for the academic year 2022-23

**Resolution:**

- HOD Pharmacy Practice analysed the results of Pharm.D 2021-2022 academic year and expressed satisfaction for getting more than 85% of pass percentage.
- Committee congratulated the faculty who met the target of 90% or more.



**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## Agenda Item 2:

Hospital training and Hospital visits

### Resolution:

- Mr.V.Uma sankar suggested faculty to train the students to participate in bed side learning.
- Dr.V.C.Randeep Raj proposed an idea of organizing regular hospital visits for the students in reputed hospitals like K.G.H & MIMS.

## Agenda Item 3:

Clinical Project works:

### Resolution:

The members suggested that every student should complete atleast one clinical project which includes both cases and controls

## Agenda Item 4

Community centers correlated training

### Resolution:

The members of the committee assigned the Pharmacy practice faculty to guide the students to participate in community center correlated training such as B.P monitoring, Glucose monitoring.

## Agenda Item 5:

Placement in Pharma – IT Sector Companies:

### Resolution:

- The Principal, AIPS staff members discussed and took a resolution and informed and the faculty members to implement the following from the academic year:
- Students should attend CRT classes conducted by the college.
- The coordinator Dr. V. C. Randeep Raj informed the faculty members to organize various activities in the form of Competitions, Guest lectures, Career guidance, Entrepreneurship programmes etc for the students to improve their knowledge, skills and keep them abreast with the changing demands of the industries.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## Agenda Item 6:

Value added courses

### Resolution:

The members of the committee have been proposed that value added courses related to clini-SAP, clinical research, Pharmacovigilance should be included in each department though its not included in the curriculum as it finds important for the development and employability of the students.

## Agenda Item 7:

Research works

### Resolution:

- Dr. T. Rushi advised the faculty members to publish atleast one research paper per semester in High Indexed Journal. The entire remaining faculty were suggested to publish one paper in Scopus journal

## Agenda Item 8:

Sports/NSS activities

### Resolution:

- Mr.D.Koteswara Rao proposed organizing Sports activities for the students and encourages the students to participate in competitions at the university, state or national level tournaments.
- Dr.T.Rushi also informed the faculty members to conduct various technical events and NSS activities like Blood donation camps, Plantation drive, Swacch Bharat Campaign, Health check-up programs etc.

## Agenda Item 9:

Any other Issues

### Resolution:

- The IQAC coordinator instructed all the staff members to maintain updated stock registers, Maintenance registers, and Complaint registers of all the laboratories duly verified by the committee.
- It was also resolved after the discussion and should follow IQAC Audit Action Taken Report



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162


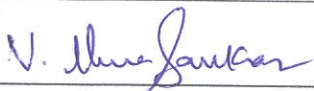

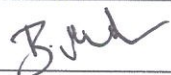

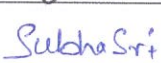

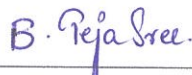

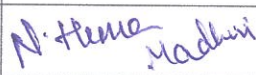


## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### List of DAC members attended:

S.No	Name	Designation	Signature
1.	Dr. M. B. V. Raju	Principal	
2.	Mr. V. Uma Sankar	HOD- Department of Pharmacy Practice	
3.	Dr.V.C.Randeep Raj	Associate Professor	
4.	Dr.B.Manoj Kumar	Associate Professor	
5.	Dr.T.Rushi	Assistant Professor	
6.	Dr.D.Subha Sri	Assistant Professor	
7.	Dr.A.Jyotsna	Assistant Professor	
8.	Dr.B.Tejasree	Assistant Professor	
9.	Dr.Naga Phani Sharma	Assistant Professor	
10.	Dr.N.Hema Madhuri	Assistant Professor	



  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## DEPARTMENT OF PHARMACY

Ref:AIPS/B.PHARM/PAC/Cir/2022-23/01

Date: 16-08-2022

### CIRCULAR

Members of the **Program Assessment Committee (PAC)** are requested to attend a meeting at **2:00 PM** on **22<sup>nd</sup> August 2022** in the HOD's chamber.

#### Agenda:

1. Review on CO-PO attainment level in the academic year 2021-2022.
2. Spreading of Vision, Mission of the department.
3. Explanation of CO, PO and PSOs to the newly appointed faculty members and discussion on lab COs attainment level.
4. Attainment of CO-PO-PSO & measures taken for continuous improvement.
5. Program effectiveness.
6. Faculty and student's motivation and participation.
7. Activities leading to Quality improvement.
8. Curriculum gap identification.
9. The verification of lab maintenance record and equipment's.
10. Remedial classes schedule for 2022-2023 first semester.
11. Add-on Courses Schedule

#### Copy To:

1. Principal Office
2. HOD Office
3. PAC Member



  
**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## DEPARTMENT OF PHARMACY

Ref:AIPS/B.PHARM/PAC/Cir/2022-23/01

Date: 16-08-2022

### MINUTES OF PAC MEETING

A meeting of Program assessment committee (PAC) was held in HOD's chamber at 2:00 P.M on 22<sup>nd</sup> August 2022. The following members were present.

S.No	Name	Designation	Category
1.	Dr.M.Pavani	Head of the Department	Chair Person
2.	Ms.D.Purnima Yadav	Department PAC Coordinator	Member
3.	Mr.A.Nanaji	Exam Cell Coordinator	Member
4.	Mrs.Y.AnveshiDhanunjaya	Student Mentoring Coordinator	Member
5.	Mrs.B.MeherJyothi	Attendance Coordinator	Member
6.	Dr.M.Pavani	M.Pharm Coordinator	Member

#### Review on Action taken in Previous Meeting:

- Chairperson presented the earlier meeting action report

S.No	Agenda Points	Action Taken
1.	Analysis of CO,PO and PSO attainment level	CO,PO and PSO attainments for all the courses is verified and discussed to improve attainment levels



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## Minutes of Meeting:

### Item-1:

- Review on CO-PO attainment level in the academic year 2021-2022.

### Resolution:

- HOD PHARMACY discussed and observed the CO-PO attainment target levels of the previous year and directed the faculty members concerned to take appropriate steps to attain satisfactory levels.
- HOD PHARMACY apprised the faculty members to involve students in knowledge up gradation programs like Workshops, seminars, guest lectures etc, for the it was also suggested to organize various training programs in soft skills to improve the confidence levels, leadership qualities, team working, creative skills etc, of the students.

### Item-2:

- Spreading of Vision, Mission of the department.

### Resolution:

- HOD PHARMACY briefed the process followed in evolving vision and mission and also presented the relation between vision and mission with institute and department and explained the process of spreading and publicizing of vision and mission through website and through stack holders etc.

### Item-3:

- Explanation of CO,PO and PSOs to the newly appointed faculty members and discussion on lab COs attainment level

### Resolution:

- HOD PHARMACY directed the senior faculty members to explain and train the newly appointed faculty members about COs, POs and PSOs.
- HOD PHARMACY instructed the faculty members to provide the knowledge and information to the students regarding laboratory course objectives, outcomes and ways of achieving it.

### Item-4:

- Attainment of CO-PO-PSO & measures taken for continuous improvement

### Resolution:



  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal,  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- The attainment of CO, PO & PSOs for all the courses was verified and discussions to improve attainments levels were carried out.
- In addition Academic performance, suggestions to improve PO & PSOs attainments are discussed and it was proposed to conduct guest lectures and seminars to create OBE awareness.
- Learning activities conducted by the faculty in the previous semester was analyzed and appreciated by the HOD.

## Item-5:

- Program Effectiveness

## Resolution:

- Mr. Bhargav Krishna Raju, process and followed to improve Quality Teaching Learning process Methodologies to support weak students and encourage bright students.
- He also discussed to identify curriculum gaps, content beyond the syllabus in process implementation for attaining the program outcomes and program specific outcomes.

## Item-6:

- Faculty and student's motivation and participation

## Resolution:

- Members of PAC suggested that department must have a plan for every semester to improve the academic result and placements.
- The students should be motivated to do multidisciplinary projects during their course of study which will enhance their understanding of multidisciplinary subjects.
- The students must be encouraged to participate in project exhibitions, which will create a project based learning environment inside the campus.

## Item-7:

- Activities leading Quality improvement.

## Resolution:

- Association activities should be organized and conducted by the students. It will help in not only belongingness to the college but also their leadership qualities.
- Effective Student mentoring through a separate hour.
- Industrial visit can be arranged in the MOU signed industries / organizations.

  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences



Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## Item-8:

- Curriculum gap identification

### Resolution:

- Discussed to instruct the students to register in Swayam, NPTEL online courses to reduce the gap between academic and industry.
- HOD-PHARMACY proposed to organize regular industrial visits for the students in reputed Organizations like Pfizer, AUROBINDO.

## Item-9:

- The verification of lab maintenance records and equipment's.

### Resolution:

- Mr.M.Vasu has been appointed as Department Overall Lab in-charge to find the required maintenance and to purchase the required equipment.
- The Lab technicians were asked to verify the minimum Lab requirements such as manuals, equipment login books to ensure the smooth functioning of Lab experiments for the coming semester.
- A discussion on the new labs introduced as per the current regulation for the next semester was carried out.
- Suggested maintaining lab manuals according to university.
- The conduction of experiments beyond the syllabus in the respective labs to enhance the practical knowledge of students.

## Item-10:

- Remedial classes schedule for 2022-2023 first semester

### Resolution:

- Mrs.M.Venkata Naga Deepika has been appointed as Remedial class's in-charge to identify the underperforming students with their semester results.
- After completion of mid I exams, remedial classes are going to conduct for slow learners based on their performance in mid exams.
- A proposal was mooted to conduct extra classes and remedial classes to slow learners with an aim to improve the pass percentage.



  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## Item-11:

- Add-on courses

## Resolution:

- PAC discussed the schedule of Add-on courses , proposed to be conducted in semester –I ,II and IV B.Pharmacy students.
- Based on the Add-on courses options given by the students, the courses will be according scheduled.
- Some faculty members suggested starting of courses like Medical coding, Pharmacovigilance, Clinical SAS.
- Swayam, NPTEL, APSCHE training program were recommended.

## Venue: HOD'S Cabin

S.NO	Name	Signature
1.	Dr.M.Pavani HOD Pharmacy	M. pavani
2.	Ms.D.Purnima Yadav Department PAC Coordinator	D. Purnima
3.	Mr.Ch.Madhu Exam Cell Coordinator	Ch. Madhu
4.	Mrs.Y.Anveshi Dhanunjaya Student Mentoring Coordinator	Dhanunjaya
5.	Mrs.B.Meher Jyothi Attendance Coordinator	B. meher jyothi
6.	Dr.G.Prashanti M.Pharm Coordinator	G. Prashanti

M. pavani  
HOD Pharmacy



Principal

PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences





**DEPARTMENT OF PHARMACY**

**Ref:AIPS/B.PHARM/PAC/Cir/2022-23/01**

**Date: 09-02-2023**

**CIRCULAR**

This is to inform that a meeting will be held for the Members of the Program Assessment Committee (PAC) in the HOD's chamber on date 2023 at 2:00 P.M. All the members are requested to attend the meeting without fail.

**Agenda:**

1. Teaching Learning methods practiced.
2. Result Analysis.
3. Assessment methods, attainment of COs, Pos, with program effectiveness.
4. Training and placement progress with feedback from recruiters.
5. Report on program activities and status.
6. Industrial training and Internships.
7. Students's participation in co curricular and extracurricular activities.
8. Faculty Research and publications and participation in FDP's, seminars. Workshops etc.
9. Add-on Courses Schedule.

**Copy To:**

1. Principal Office
2. HOD Office
3. PAC Member



  
**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**DEPARTMENT OF PHARMACY**

**Ref:AIPS/B.PHARM/PAC/Cir/2022-23/01**

**Date:14-02-2023**

**MINUTES OF PAC MEETING**

A meeting of Program assessment committee (PAC) was held in HOD's chamber at 2:00 P.M on date 2022. The following members were present.

S.No	Name	Designation	Category
1.	Dr.M.Pavani	Professor & Head of the Department	Chair Person
2.	Mrs.B.Chaitanya	Training and Placement Coordinator	Member
3.	Ms.D.Purnima Yadav	Department PAC Coordinator	Member
4.	Mrs.Y.AnveshiDhanunjaya	Student MentoringCoordinator	Member
5.	Mrs.B.MeherJyothi	Attendance Coordinator	Member
6.	Mr.Ch.Madhu	Exam Cell Coordinator	Member
7.	Mr.A.Nanaji	Project Coordinator	Member
8.	Dr.G.Prashanti	M.Pharm Coordinator	Member

**Review on Action taken in Previous Meeting:**

- Welcome to our beloved Chairperson Dr.M.B.Venkatapathi Raju Garu to review the action taken in previous meeting.
- Committee discussed about recently announced B.Pharmacy II semester and IV semester results
- Chairperson expressed satisfaction for getting > 80% of results.
- Committee discussed about minor changes in course outcome of B.Pharmacy final semester Elective subjects.

S.No	Agenda Points	Action Taken
1.	Analysis of CO,PO and PSO attainment level	CO,PO and PSO attainments for all the courses is verified and discussed to improve attainment levels



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## Minutes of Meeting:

### Item-1:

- Teaching and Learning methods practiced.

### Resolution:

- PAC members suggested that every faculty practice innovative ideas of teaching that can be updated periodically.
- The Outcome of the FDP Participation can be shared with other faculty members in the department.
- The rubrics can be formed for the evaluation of the assignments and tutorials.
- The knowledge gained from online courses completed by faculty should be disseminated to the students.
- The identified curriculums gap and fulfillment of the same can be documented in the course file.

### Item-2:

- Result Analysis.

### Resolution:

- Class wise results were presented and department wise comparisons were also done.
- The results for the results in some subjects are need to be analyzed.
- The class mentors are requested to closely interact with students during the mentor meetings and identify the difficulties faced by them in learning subjects.
- The faculty members are advised to identify the follow effective teaching learning methods for improvement of academic performance.
- Members suggested to get the feedback from the students for poor results and based on that remedial action can be planned.
- Faculty members are requested to analyze internal and external factors influencing the performance of their subject and based on that plan should prepared to improve performance of students.

### Item-3:


- Assessment methods, attainment of COs, POs, with program effectiveness.

### Resolution:

- The reasons for decrease in attainment level of few subjects can be analyzed and the result can be discussed with faculty members who is currently taking the course.

Avanthi Institute of Pharmaceutical Sciences



  
**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- The faculty members can provide the reasons behind the decrease in the attainment level for few subjects and the remedial actions can be suggested.
- The CO calculations for odd semester can be filed in the corresponding course files.
- The members insisted to check the attainment of PO6 and PO7 measures taken by the faculty members to attain PO6 and PO and must be recorded properly.

## Item-4:

- Training and placement progress with feedback from recruiters.

## Resolution:

- It has been suggested to collect feedback given by the employers specific to the PHARM.D department, analyze the same and provide the reports.
- Members asked to provide the actions taken based on feedback and suggested to implement those actions for the current final year students.
- Members suggested to display the placed students in various places of the department.
- Insisted to motivate the II and III year students to participate in virtual internship training.
- Suggested to include department faculty in the group discussion and mock interviews along with English faculty.
- The appointment orders of the current passed students should be collected and filled properly.

## Item-5:

- Report on program activities and status

## Resolution:

- Members suggested executing all the planned activities without fail and the benefits received by the students should be recorded.
- The members advised to publish the activities and events organized by the department in the respective newsletters and college website.

## Item-6:

- Internships.

## Resolution:

- The students must undergo one internship during the course of study and hence members advised to check the status of the final year students and encourage them to undergo the training in Hospital.

Avanthi Institute of Pharmaceutical Sciences



**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## Item-7:

- Student's participation in co curricular and extracurricular activities.

## Resolution:

- Members suggested to consolidate the number of events participated by students and the number of prizes won by the students.
- The student's publications need to be properly tracked by the faculty members and should be documented.
- The certificates of recent online courses completed by the students should be collected.

## Item-8:

- Faculty Research and publications and participations in FDP's, seminars, workshops etc.

## Resolution:

- HOD – PHARM.D advised the faculty members to attend at least one FDP organized by AICTE/ Universities and informed each and every faculty to enroll in NPTEL courses and to complete certification.
- He further stated about the provision of research incentives to the faculty involved in Research and Development activities as per the Research Promotion Policy of the college in order to promote research culture and to encourage faculty to involve in research activities.
- Discussions were carried out on the learning activities conducted by the faculty members in the last year.

## Item-9:

- Add –on Courses Schedule.

## Resolution:

- PAC discussed the schedule of Add- on courses, proposed to be conducted for I & III PHARM.D students
- Based upon the Add – on courses options given by the students, the courses will be accordingly scheduled.
- Some faculty members suggested starting of courses like Clinical SAS programming, Pharmacovigilance and Medical coding.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- Some faculty members suggested starting of courses like Clinical SAS programming, Pharmacovigilance and Medical coding.

Venue: HOD's Cabin

S.No	Name	Signature
1.	Dr.M.Pavani Professor&Head of the Department	M. pavani
2.	Mrs.B.Chaitanya Training and Placement Coordinator	B. chaitanya
3.	Ms.D.PurnimaYadav Department PAC Coordinator	D. Purnima
4.	Mrs.Y.Anveshi Dhanunjaya Student Mentoring Coordinator	Dhanunjaya
5.	Mrs.B.Meher Jyothi Attendance Coordinator	B. Meher Jyothi
6.	Mr.Ch.Madhu Exam Cell Coordinator	Ch
7.	Mr.A.Nanaji Project Coordinator	Nanaji
8.	Dr.G.Prashanti M.Pharm Coordinator	G. Prashanti



  
PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## DEPARTMENT OF PHARMACY PRACTICE

Ref:AIPS/PHARM.D/PAC/Cir/2022-23/01

Date: 18-08-2022

### MINUTES OF PAC MEETING

A meeting of Program assessment committee (PAC) was held in HOD's chamber at 10:00 A.M on 18<sup>th</sup> August 2022. The following members were present.


S.No	Name	Designation	Category
1.	Mr.V.Uma Sankar	Professor & Head of the Department	Chair Person
2.	Dr.V.C.Randeep Raj	Training and Placement Coordinator	Member
3.	Dr.B.Tejasree	Department PAC Coordinator	Member
4.	Dr.T.Rushi	Student Mentoring Coordinator	Member
5.	Dr.B.Manoj Kumar	Attendance Coordinator	Member
6.	Mr.Ch.Madhu	Exam Cell Coordinator	Member

### Review on Action taken in Previous Meeting:

Welcome to our beloved Chairperson Dr.V.Uma Sankar Garu to review the action taken in previous meeting. Chairperson presented the earlier meeting action report

S.No	Agenda Points	Action Taken
1.	Analysis of CO,PO and PSO attainment level	CO,PO and PSO attainments for all the courses is verified and discussed to improve attainment levels



  
**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## Minutes of Meeting:

### Item-1:

- Teaching and Learning methods practiced.

### Resolution:

- PAC members suggested that every faculty practice innovative ideas of teaching that can be updated periodically.
- The Outcome of the FDP Participation can be shared with other faculty members in the department.
- The rubrics can be formed for the evaluation of the assignments and tutorials.
- The knowledge gained from online courses completed by faculty should be disseminated to the students.
- The identified curriculums gap and fulfillment of the same can be documented in the course file.

### Item-2:

- Result Analysis.

### Resolution:

- Class wise results were presented and department wise comparisons were also done.
- The results for the results in some subjects are need to be analyzed.
- The class mentors are requested to closely interact with students during the mentor meetings and identify the difficulties faced by them in learning subjects.
- The faculty members are advised to identify the follow effective teaching learning methods for improvement of academic performance.
- Members suggested to get the feedback from the students for poor results and based on that remedial action can be planned.
- Faculty members are requested to analyze internal and external factors influencing the performance of their subject and based on that plan should prepared to improve performance of students.

### Item-3:

- Assessment methods, attainment of COs, POs, with program effectiveness.

### Resolution:

- The reasons for decrease in attainment level of few subjects can be analyzed and the result can be discussed with faculty members who is currently taking the course.

  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences



Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- The faculty members can provide the reasons behind the decrease in the attainment level for few subjects and the remedial actions can be suggested.
- The CO calculations for odd semester can be filed in the corresponding course files.
- The members insisted to check the attainment of PO6 and PO7 measures taken by the faculty members to attain PO6 and PO and must be recorded properly.

## Item-4:

- Training and placement progress with feedback from recruiters.

## Resolution:

- It has been suggested to collect feedback given by the employers specific to the PHARM.D, analyze the same and provide the reports.
- Members asked to provide the actions taken based on feedback and suggested to implement those actions for the current final year students.
- Members suggested to display the placed students in various places of the department.
- Insisted to motivate the II and III year students to participate in virtual internship training.
- Suggested to include department faculty in the group discussion and mock interviews along with English faculty.
- The appointment orders of the current passed students should be collected and filled properly.

## Item-5:

- Report on program activities and status

## Resolution:

- Members suggested executing all the planned activities without fail and the benefits received by the students should be recorded.
- The members advised to publish the activities and events organized by the department in the respective newsletters and college website.

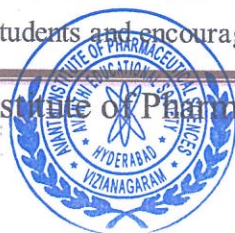
## Item-6:

- Internships.

## Resolution:

- The students must undergo one internship during the course of study and hence members advised to check the status of the final year students and encourage them to undergo the training in Hospital.

Avanthi Institute of Pharmaceutical Sciences



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## Item-7:

- Student's participation in co curricular and extracurricular activities.

## Resolution:

- Members suggested to consolidate the number of events participated by students and the number of prizes won by the students.
- The student's publications need to be properly tracked by the faculty members and should be documented.
- The certificates of recent online courses completed by the students should be collected.

## Item-8:

- Faculty Research and publications and participations in FDP's, seminars, workshops etc.

## Resolution:

- HOD – PHARM.D advised the faculty members to attend at least one FDP organized by AICTE/ Universities and informed each and every faculty to enroll in NPTEL courses and to complete certification.
- He further stated about the provision of research incentives to the faculty involved in Research and Development activities as per the Research Promotion Policy of the college in order to promote research culture and to encourage faculty to involve in research activities.
- Discussions were carried out on the learning activities conducted by the faculty members in the last year.

## Item-9:

- Add –on Courses Schedule.

## Resolution:

- PAC discussed the schedule of Add- on courses, proposed to be conducted for - I & III PHARM.D
- Based upon the Add – on courses options given by the students, the courses will be according scheduled.
- Some faculty members suggested starting of courses like Clinical SAS programming, Pharmacovigilance and Medical coding.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Venue: HOD's Cabin

S.NO	Name	Signature
1.	Mr.V.Uma Sankar Professor & Head of the Department	V. Uma Sankar
2.	Dr.V.C.Randeep Raj Training and Placement Coordinator	Dr. V.C. Randeep Raj
3.	Dr.B.Tejasree Department PAC Coordinator	B. Tejasree.
4.	Dr.T.Rushi Student Mentoring Coordinator	Dr. T. Rushi
5.	Dr.B.Manoj Kumar Attendance Coordinator	B. Manoj Kumar
6.	Mr.Ch.Madhu Exam Cell Coordinator	Ch. Madhu



  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## DEPARTMENT OF PHARMACY PRACTICE

Ref:AIPS/PHARM.D/PAC/Cir/2022-23/01

Date: 10-11-2023

### MINUTES OF PAC MEETING

A meeting of Program assessment committee ( PAC) was held in HOD's chamber at 10:00 A.M on 12<sup>th</sup> Feb2023. The following members were present.

S.No	Name	Designation	Category
1.	Mr.V.Uma Sankar	Professor&Head of the Department	Chair Person
2.	Dr.V.C.Randeep Raj	Training and Placement Coordinator	Member
3.	Dr.B.Tejasree	Department PAC Coordinator	Member
4.	Dr.T.Rushi	Student MentoringCoordinator	Member
5.	Dr.B.Manoj Kumar	Attendance Coordinator	Member
6.	Mr.Ch.Madhu	Exam Cell Coordinator	Member
7.	Dr.A.Jyotsna	Project Coordinator	Member
8.	Dr.D.Subhasree	Pharm.D Coordinator	Member

### Review on Action taken in Previous Meeting:

Chairperson presented the meeting action report.

S.No	Agenda Points	Action Taken
1.	Analysis of CO,PO and PSO attainment level	CO,PO and PSO attainments for all the courses is verified and discussed to improve attainment levels



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## Minutes of Meeting:

### Item-1:

- Teaching and Learning methods practiced.

### Resolution:

- PAC members suggested that every faculty practice innovative ideas of teaching that can be updated periodically.
- The Outcome of the FDP Participation can be shared with other faculty members in the department.
- The rubrics can be formed for the evaluation of the assignments and tutorials.
- The knowledge gained from online courses completed by faculty should be disseminated to the students.
- The identified curriculums gap and fulfillment of the same can be documented in the course file.

### Item-2:

- Result Analysis.

### Resolution:

- Class wise results were presented and department wise comparisons were also done.
- The results for the results in some subjects are need to be analyzed.
- The class mentors are requested to closely interact with students during the mentor meetings and identify the difficulties faced by them in learning subjects.
- The faculty members are advised to identify the follow effective teaching learning methods for improvement of academic performance.
- Members suggested to get the feedback from the students for poor results and based on that remedial action can be planned.
- Faculty members are requested to analyze internal and external factors influencing the performance of their subject and based on that plan should prepared to improve performance of students.

### Item-3:

- Assessment methods, attainment of COs, POs, with program effectiveness.

### Resolution:

- The reasons for decrease in attainment level of few subjects can be analyzed and the result can be discussed with faculty members who is currently taking the course.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- The faculty members can provide the reasons behind the decrease in the attainment level for few subjects and the remedial actions can be suggested.
- The CO calculations for odd semester can be filed in the corresponding course files.
- The members insisted to check the attainment of PO6 and PO7 measures taken by the faculty members to attain PO6 and PO and must be recorded properly.

#### Item-4:

- Training and placement progress with feedback from recruiters.

#### Resolution:

- It has been suggested to collect feedback given by the employers specific to the B.PHARMACY department, analyze the same and provide the reports.
- Members asked to provide the actions taken based on feedback and suggested to implement those actions for the current final year students.
- Members suggested to display the placed students in various places of the department.
- Insisted to motivate the II and III year students to participate in virtual internship training.
- Suggested to include department faculty in the group discussion and mock interviews along with English faculty.
- The appointment orders of the current passed students should be collected and filled properly.

#### Item-5:

- Report on program activities and status

#### Resolution:

- Members suggested executing all the planned activities without fail and the benefits received by the students should be recorded.
- The members advised to publish the activities and events organized by the department in the respective newsletters and college website.

#### Item-6:

- Industrial training and Internships.

#### Resolution:

- The students must undergo one internship during the course of study and hence members advised to check the status of the final year students and encourage them to undergo the training in online.

**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences



Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- Members suggested to incorporate industrial training outcomes as a quantitative measure in outcome attainment.

## Item-7:

- Student's participation in co curricular and extracurricular activities.

## Resolution:

- Members suggested to consolidate the number of events participated by students and the number of prizes won by the students.
- The student's publications need to be properly tracked by the faculty members and should be documented.
- The certificates of recent online courses completed by the students should be collected.

## Item-8:

- Faculty Research and publications and participations in FDP's, seminars, workshops etc.

## Resolution:

- HOD - PHARMACY advised the faculty members to attend at least one FDP organized by AICTE/ Universities and informed each and every faculty to enroll in NPTEL courses and to complete certification.
- He further stated about the provision of research incentives to the faculty involved in Research and Development activities as per the Research Promotion Policy of the college in order to promote research culture and to encourage faculty to involve in research activities.
- Discussions were carried out on the learning activities conducted by the faculty members in the last semester.

## Item-9:

- Add –on Courses Schedule.

## Resolution:

- PAC discussed the schedule of Add- on courses, proposed to be conducted in semester - I for III B.Pharmacy students.
- Based upon the Add – on courses options given by the students, the courses will be according scheduled.



  
**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Venue: HOD's Cabin

S.NO	Name	Signature
1.	Mr.V.Uma Sankar Professor & Head of the Department	V. Uma Sankar
2.	Mr.V.C.Randeep Raj Training and Placement Coordinator	V.C. Randeep Raj
3.	Mrs.B.Tejasree Department PAC Coordinator	B. Teja Sree
4.	Mr.T.Rushi Student Mentoring Coordinator	T. Rushi
5.	Mr.B.Manoj Kumar Attendance Coordinator	B. Manoj Kumar
6.	Mr.Ch.Madhu Exam Cell Coordinator	Ch. Madhu
7.	Dr.A.Jyotsna Project Coordinator	A. Jyotsna
8.	Dr.D.Subhasree Pharm.D Coordinator	D. Subhasree



  
Principal  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Website: www.jntuk.edu.in  
Email: dap@jntuk.edu.in



Phone: 7032894555

**Directorate of Academics and Planning**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

KAKINADA-533003, Andhra Pradesh, INDIA

(Established by AP Government Act No. 30 of 2008)

Lr. No. JNTUK/DAP/AC/I Year/B. Pharmacy/2022-23

Date: 24-12-2022

**Dr. KVSG Murali Krishna,**

M.E., Ph.D.,

**Director, Academics & Planning**

**JNTUK, Kakinada**

To

All the Principals of Affiliated Colleges,

JNTUK, Kakinada.

**Academic Calendar of I Year B. Pharmacy for Academic year 2022-23**

I SEMESTER			
Description	From	To	Weeks
Commencement of Class Work	26.12.2022		
	26.12.2022	14.01.2023	3 W
I Unit of Instruction	16.01.2023	11.03.2023	8 W
I Mid Examinations	06.03.2023	11.03.2023	
II Unit of Instructions	13.03.2023	06.05.2023	8 W
II Mid Examinations	01.05.2023	06.05.2023	
Preparation & Practicals	08.05.2023	13.05.2023	1 W
End Examinations	15.05.2023	27.05.2023	2 W
Commencement of II Semester Class Work	29.05.2023		
II SEMESTER			
Commencement of Class Work		29.05.2023	
I Unit of Instruction	29.05.2023	22.07.2023	8 W
I Mid Examinations	17.07.2023	22.07.2023	
II Unit of Instructions	24.07.2023	16.09.2023	8 W
II Mid Examinations	11.09.2023	16.09.2023	
Preparation & Practicals	18.09.2023	23.09.2023	1 W
End Examinations	25.09.2023	07.10.2023	2 W

**Director**  
**Academics & Planning**  
**JNTUK Academic Planning**  
**JNTUK Kakinada**

Copy to the Secretary to the Hon'ble Vice Chancellor, JNTUK

Copy to PA to the Rector, JNTUK

Copy to PA to the Registrar, JNTUK

Copy to Director Academic Audit, JNTUK

Copy to Director of Evaluation, JNTUK



**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Website: www.jntuk.edu.in  
Email: dap@jntuk.edu.in



Phone: 7032894555

**Directorate of Academics and Planning**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

KAKINADA-533003, Andhra Pradesh, INDIA

(Established by AP Government Act No. 30 of 2008)

Lr. No. JNTUK/DAP/AC/II Year/B. Pharmacy/2022-23

Date: 02-11-2022

**Dr. KVSG Murali Krishna,**

M.E. Ph.D.

**Director, Academics & Planning  
JNTUK, Kakinada**

To

All the Principals of Affiliated Colleges,  
JNTUK, Kakinada.

**Academic Calendar of II Year B. Pharmacy for Academic year 2022-23**

I SEMESTER			
Description	From	To	Weeks
Commencement of Class Work	08.11.2022		
I Unit of Instruction	08.11.2022	31.12.2022	8W
I Mid Examinations	26.12.2022	31.12.2022	
II Unit of Instructions	02.01.2023	25.02.2023	8W
II Mid Examinations	20.02.2023	25.02.2023	
Preparation & Practicals	27.02.2023	04.03.2023	1W
End Examinations	06.03.2023	18.03.2023	2W
Commencement of II Semester Class Work	20.03.2023		
II SEMESTER			
Commencement of Class Work	20.03.2023		
I Unit of Instruction	20.03.2023	13.05.2023	8W
I Mid Examinations	08.05.2023	13.05.2023	
II Unit of Instructions	15.05.2023	08.07.2023	8W
II Mid Examinations	03.07.2023	08.07.2023	
Preparation & Practicals	10.07.2023	15.07.2023	1W
End Examinations	17.07.2023	29.07.2023	2W

KVSG

**Director  
Academics & Planning**

**JNTUK  
Academic Planning  
JNTUK Kakinada**

Copy to the Secretary to the Hon'ble Vice Chancellor, JNTUK  
Copy to Rector, JNTUK  
Copy to Registrar, JNTUK  
Copy to Director Academic Audit, JNTUK  
Copy to Director of Evaluation, JNTUK



**PRINCIPAL**  
**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**Directorate of Academic Planning**  
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA  
KAKINADA-533003, Andhra Pradesh, INDIA  
(Established by AP Government Act No. 30 of 2008)

Lr. No. DAP/AC/III Year /B. Tech/B. Pharmacy/2022

Date 14.09.2022

**Dr. KVSG Murali Krishna,**  
M.E., Ph.D.,

**Director, Academic Planning**  
**JNTUK, Kakinada**

To  
All the Principals of Affiliated Colleges,  
JNTUK, Kakinada.

**Academic Calendar for III Year - B. Tech/B. Pharmacy for the AY 2022-23**  
**(2020-21 Admitted Batch)**


I SEMESTER			
Description	From	To	Weeks
Community Service Project	15.07.2022	30.07.2022	2W
I Unit of Instruction	01.08.2022	24.09.2022	8W
I Mid Examinations	26.09.2022	01.10.2022	1W
II Unit of Instructions	03.10.2022	26.11.2022	8W
II Mid Examinations	28.11.2022	03.12.2022	1W
Preparation & Practicals	05.12.2022	10.12.2022	1W
End Examinations	12.12.2022	25.12.2022	2W
Commencement of II Semester Class Work	02.01.2023		
II SEMESTER			
I Unit of Instructions	02.01.2023	25.02.2023	8W
I Mid Examinations	27.02.2023	04.03.2023	1W
II Unit of Instructions	06.03.2023	29.04.2023	8W
II Mid Examinations	01.05.2023	06.05.2023	1W
Preparation & Practicals	08.05.2023	13.05.2023	1W
End Examinations	15.05.2023	27.05.2023	2W

\* As per the APSCHE Guidelines Out of the Total 180 hours of Community Service Project leading to 4 Credits, two weeks will be offline and remaining project work can be done during the III-I semester weekends and holidays. The summer internship can be done in online cum offline during III-I and III-II semesters.

  
**Director,**  
**Academics & Planning, JNTUK**  
Director  
**Academic Planning**  
**JNTUK Kakinada**

Copy to the Secretary to the Hon'ble Vice Chancellor, JNTUK  
Copy to Rector, Registrar, JNTUK  
Copy to Director Academic Audit, JNTUK  
Copy to Director of Evaluation, JNTUK



  
**PRINCIPAL**  
**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**Directorate of Academic Planning**  
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA  
KAKINADA-533003, Andhra Pradesh, INDIA  
(Established by AP Government Act No. 30 of 2008)

Lr. No. DAP/AC/IV Year /B. Tech/B. Pharmacy/2022

Date 25.06.2022

**Dr. KVSG Murali Krishna,**  
M.E. Ph.D.,

**Director, Academic Planning**  
JNTUK, Kakinada

To  
All the Principals of Affiliated Colleges.  
JNTUK, Kakinada.

**Academic Calendar for IV Year - B. Tech/B. Pharmacy for the AY 2022-23**

I SEMESTER			
Description	From	To	Weeks
Commencement of Class Work	04.07.2022		
I Unit of Instruction	04.07.2022	27.08.2022	8W
I Mid Examinations	29.08.2022	03.09.2022	1W
II Unit of Instructions	05.09.2022	29.10.2022	8W
II Mid Examinations	31.10.2022	05.11.2022	1W
Preparation & Practicals	07.11.2022	12.11.2022	1W
End Examinations	14.11.2022	26.11.2022	2W
Commencement of II Semester Class Work	05.12.2022		
II SEMESTER			
I Unit of Instructions	05.12.2022	28.01.2023	8W
I Mid Examinations	30.01.2023	04.02.2023	1W
II Unit of Instructions	06.02.2023	01.04.2023	8W
II Mid Examinations	03.04.2023	08.04.2023	1W
Preparation & Practicals	10.04.2023	15.04.2023	1W
End Examinations	17.04.2023	29.04.2023	2W

*KVSG*  
Director, 25/6/22  
Academics & Planning,  
Director  
JNTUK Academic Planning  
JNTUK Kakinada

Copy to the Secretary to the Hon'ble Vice Chancellor, JNTUK  
Copy to Rector, Registrar, JNTUK  
Copy to Director Academic Audit, JNTUK  
Copy to Director of Evaluation, JNTUK



*for*  
**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**Directorate of Academic Planning**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

KAKINADA-533003, Andhra Pradesh, INDIA

(Established by AP Government Act No. 30 of 2008)

Lr. No. JNTUK/DAP/RAC/I Year/M.Pharmacy/2022-23

Date: 08-12-2022

Dr. KVSG Murali Krishna,

M.E., Ph.D.,

Director, Academic Planning

JNTUK, Kakinada

To

All the Principals of Affiliated Colleges.

JNTUK, Kakinada.

**Revised Academic Calendar of I Year M. Pharmacy  
Academic year 2022-23**

I SEMESTER			
Description	From	To	Weeks
Commencement of Class Work	12.12.2022		
Induction Classes	12.12.2022	17.11.2022	1W
I Unit of Instruction	19.12.2022	11.02.2023	8W
I Mid Examinations	06.02.2023	11.02.2023	
II Unit of Instructions	13.02.2023	08.04.2023	8W
II Mid Examinations	03.04.2023	08.04.2023	
Preparation & Practicals	10.04.2023	15.04.2023	1W
End Examinations	17.04.2023	29.04.2023	2W
Commencement of II Semester Class Work	01.05.2023		
II SEMESTER			
Commencement of Class Work	01.05.2023		
I Unit of Instructions	01.05.2023	24.06.2023	8W
I Mid Examinations	26.06.2023	24.06.2023	
II Unit of Instructions	26.06.2023	19.08.2023	8W
II Mid Examinations	14.08.2022	19.08.2023	
Preparation & Practicals	21.08.2023	26.08.2023	1W
End Examinations	28.08.2023	10.09.2023	2W
Commencement of Class Work	12.09.2023		

Director Academics & Planning

JNTUK Kakinada

Director  
Academic Planning  
JNTUK Kakinada

Copy to the Secretary to the Hon'ble Vice Chancellor, JNTUK

Copy to PA to the Rector, JNTUK

Copy to PA to the Registrar, JNTUK

Copy to Director Academic Audit, JNTUK

Copy to Director of Evaluation, JNTUK



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**Directorate of Academic Planning**  
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA  
KAKINADA-533003, Andhra Pradesh, INDIA  
(Established by AP Government Act No. 30 of 2008)

Lr. No. JNTUK/DAP/RAC/I Year/M.Tech/2022-23

Date: 14-12-2022

Dr. KVSG Murali Krishna,

M.E., Ph.D.,

Director, Academic Planning

JNTUK, Kakinada

To

All the Principals of Affiliated Colleges,

JNTUK, Kakinada.

**Revised Academic Calendar of I Year M. Tech/M. Pharmacy**  
**Academic year 2022-23**

I SEMESTER			
Description	From	To	Weeks
Commencement of Class Work	31.10.2022		
Induction Classes	31.10.2022	05.11.2022	1W
I Unit of Instruction	07.11.2022	31.12.2022	8W
I Mid Examinations	26.12.2022	31.12.2022	
II Unit of Instructions	02.01.2023	25.02.2023	8W
II Mid Examinations	20.02.2023	25.02.2023	
Preparation & Practicals	27.02.2023	04.03.2023	1W
End Examinations	06.03.2023	18.03.2023	2W
Commencement of II Semester Class Work	20.03.2023		
II SEMESTER			
Commencement of Class Work	20.03.2023		
I Unit of Instructions	20.03.2023	29.04.2023	6W
Summer Holidays	01.05.2023	27.05.2023	4W
Continue of I Unit of Instructions	29.05.2023	10.06.2023	2W
I Mid Examinations	05.06.2023	10.06.2023	
II Unit of Instructions	12.06.2023	05.08.2023	8W
II Mid Examinations	31.07.2022	05.08.2023	
Preparation & Practicals	07.08.2023	12.08.2023	1W
End Examinations	14.08.2023	26.08.2023	2W
Commencement of Class Work	04.09.2023		

KVSG  
14-12-22

Director Academics &amp; Planning

JNTUK Kakinada

Director

Academic Planning

JNTUK Kakinada

Copy to the Secretary to the Hon'ble Vice Chancellor, JNTUK

Copy to PA to the Rector, JNTUK

Copy to PA to the Registrar, JNTUK

Copy to Director Academic Audit, JNTUK

Copy to Director of Evaluation, JNTUK



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Website: www.jntuk.edu.in  
Email: dap@jntuk.edu.in



Phone: 7032894555

**Directorate of Academics & Planning**  
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA  
KAKINADA-533003, Andhra Pradesh, INDIA  
(Established by AP Government Act No. 30 of 2008)

Lr. No. JNTUK/DAP/AC/II Year/M.Pharmacy/2022-23

Date: 07-11-2022

Dr. KVSG Murali Krishna,  
M.E. Ph.D.,  
Director, Academics & Planning  
JNTUK, Kakinada

To  
All the Principals of Affiliated Colleges,  
JNTUK, Kakinada.

**Academic Calendar of II Year M. Pharmacy for Academic year 2022-23**

III & IV SEMESTER			
Description	From	To	Weeks
Commencement of Project Work	14.11.2022		
III Semester*	14.11.2022	15.04.2023	22 W
IV Semester	17.04.2023	16.09.2023	22 W
Thesis submission duration	18.09.2023	23.09.2023	1 W

\*Non-University examination, but department has to conduct internal mid-term examinations as per University norms. The student should get at least 50% marks in internal examinations to get satisfactory in the Research Methodology & Bio statics.

Director Academics and Planning  
Director  
Academic Planning  
JNTUK Kakinada

Copy to the Secretary to the Hon'ble Vice Chancellor, JNTUK  
Copy to Rector, JNTUK  
Copy to Registrar, JNTUK  
Copy to Director Academic Audit, JNTUK  
Copy to Director of Evaluation, JNTUK



PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Website: www.jntuk.edu.in

Email: dap@jntuk.edu.in



Phone: 7032894555

### Directorate of Academic Planning

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

KAKINADA-533003, Andhra Pradesh, INDIA

(Established by AP Government Act No. 30 of 2008)

Lr. No. JNTUK/DAP/AC/I Year/Pharm D/2022-23

Date: 24-12-2022

Dr. KVSG Murali Krishna,

M.E. Ph.D.,

Director, Academic Planning

JNTUK, Kakinada

To

All the Principals of Affiliated Colleges,

JNTUK, Kakinada.

#### Academic Calendar of I Year Pharm D for Academic year 2022-23

Description	From	To	Weeks
Commencement of Class Work	26.12.2022		
I Unit of Instruction	26.12.2022	11.03.2023	11W
I Mid Examinations	13.03.2023	18.03.2023	1W
II Unit of Instructions	20.03.2023	03.06.2023	11W
II Mid Examinations	05.06.2023	10.06.2023	1W
III Unit of Instructions	12.06.2023	26.08.2023	11W
III Mid Examinations	28.08.2023	02.09.2023	1W
Preparation & Practical Exams	04.09.2023	09.09.2023	1W
End Examinations	11.09.2023	23.09.2023	1W

Director Academics & Planning

JNTUK Kakinada

Director Academic Planning  
JNTUK Kakinada

Copy to the Secretary to the Hon'ble Vice Chancellor, JNTUK

Copy to PA to the Rector, JNTUK

Copy to PA to the Registrar, JNTUK

Copy to Director Academic Audit, JNTUK

Copy to Director of Evaluation, JNTUK



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Website: www.jntuk.edu.in  
Email: dap@jntuk.edu.in



Phone : 7032894555

**Directorate of Academics & Planning**  
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA  
KAKINADA-533003, Andhra Pradesh, INDIA  
(Established by AP Government Act No. 30 of 2008)

Lr. No. JNTUK/DAP/AC/ II,III,IV & V Years/Pharm D/2022

Date: 28-07-2022

Dr. KVSG Murali Krishna,  
M.E., Ph.D.,  
Director, Academics & Planning  
JNTUK, Kakinada

To  
All the Principals of Affiliated Colleges.  
JNTUK, Kakinada.

**Academic Calendar of II, III, IV and V Year Pharm D**  
**Academic year 2022-23**

Description	From	To	Weeks
Commencement of Class Work	01.08.2022		
Community Service Project	01.08.2022	13.08.2022	2W
I Unit of Instruction	15.08.2022	29.10.2022	11W
I Mid Examinations	31.10.2022	05.11.2022	1W
II Unit of Instructions	07.11.2021	21.01.2023	11W
II Mid Examinations	23.01.2023	28.01.2023	1W
III Unit of Instructions	30.01.2023	15.04.2023	11W
III Mid Examinations	17.04.2023	22.04.2023	1W
Preparation & Practical Exams	24.04.2023	29.04.2023	1W
End Examinations	01.05.2023	13.05.2023	2W
Commencement of next Year Class Work	05.06.2023		

\* As per the APSCHE Guidelines Out of the Total 180 hours of Community Service Project leading to 4 Credits, two weeks will be offline and remaining project work can be done during the III-I semester weekends and holidays.  
All the B. Tech, B. Pharmacy & Pharm D students admitted from 2020-21 onwards are supposed to do CSP (Community Service Project).

  
28/7/22  
Director Academic Planning

Director  
Academic Planning  
JNTUK Kakinada

Copy to the Secretary to the Hon'ble Vice Chancellor, JNTUK  
Copy to the Rector, JNTUK.  
Copy to the Registrar, JNTUK.  
Copy to Director Academic Audit, JNTUK.  
Copy to Director of Evaluation, JNTUK.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Website: www.jntuk.edu.in  
Email: dap@jntuk.edu.in



Phone: 7032894555

**Directorate of Academics & Planning**  
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA  
KAKINADA-533003, Andhra Pradesh, INDIA  
(Established by AP Government Act No. 30 of 2008)

Lr. No. JNTUK/DAP/AC/ II,III,IV & V Years/Pharm D/2022

Date: 28-07-2022

Dr. KVSG Murali Krishna,  
M.E, Ph.D.,  
Director, Academics & Planning  
JNTUK, Kakinada

To  
All the Principals of Affiliated Colleges,  
JNTUK, Kakinada.

**Academic Calendar of VI Year Pharm D**  
**Academic year 2022-23**

Description	Date
Commencement of Class Work for Internship	01.08.2022
Closing of Internship (12 Months)	29.07.2023

  
Director Academic Planning  
Director  
Academic Planning  
JNTUK Kakinada

Copy to the Secretary to the Hon'ble Vice Chancellor, JNTUK.  
Copy to the Rector, JNTUK.  
Copy to the Registrar, JNTUK.  
Copy to Director Academic Audit, JNTUK.  
Copy to Director of Evaluation, JNTUK.



  
**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### ACADEMIC CALENDAR FOR 2022 – 2023 B.PHARMACY

EVENT	I YEAR		II YEAR		III YEAR		IV YEAR	
EVENT	Sem I	Sem II	Sem I	Sem II	Sem I	Sem II	Sem I	Sem II
Commencement of class work	26-12-2022	29-05-2023	08-11-2022	20-03-2023	15-07-2022	02-01-2023	04-07-2022	05-12-2022
I Unit of Instruction	16-01-2023	29-05-2023	08-11-2022	20-03-2023	01-08-2022	02-01-2023	04-07-2022	05-12-2022
I Mid Examinations	06-03-2023	17-07-2023	26-12-2022	08-05-2023	26-09-2022	27-02-2023	29-08-2022	30-01-2023
II Unit of Instruction	13-03-2023	24-07-2023	02-01-2023	15-05-2023	03-10-2022	06-03-2023	05-09-2022	06-01-2023
II Mid Examinations	01-05-2023	11-09-2023	20-02-2023	03-07-2023	28-11-2022	01-05-2023	31-10-2022	03-04-2023
Preparation and Practicals	08-05-2023	18-09-2023	27-02-2023	10-07-2023	15-12-2022	08-05-2023	07-11-2022	10-04-2023
End Examinations	15-05-2023	25-09-2023	06-03-2023	17-07-2023	12-12-2022	15-05-2023	14-11-2022	17-04-2023



  
Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### ACADEMIC CALENDAR FOR 2022-2023 M PHARMACY (All Branches)

Event	I Year	
Event	Sem - I	Sem -II
Commencement of Class Work	12-12-2022	01-05-2023
I Unit of Instruction	19-12-2022	01-05-2023
I Mid Examination	06-02-2023	26-06-2023
II Unit of Instruction	13-02-2023	26-06-2023
II Mid Examination	03-04-2023	14-08-2023
Preparation And Practicals	10-04-2023	21-08-2023
End Examinations	17-04-2023	28-08-2023



  
Principal

PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## ACADEMIC CALENDAR 2022-2023 PHARM.D

DESCRIPTION	I YEAR	II YEAR	III YEAR	IV YEAR	V YEAR	VI YEAR
Commencement of class work	26-12-2022	07-11-2022	01-08-2022	01-08-2022	01-08-2022	01-08-2022
I Unit of Instruction	16-01-2023	07-11-2022	15-08-2022	15-08-2022	15-08-2022	---
I Mid Examinations	03-04-2023	23-01-2023	31-10-2022	31-10-2022	31-10-2022	---
II Unit of Instruction	10-04-2023	30-01-2023	07-11-2022	07-11-2022	07-11-2022	---
II Mid Examinations	26-06-2023	17-04-2023	23-01-2023	23-01-2023	23-01-2023	---
III Unit of Instruction	03-07-2023	24-04-2023	30-01-2023	30-01-2023	30-01-2023	---
III Mid Examinations	18-09-2023	10-07-2023	17-04-2023	17-04-2023	17-04-2023	---
Preparation and Practicals	25-09-2023	17-07-2023	24-04-2023	24-04-2023	24-04-2023	---
End Examinations	03-10-2023	24-07-2023	01-05-2023	01-05-2023	01-05-2023	---
Closing of Internship (12 Months)	---	---	---	---	---	29-07-2023



  
Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### COLLEGE ACADEMIC CALENDAR -2022-2023

DATE	DESCRIPTION
01/06/2022	Continuation of classes for I Pharm. D, I B. Pharm, II Pharm. D
05/06/2022	World Environment Day Plantation in the campus premises by I B. Pharm students and I Pharm. D students
13/06/2022	Commencement of II Mid exams for II B. Pharm II Semester & Clinindia – webinar on Importance of profession ready training and placement program- [ Entrepreneurship]
20/06/2022	Commencement of practical examinations for II B. Pharm II sem
21/06/2022	International Yoga Day
04/07/2022	Commencement of class work for IV B. Pharmacy I Semester Commencement of II Mid Examinations for II Pharm. D
08/07/2022	Seminar on plagiarism [Research Methodology]
11/07/2022	Commencement of II mid Examinations for I Pharm. D Commencement of Practical Exams for II Pharm D Commencement of I Mid Examinations for M. Pharmacy of all branches I year II sem
15/07/2022	Commencement of Classwork for III B. Pharm I sem
18/07/2022	Commencement of I Mid examinations for I B. Pharm II sem
01/08/2022	Commencement of classwork for III Pharm. D
15/08/2022	Independence Day Celebrations
16/08/2022- 22/08/2022	VAC- HPLC(High Performance Liquid Chromatography) and its usage in assessing the values in human blood.
29/08/2022	Commencement of I Mid Examinations for IV B. Pharm I sem
05/09/2022	Teachers Day Celebrations& Commencement of Project work thesis submission for II M. Pharm II sem
07/09/2022	Workshop on Instrument handling for method development molecules identification [ Research Methodology]
12/09/2022	Commencement of II Mid Examinations for I B. Pharm II sem
12/09/2022	Commencement of II Mid examinations for I M. Pharm of all branches
14/09/2022	World First Aid Day
17/09/2022	World Patients Safety Day (Avanathi Institute of Pharmaceutical Sciences college)



  
**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

19/09/2022	Commencement of Practical Exams for I M. Pharm of all branches
19/09/2022	Commencement of Practical Exams for I B. Pharm II sem
21/09/2022	Alzheimer's Day
25/09/2022	Celebrations of world's pharmacist day in college
26/09/2022	Commencement of III Mid Examinations for I Pharm. D
02/10/2022	Celebration of Gandhi Jayanti in College
03/10/2022	Importance of Patent oriented research in Pharmacy divisions-[Intellectual Property Rights]
03/10/2022-08/10/2022	VAC- Unlocking Conversation with AI Chat GPT interface and applications
04/10/2022	Commencement of Practical Examinations for I Pharm. D
10/10/2022-15/10/2022	VAC-Emerging trends in Targeted Drug Delivery System
31/10/2022	Commencement of II Mid Examinations for IV B. Pharm I sem
07/11/2022	Commencement of Practical Exams for IV B. Pharm I sem
07/11/2022	National Cancer Awareness Day
07/11/2022-12/11/2022	VAC- Medical Scribing.
14/11/2022	World Diabetes Day Commencement of Pharmacy week celebrations
28/11/2022	Commencement of II Mid Examinations for III B. Pharm I Sem
30/11/2022	One day workshop on Health App design and development – [Entrepreneurship]
01/12/2022	World Aid's Day(Awareness program in college)
05/12/2022	Commencement of classwork of IV B. Pharm II Sem
05/12/2022-10/12/2022	VAC- Medical Coding.
12/12/2022-17/12/2022	VAC-Clinical SAS
15/12/2022	Commencement of practical examination of III B. Pharm I sem
26/12/2022	Commencement of Class work of IV B. Pharm I sem

  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences



Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

ESTD : 2005

26/12/2022	Commencement of Class work of I Pharm. D
01/01/2023	New Year celebrations in college
02/01/2023-07/01/2023	VAC- Microbiological Tests of different water samples.
02/01/2023	Commencement of Class work for III B. Pharm II sem
23/01/2023	Commencement of II Mid examinations for III,IV,V Pharm. D
25/01/2023	Application of SPSS Software in clinical Data Analysis for Pharmaco-epidemiological Researches –[Intellectual Property Rights]
11/01/2023	Sankranti Celebrations in the college
26/01/2023	Republic day celebrations in college
30/01/2023	Commencement of I Mid Examinations for IV B. Pharm II sem
04/02/2023	World Cancer Day
06/02/2023-11/02/2023	VAC- Clinical Pharmacist Skills in Cochlear Implantation Surgical Techniques.
10/02/2023	Role of Entrepreneurs in the field of Pharmacy –[Entrepreneurship]
13/02/2023-20/02/2023	Spectroscopic techniques usage and its role in filling the NDA application.
20/02/2023	Commencement of Mid II examinations for II B. Pharm I sem
24/02/2023	One day Seminar on Intellectual property challenges in the field of Agricultural and Pharmaceuticals-[ Intellectual Property Rights ]
27/02/2023	Commencement of Practical Examinations for II B. Pharm II sem
27/02/2023	I Mid examinations for II B. Pharm II sem
28/02/2023	National Science Day
06/03/2023	I Mid Examinations for I B. Pharm I sem
08/03/2023	International Women's Day Celebrations in college
13/03/2023-18/03/2023	VAC- Global Standards in Surgical Instrumentation.
16/03/2023	National Vaccination Day (Awareness Program)& One day webinar on research methodology –[ Research Methodology]
18/03/2023	National seminar in college (APOTHEKES - 2K23)

  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162







## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

24/03/2023	World Tuberculosis Day Class work for II B. Pharm II sem
03/04/2023	Commencement of II Mid examinations for IV B. Pharm II sem
07/04/2023	World Health Day
10/04/2023	Commencement of project work
17/04/2023	Commencement of II Mid examinations for II Pharm. D & Commencement of III Mid examinations for III, IV, V Pharm. D
17/04/2023-24/04/2023	VAC- Crude Drugs from marine corridor resources.
21/04/2023	Qualitative Research & Methods –Module in Research Methods [Research Methodology]
24/04/2023	Commencement of Practical examinations for III, IV, V Pharm. D
25/04/2023	World Malaria Day
26/04/2023	World Intellectual Property day
01/05/2023	Commencement of II Mid Examinations I B. Pharm I sem
08/05/2023	Commencement of II Mid Examinations for III B. Pharm II sem & Commencement of I Mid examinations for II B. Pharm II sem & Awareness Program for Ovarian Cancer
15/05/2023	Commencement of Practical Examinations for III B. Pharm II sem
17/05/2023	One day webinar on differences in filing for Indian patents & Australian patents – [Intellectual Property Rights]
22/05/2023-28/05/2023	VAC- Cardiovascular drugs as alternative to Surgical Procedures.
14/06/2023	How Technological Advancements are transforming clinical research careers - [Research Methodology]
12/08/2023	One day Seminar on Trade mark & Copyrights [Intellectual Property Rights]
26/08/2023	One day Seminar on Steps to follow a patent application for U.K Patent System [Intellectual Property Rights]
28/08/2023	One day workshop on suits Health App-One App Suits everyone health needs

  
Principal



**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### SYLLABUS REGULATION (PCI)

Avanthi Institute Of Pharmaceutical Sciences (AIPS) follows PCI Syllabus for all the programs such as B.Pharm, M.Pharm, Pharm.D. PCI Syllabus covered the vast and categorically includes Pharmacy subjects which later the needs of students both in professional and scientific requirements.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Pharmacy Council of India  
New Delhi

Rules & Syllabus for the Bachelor  
of Pharmacy (B. Pharm) Course

---

[Framed under Regulation 6, 7 & 8 of the Bachelor of  
Pharmacy (B. Pharm) course regulations 2014]



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## CHAPTER- I: REGULATIONS

### 1. Short Title and Commencement

These regulations shall be called as “The Revised Regulations for the B. Pharm. Degree Program (CBCS) of the Pharmacy Council of India, New Delhi”. They shall come into effect from the Academic Year 2016-17. The regulations framed are subject to modifications from time to time by Pharmacy Council of India.

### 2. Minimum qualification for admission

#### 2.1 First year B. Pharm:

Candidate shall have passed 10+2 examination conducted by the respective state/central government authorities recognized as equivalent to 10+2 examination by the Association of Indian Universities (AIU) with English as one of the subjects and Physics, Chemistry, Mathematics (P.C.M) and or Biology (P.C.B / P.C.M.B.) as optional subjects individually. Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations.

#### 2.2. B. Pharm lateral entry (to third semester):

A pass in D. Pharm. course from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act.

### 3. Duration of the program

The course of study for B.Pharm shall extend over a period of eight semesters (four academic years) and six semesters (three academic years) for lateral entry students. The curricula and syllabi for the program shall be prescribed from time to time by Pharmacy Council of India, New Delhi.

### 4. Medium of instruction and examinations

Medium of instruction and examination shall be in English.

### 5. Working days in each semester

Each semester shall consist of not less than 100 working days. The odd semesters shall be conducted from the month of June/July to November/December and the even semesters shall be conducted from December/January to May/June in every calendar year.

### 6. Attendance and progress

A candidate is required to put in at least 80% attendance in individual courses considering theory and practical separately. The candidate shall complete the prescribed course satisfactorily to be eligible to appear for the respective examinations.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## **7. Program/Course credit structure**

As per the philosophy of Credit Based Semester System, certain quantum of academic work viz. theory classes, tutorial hours, practical classes, etc. are measured in terms of credits. On satisfactory completion of the courses, a candidate earns credits. The amount of credit associated with a course is dependent upon the number of hours of instruction per week in that course. Similarly, the credit associated with any of the other academic, co/extra-curricular activities is dependent upon the quantum of work expected to be put in for each of these activities per week.

### **7.1. Credit assignment**

#### **7.1.1. Theory and Laboratory courses**

Courses are broadly classified as Theory and Practical. Theory courses consist of lecture (L) and /or tutorial (T) hours, and Practical (P) courses consist of hours spent in the laboratory. Credits (C) for a course is dependent on the number of hours of instruction per week in that course, and is obtained by using a multiplier of one (1) for lecture and tutorial hours, and a multiplier of half (1/2) for practical (laboratory) hours. Thus, for example, a theory course having three lectures and one tutorial per week throughout the semester carries a credit of 4. Similarly, a practical having four laboratory hours per week throughout semester carries a credit of 2.

### **7.2. Minimum credit requirements**

The minimum credit points required for award of a B. Pharm. degree is 208. These credits are divided into Theory courses, Tutorials, Practical, Practice School and Project over the duration of eight semesters. The credits are distributed semester-wise as shown in Table IX. Courses generally progress in sequences, building competencies and their positioning indicates certain academic maturity on the part of the learners. Learners are expected to follow the semester-wise schedule of courses given in the syllabus.

The lateral entry students shall get 52 credit points transferred from their D. Pharm program. Such students shall take up additional remedial courses of 'Communication Skills' (Theory and Practical) and 'Computer Applications in Pharmacy' (Theory and Practical) equivalent to 3 and 4 credit points respectively, a total of 7 credit points to attain 59 credit points, the maximum of I and II semesters.

## **8. Academic work**

A regular record of attendance both in Theory and Practical shall be maintained by the teaching staff of respective courses.



### 9. Course of study

The course of study for B. Pharm shall include Semester Wise Theory & Practical as given in Table – I to VIII. The number of hours to be devoted to each theory, tutorial and practical course in any semester shall not be less than that shown in Table I to VIII.

**Table-I: Course of study for semester I**

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP101T	Human Anatomy and Physiology I– Theory	3	1	4
BP102T	Pharmaceutical Analysis I – Theory	3	1	4
BP103T	Pharmaceutics I – Theory	3	1	4
BP104T	Pharmaceutical Inorganic Chemistry – Theory	3	1	4
BP105T	Communication skills – Theory *	2	-	2
BP106RBT BP106RMT	Remedial Biology/ Remedial Mathematics – Theory*	2	-	2
BP107P	Human Anatomy and Physiology – Practical	4	-	2
BP108P	Pharmaceutical Analysis I – Practical	4	-	2
BP109P	Pharmaceutics I – Practical	4	-	2
BP110P	Pharmaceutical Inorganic Chemistry – Practical	4	-	2
BP111P	Communication skills – Practical*	2	-	1
BP112RBP	Remedial Biology – Practical*	2	-	1
<b>Total</b>		<b>32/34<sup>S</sup>/36<sup>#</sup></b>	<b>4</b>	<b>27/29<sup>S</sup>/30<sup>#</sup></b>

<sup>#</sup>Applicable ONLY for the students who have studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB)course.

<sup>S</sup>Applicable ONLY for the students who have studied Physics / Chemistry / Botany / Zoology at IISC and appearing for Remedial Mathematics (RM)course.

\* Non University Examination (NUE)



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**Table-II: Course of study for semester II**

Course Code	Name of the course	No. of hours	Tutorial	Credit points
BP201T	Human Anatomy and Physiology II – Theory	3	1	4
BP202T	Pharmaceutical Organic Chemistry I – Theory	3	1	4
BP203T	Biochemistry – Theory	3	1	4
BP204T	Pathophysiology – Theory	3	1	4
BP205T	Computer Applications in Pharmacy – Theory *	3	-	3
BP206T	Environmental sciences – Theory *	3	-	3
BP207P	Human Anatomy and Physiology II –Practical	4	-	2
BP208P	Pharmaceutical Organic Chemistry I– Practical	4	-	2
BP209P	Biochemistry – Practical	4	-	2
BP210P	Computer Applications in Pharmacy – Practical*	2	-	1
<b>Total</b>		<b>32</b>	<b>4</b>	<b>29</b>

\*Non University Examination (NUE)

**Table-III: Course of study for semester III**

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP301T	Pharmaceutical Organic Chemistry II – Theory	3	1	4
BP302T	Physical Pharmaceutics I – Theory	3	1	4
BP303T	Pharmaceutical Microbiology – Theory	3	1	4
BP304T	Pharmaceutical Engineering – Theory	3	1	4
BP305P	Pharmaceutical Organic Chemistry II – Practical	4	-	2
BP306P	Physical Pharmaceutics I – Practical	4	-	2
BP307P	Pharmaceutical Microbiology – Practical	4	-	2
BP 308P	Pharmaceutical Engineering –Practical	4	-	2
<b>Total</b>		<b>28</b>	<b>4</b>	<b>24</b>



**Table-IV: Course of study for semester IV**

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP401T	Pharmaceutical Organic Chemistry III– Theory	3	1	4
BP402T	Medicinal Chemistry I – Theory	3	1	4
BP403T	Physical Pharmaceutics II – Theory	3	1	4
BP404T	Pharmacology I – Theory	3	1	4
BP405T	Pharmacognosy and Phytochemistry I– Theory	3	1	4
BP406P	Medicinal Chemistry I – Practical	4	-	2
BP407P	Physical Pharmaceutics II – Practical	4		2
BP408P	Pharmacology I – Practical	4	-	2
BP409P	Pharmacognosy and Phytochemistry I – Practical	4	-	2
<b>Total</b>		<b>31</b>	<b>5</b>	<b>28</b>

**Table-V: Course of study for semester V**

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP501T	Medicinal Chemistry II – Theory	3	1	4
BP502T	Industrial PharmacyI– Theory	3	1	4
BP503T	Pharmacology II – Theory	3	1	4
BP504T	Pharmacognosy and Phytochemistry II– Theory	3	1	4
BP505T	Pharmaceutical Jurisprudence – Theory	3	1	4
BP506P	Industrial PharmacyI – Practical	4	-	2
BP507P	Pharmacology II – Practical	4	-	2
BP508P	Pharmacognosy and Phytochemistry II – Practical	4	-	2
<b>Total</b>		<b>27</b>	<b>5</b>	<b>26</b>



*tv*  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**Table-VI: Course of study for semester VI**

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP601T	Medicinal Chemistry III – Theory	3	1	4
BP602T	Pharmacology III – Theory	3	1	4
BP603T	Herbal Drug Technology – Theory	3	1	4
BP604T	Biopharmaceutics and Pharmacokinetics – Theory	3	1	4
BP605T	Pharmaceutical Biotechnology – Theory	3	1	4
BP606T	Quality Assurance –Theory	3	1	4
BP607P	Medicinal chemistry III – Practical	4	-	2
BP608P	Pharmacology III – Practical	4	-	2
BP609P	Herbal Drug Technology – Practical	4	-	2
<b>Total</b>		<b>30</b>	<b>6</b>	<b>30</b>

**Table-VII: Course of study for semester VII**

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP701T	Instrumental Methods of Analysis – Theory	3	1	4
BP702T	Industrial PharmacyII – Theory	3	1	4
BP703T	Pharmacy Practice – Theory	3	1	4
BP704T	Novel Drug Delivery System – Theory	3	1	4
BP705P	Instrumental Methods of Analysis – Practical	4	-	2
BP706PS	Practice School*	12	-	6
<b>Total</b>		<b>28</b>	<b>5</b>	<b>24</b>

\* Non University Examination (NUE)



**Table-VIII: Course of study for semester VIII**

Course code	Name of the course	No. of hours	Tutorial	Credit points
BP801T	Biostatistics and Research Methodology	3	1	4
BP802T	Social and Preventive Pharmacy	3	1	4
BP803ET	Pharma Marketing Management	3 + 3 = 6	1 + 1 = 2	4 + 4 = 8
BP804ET	Pharmaceutical Regulatory Science			
BP805ET	Pharmacovigilance			
BP806ET	Quality Control and Standardization of Herbals			
BP807ET	Computer Aided Drug Design			
BP808ET	Cell and Molecular Biology			
BP809ET	Cosmetic Science			
BP810ET	Experimental Pharmacology			
BP811ET	Advanced Instrumentation Techniques			
BP812ET	Dietary Supplements and Nutraceuticals			
BP813PW	Project Work	12	-	6
<b>Total</b>		<b>24</b>	<b>4</b>	<b>22</b>

**Table-IX: Semester wise credits distribution**

Semester	Credit Points
I	27/29 <sup>\$</sup> /30 <sup>#</sup>
II	29
III	26
IV	28
V	26
VI	26
VII	24
VIII	22
Extracurricular/ Co curricular activities	01*
<b>Total credit points for the program</b>	<b>209/211<sup>\$</sup>/212<sup>#</sup></b>

\* The credit points assigned for extracurricular and or co-curricular activities shall be given by the Principals of the colleges and the same shall be submitted to the University. The criteria to acquire this credit point shall be defined by the colleges from time to time.

<sup>\$</sup>Applicable ONLY for the students studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics course.

<sup>#</sup>Applicable ONLY for the students studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology course.





## 10. Program Committee

1. The B. Pharm. program shall have a Program Committee constituted by the Head of the institution in consultation with all the Heads of the departments.
2. The composition of the Program Committee shall be as follows:  
  
A senior teacher shall be the Chairperson; One Teacher from each department handling B.Pharm courses; and four student representatives of the program (one from each academic year), nominated by the Head of the institution.
3. Duties of the Program Committee:
  - i. Periodically reviewing the progress of the classes.
  - ii. Discussing the problems concerning curriculum, syllabus and the conduct of classes.
  - iii. Discussing with the course teachers on the nature and scope of assessment for the course and the same shall be announced to the students at the beginning of respective semesters.
  - iv. Communicating its recommendation to the Head of the institution on academic matters.
  - v. The Program Committee shall meet at least thrice in a semester preferably at the end of each Sessionalexam (Internal Assessment) and before the end semester exam.

## 11. Examinations/Assessments

The scheme for internal assessment and end semester examinations is given in Table – X.

### 11.1. End semester examinations

The End Semester Examinations for each theory and practical course through semesters I to VIII shall be conducted by the university except for the subjects with asterix symbol (\*) in table I and II for which examinations shall be conducted by the subject experts at college level and the marks/grades shall be submitted to the university.



*tr3*

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**Tables-X: Schemes for internal assessments and end semester examinations semester wise**

**Semester I**

Course code	Name of the course	Internal Assessment						End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration			
			Marks	Duration						
BP101T	Human Anatomy and Physiology I– Theory	10	15	1 Hr	25	75	3 Hrs	100		
BP102T	Pharmaceutical Analysis I – Theory	10	15	1 Hr	25	75	3 Hrs	100		
BP103T	Pharmaceutics I – Theory	10	15	1 Hr	25	75	3 Hrs	100		
BP104T	Pharmaceutical Inorganic Chemistry – Theory	10	15	1 Hr	25	75	3 Hrs	100		
BP105T	Communication skills – Theory *	5	10	1 Hr	15	35	1.5 Hrs	50		
BP106RBT BP106RMT	Remedial Biology/ Mathematics – Theory*	5	10	1 Hr	15	35	1.5 Hrs	50		
BP107P	Human Anatomy and Physiology – Practical	5	10	4 Hrs	15	35	4 Hrs	50		
BP108P	Pharmaceutical Analysis I – Practical	5	10	4 Hrs	15	35	4 Hrs	50		
BP109P	Pharmaceutics I – Practical	5	10	4 Hrs	15	35	4 Hrs	50		
BP110P	Pharmaceutical Inorganic Chemistry – Practical	5	10	4 Hrs	15	35	4 Hrs	50		
BP111P	Communication skills – Practical*	5	5	2 Hrs	10	15	2 Hrs	25		
BP112RBP	Remedial Biology – Practical*	5	5	2 Hrs	10	15	2 Hrs	25		
Total		70/75 <sup>s</sup> /80 <sup>#</sup>	115/125 <sup>s</sup> /130 <sup>#</sup>	23/24 <sup>s</sup> /26 <sup>#</sup> Hrs	185/200 <sup>s</sup> /210 <sup>#</sup>	490/525 <sup>s</sup> / 540 <sup>#</sup>	31.5/33 <sup>s</sup> / 35 <sup>#</sup> Hrs	675/725 <sup>s</sup> / 750 <sup>#</sup>		

# Applicable ONLY for the students studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB) course.  
\$ Applicable ONLY for the students studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Biology (RB) course.  
\* Non-University students only.

<sup>#</sup> Applicable ONLY for the students studied Mathematics / Physics / Chemistry at HSC and appearing for Remedial Biology (RB) course.

<sup>s</sup> Applicable ONLY for the students studied Physics / Chemistry / Botany / Zoology at HSC and appearing for Remedial Mathematics (RM) course.

\* Non University Examination (NUE)



**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## Semester II

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP201T	Human Anatomy and Physiology II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP202T	Pharmaceutical Organic Chemistry I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP203T	Biochemistry – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP204T	Pathophysiology – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP205T	Computer Applications in Pharmacy – Theory*	10	15	1 Hr	25	50	2 Hrs	75
BP206T	Environmental sciences – Theory*	10	15	1 Hr	25	50	2 Hrs	75
BP207P	Human Anatomy and Physiology II –Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP208P	Pharmaceutical Organic Chemistry I– Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP209P	Biochemistry – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP210P	Computer Applications in Pharmacy – Practical*	5	5	2 Hrs	10	15	2 Hrs	25
Total		80	125	20 Hrs	205	520	30 Hrs	725

\* The subject experts at college level shall conduct examinations

\* The subject experts at college level shall conduct examinations



*th*  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

### Semester III

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP301T	Pharmaceutical Organic Chemistry II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP302T	PhysicalPharmaceuticsI –Theory	10	15	1 Hr	25	75	3 Hrs	100
BP303T	Pharmaceutical Microbiology – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP304T	Pharmaceutical Engineering – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP305P	Pharmaceutical Organic Chemistry II – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP306P	Physical Pharmaceutics I – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP307P	Pharmaceutical Microbiology – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP308P	Pharmaceutical Engineering – Practical	5	10	4 Hr	15	35	4 Hrs	50
Total		60	100	20	160	440	28Hrs	600



*th*

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# Semester IV

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP401T	Pharmaceutical Organic Chemistry III– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP402T	Medicinal Chemistry I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP403T	Physical Pharmaceutics II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP404T	Pharmacology I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP405T	Pharmacognosy I – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP406P	Medicinal Chemistry I – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP407P	Physical Pharmaceutics II – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP408P	Pharmacology I – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP409P	Pharmacognosy I – Practical	5	10	4 Hrs	15	35	4 Hrs	50
Total		70	115	21 Hrs	185	515	31 Hrs	700




PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

# Semester V

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP501T	Medicinal Chemistry II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP502T	Industrial PharmacyI– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP503T	Pharmacology II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP504T	Pharmacognosy II – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP505T	Pharmaceutical Jurisprudence – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP506P	Industrial PharmacyI– Practical	5	10	4 Hr	15	35	4 Hrs	50
BP507P	Pharmacology II – Practical	5	10	4 Hr	15	35	4 Hrs	50
BP508P	Pharmacognosy II – Practical	5	10	4 Hr	15	35	4 Hrs	50
Total		65	105	17 Hr	170	480	27 Hrs	650




  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



# Semester VI

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP601T	Medicinal Chemistry III – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP602T	Pharmacology III – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP603T	Herbal Drug Technology – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP604T	Biopharmaceutics and Pharmacokinetics – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP605T	Pharmaceutical Biotechnology– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP606T	Quality Assurance– Theory	10	15	1 Hr	25	75	3 Hrs	100
BP607P	Medicinal chemistry III – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP608P	Pharmacology III – Practical	5	10	4 Hrs	15	35	4 Hrs	50
BP609P	Herbal Drug Technology – Practical	5	10	4 Hrs	15	35	4 Hrs	50
Total		75	120	18 Hrs	195	555	30 Hrs	750



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162


## Semester VII

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP701T	Instrumental Methods of Analysis – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP702T	Industrial Pharmacy – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP703T	Pharmacy Practice – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP704T	Novel Drug Delivery System – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP705 P	Instrumental Methods of Analysis – Practical	5	10	4 Hrs	25	35	4 Hrs	50
BP706 PS	Practice School*	25	-	-	25	125	5 Hrs	150
Total		70	70	8Hrs	140	460	21 Hrs	600

\* The subject experts at college level shall conduct examinations

\* The subject experts at college level shall conduct examinations



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



# Semester VIII

Course code	Name of the course	Internal Assessment				End Semester Exams		Total Marks
		Continuous Mode	Sessional Exams		Total	Marks	Duration	
			Marks	Duration				
BP801T	Biostatistics and Research Methodology – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP802T	Social and Preventive Pharmacy – Theory	10	15	1 Hr	25	75	3 Hrs	100
BP803ET	Pharmaceutical Marketing – Theory	10 + 10 = 20	15 + 15 = 30	1 + 1 = 2 Hrs	25 + 25 = 50	75 + 75 = 150	3 + 3 = 6 Hrs	100 + 100 = 200
BP804ET	Pharmaceutical Regulatory Science – Theory							
BP805ET	Pharmacovigilance – Theory							
BP806ET	Quality Control and Standardization of Herbals – Theory							
BP807ET	Computer Aided Drug Design – Theory							
BP808ET	Cell and Molecular Biology – Theory							
BP809ET	Cosmetic Science – Theory							
BP810ET	Experimental Pharmacology – Theory							
BP811ET	Advanced Instrumentation Techniques – Theory							
BP812PW	Project Work	-	-	-	-	150	4 Hrs	150
Total		40	60	4 Hrs	100	450	16 Hrs	550



*h3*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt.. - 531162

### 11.2. Internal assessment: Continuous mode

The marks allocated for Continuous mode of Internal Assessment shall be awarded as per the scheme given below.

**Table-XI: Scheme for awarding internal assessment: Continuous mode**

Theory		
Criteria	Maximum Marks	
Attendance (Refer Table – XII)	4	2
Academic activities (Average of any 3 activities e.g. quiz, assignment, open book test, field work, group discussion and seminar)	3	1.5
Student – Teacher interaction	3	1.5
<b>Total</b>	<b>10</b>	<b>5</b>
Practical		
Attendance (Refer Table – XII)	2	
Based on Practical Records, Regular viva voce, etc.	3	
<b>Total</b>	<b>5</b>	

**Table- XII: Guidelines for the allotment of marks for attendance**

Percentage of Attendance	Theory	Practical
95 – 100	4	2
90 – 94	3	1.5
85 – 89	2	1
80 – 84	1	0.5
Less than 80	0	0

#### 11.2.1. Sessional Exams

Two Sessional exams shall be conducted for each theory / practical course as per the schedule fixed by the college(s). The scheme of question paper for theory and practical Sessional examinations is given below. The average marks of two Sessional exams shall be computed for internal assessment as per the requirements given in tables – X.

Sessional exam shall be conducted for 30 marks for theory and shall be computed for 15 marks. Similarly Sessional exam for practical shall be conducted for 40 marks and shall be computed for 10 marks.

#### Question paper pattern for theory Sessional examinations

##### For subjects having University examination

I. Multiple Choice Questions (MCQs) = 10 x 1 = 10

OR

Objective Type Questions (5 x 2) = 05 x 2 = 10

(Answer all the questions)

I. Long Answers (Answer 1 out of 2) = 1 x 10 = 10

II. Short Answers (Answer 2 out of 3) = 2 x 5 = 10

Total = 30 marks





**For subjects having Non University Examination**

I. Long Answers (Answer 1 out of 2)	=	1 x 10 = 10
II. Short Answers (Answer 4 out of 6)	-	4 x 5 = 20
		-----
Total	=	30 marks
		-----

**Question paper pattern for practical sessional examinations**

I. Synopsis	=	10
II. Experiments	=	25
III. Viva voce	=	05
		-----
Total	=	40 marks
		-----

**12. Promotion and award of grades**

A student shall be declared PASS and eligible for getting grade in a course of B.Pharm. program if he/she secures at least 50% marks in that particular course including internal assessment. For example, to be declared as PASS and to get grade, the student has to secure a minimum of 50 marks for the total of 100 including continuous mode of assessment and end semester theory examination and has to secure a minimum of 25 marks for the total 50 including internal assessment and end semester practical examination.

**13. Carry forward of marks**

In case a student fails to secure the minimum 50% in any Theory or Practical course as specified in 12, then he/she shall reappear for the end semester examination of that course. However his/her marks of the Internal Assessments shall be carried over and he/she shall be entitled for grade obtained by him/her on passing.

**14. Improvement of internal assessment**

A student shall have the opportunity to improve his/her performance only once in the Sessional exam component of the internal assessment. The re-conduct of the Sessional exam shall be completed before the commencement of next end semester theory examinations.

**15. Re-examination of end semester examinations**

Reexamination of end semester examinations shall be conducted as per the schedule given in table XIII. The exact dates of examinations shall be notified from time to time.

**PRINCIPAL****Avanathi Institute of Pharmaceutical Sciences**Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**Table-XIII: Tentative schedule of end semester examinations**

Semester	For Regular Candidates	For Failed Candidates
I, III, V and VII	November / December	May / June
II, IV, VI and VIII	May / June	November / December

**Question paper pattern for end semester theory examinations**

**For 75 marks paper**

I. Multiple Choice Questions(MCQs)	=	20 x 1	= 20
OR		OR	
Objective Type Questions (10 x 2)	=	10 x 2	= 20
(Answer all the questions)			
II. Long Answers (Answer 2 out of 3)	=	2 x 10	= 20
III. Short Answers (Answer 7 out of 9)	=	7 x 5	= 35
		-----	
Total	=	75 marks	
		-----	

**For 50 marks paper**

I. Long Answers (Answer 2 out of 3)	=	2 x 10	= 20
II. Short Answers (Answer 6 out of 8)	=	6 x 5	= 30
		-----	
Total	=	50 marks	
		-----	

**For 35 marks paper**

I. Long Answers (Answer 1 out of 2)	=	1 x 10	= 10
II. Short Answers (Answer 5 out of 7)	=	5 x 5	= 25
		-----	
Total	=	35 marks	
		-----	

**Question paper pattern for end semester practical examinations**

I. Synopsis	=	5
II. Experiments	=	25
III. Viva voce	=	5
		-----
Total	=	35 marks
		-----



*Handwritten signature*

**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



#### 16. Academic Progression:

No student shall be admitted to any examination unless he/she fulfills the norms given in 6. Academic progression rules are applicable as follows:

A student shall be eligible to carry forward all the courses of I, II and III semesters till the IV semester examinations. However, he/she shall not be eligible to attend the courses of V semester until all the courses of I and II semesters are successfully completed.

A student shall be eligible to carry forward all the courses of III, IV and V semesters till the VI semester examinations. However, he/she shall not be eligible to attend the courses of VII semester until all the courses of I, II, III and IV semesters are successfully completed.

A student shall be eligible to carry forward all the courses of V, VI and VII semesters till the VIII semester examinations. However, he/she shall not be eligible to get the course completion certificate until all the courses of I, II, III, IV, V and VI semesters are successfully completed.

A student shall be eligible to get his/her CGPA upon successful completion of the courses of I to VIII semesters within the stipulated time period as per the norms specified in 26.

A lateral entry student shall be eligible to carry forward all the courses of III, IV and V semesters till the VI semester examinations. However, he/she shall not be eligible to attend the courses of VII semester until all the courses of III and IV semesters are successfully completed.

A lateral entry student shall be eligible to carry forward all the courses of V, VI and VII semesters till the VIII semester examinations. However, he/she shall not be eligible to get the course completion certificate until all the courses of III, IV, V and VI semesters are successfully completed.

A lateral entry student shall be eligible to get his/her CGPA upon successful completion of the courses of III to VIII semesters within the stipulated time period as per the norms specified in 26.

Any student who has given more than 4 chances for successful completion of I / III semester courses and more than 3 chances for successful completion of II / IV semester courses shall be permitted to attend V / VII semester classes ONLY during the subsequent academic year as the case may be. In simpler terms there shall NOT be any ODD BATCH for any semester.



*Handwritten signature*

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Note: Grade AB should be considered as failed and treated as one head for deciding academic progression. Such rules are also applicable for those students who fail to register for examination(s) of any course in any semester.

## 17. Grading of performances

### 17.1. Letter grades and grade points allocations:

Based on the performances, each student shall be awarded a final letter grade at the end of the semester for each course. The letter grades and their corresponding grade points are given in Table – XII.

**Table – XII: Letter grades and grade points equivalent to Percentage of marks and performances**

Percentage of Marks Obtained	Letter Grade	Grade Point	Performance
90.00 – 100	O	10	Outstanding
80.00 – 89.99	A	9	Excellent
70.00 – 79.99	B	8	Good
60.00 – 69.99	C	7	Fair
50.00 – 59.99	D	6	Average
Less than 50	F	0	Fail
Absent	AB	0	Fail

A learner who remains absent for any end semester examination shall be assigned a letter grade of AB and a corresponding grade point of zero. He/she should reappear for the said evaluation/examination in due course.

## 18. The Semester grade point average (SGPA)

The performance of a student in a semester is indicated by a number called 'Semester Grade Point Average' (SGPA). The SGPA is the weighted average of the grade points obtained in all the courses by the student during the semester. For example, if a student takes five courses (Theory/Practical) in a semester with credits C<sub>1</sub>, C<sub>2</sub>, C<sub>3</sub>, C<sub>4</sub> and C<sub>5</sub> and the student's grade points in these courses are G<sub>1</sub>, G<sub>2</sub>, G<sub>3</sub>, G<sub>4</sub> and G<sub>5</sub>, respectively, and then students' SGPA is equal to:

$$SGPA = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4G_4 + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

The SGPA is calculated to two decimal points. It should be noted that, the SGPA for any semester shall take into consideration the F and AB grade awarded in that semester. For example if a learner has a F or AB grade in course 4, the SGPA shall then be computed as:



*Handwritten signature*

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences,  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



$$\text{SGPA} = \frac{C_1G_1 + C_2G_2 + C_3G_3 + C_4 \text{ ZERO} + C_5G_5}{C_1 + C_2 + C_3 + C_4 + C_5}$$

### 19. Cumulative Grade Point Average (CGPA)

The CGPA is calculated with the SGPA of all the VIII semesters to two decimal points and is indicated in final grade report card/final transcript showing the grades of all VIII semesters and their courses. The CGPA shall reflect the failed status in case of F grade(s), till the course(s) is/are passed. When the course(s) is/are passed by obtaining a pass grade on subsequent examination(s) the CGPA shall only reflect the new grade and not the fail grades earned earlier. The CGPA is calculated as:

$$\text{CGPA} = \frac{C_1S_1 + C_2S_2 + C_3S_3 + C_4S_4 + C_5S_5 + C_6S_6 + C_7S_7 + C_8S_8}{C_1 + C_2 + C_3 + C_4 + C_5 + C_6 + C_7 + C_8}$$

where  $C_1, C_2, C_3, \dots$  is the total number of credits for semester I, II, III, .... and  $S_1, S_2, S_3, \dots$  is the SGPA of semester I, II, III, ....

### 20. Declaration of class

The class shall be awarded on the basis of CGPA as follows:

First Class with Distinction	= CGPA of 7.50 and above
First Class	= CGPA of 6.00 to 7.49
Second Class	= CGPA of 5.00 to 5.99

### 21. Project work

All the students shall undertake a project under the supervision of a teacher and submit a report. The area of the project shall directly relate any one of the elective subject opted by the student in semester VIII. The project shall be carried out in group not exceeding 5 in number. The project report shall be submitted in triplicate (typed & bound copy not less than 25 pages).

The internal and external examiner appointed by the University shall evaluate the project at the time of the Practical examinations of other semester(s). Students shall be evaluated in groups for four hours (i.e., about half an hour for a group of five students). The projects shall be evaluated as per the criteria given below.



***Evaluation of Dissertation Book:***

Objective(s) of the work done	15 Marks
Methodology adopted	20 Marks
Results and Discussions	20 Marks
Conclusions and Outcomes	20 Marks

---

<b>Total</b>	<b>75 Marks</b>
--------------	-----------------

---

***Evaluation of Presentation:***

Presentation of work	25 Marks
Communication skills	20 Marks
Question and answer skills	30 Marks

---

<b>Total</b>	<b>75 Marks</b>
--------------	-----------------

---

*Explanation:* The 75 marks assigned to the dissertation book shall be same for all the students in a group. However, the 75 marks assigned for presentation shall be awarded based on the performance of individual students in the given criteria.

**22. Industrial training (Desirable)**

Every candidate shall be required to work for at least 150 hours spread over four weeks in a Pharmaceutical Industry/Hospital. It includes Production unit, Quality Control department, Quality Assurance department, Analytical laboratory, Chemical manufacturing unit, Pharmaceutical R&D, Hospital (Clinical Pharmacy), Clinical Research Organization, Community Pharmacy, etc. After the Semester – VI and before the commencement of Semester – VII, and shall submit satisfactory report of such work and certificate duly signed by the authority of training organization to the head of the institute.

**23. Practice School**

In the VII semester, every candidate shall undergo practice school for a period of 150 hours evenly distributed throughout the semester. The student shall opt any one of the domains for practice school declared by the program committee from time to time.

At the end of the practice school, every student shall submit a printed report (in triplicate) on the practice school he/she attended (not more than 25 pages). Along with the exams of semester VII, the report submitted by the student, knowledge and skills acquired by the student through practice school shall be evaluated by the subject experts at college level and grade point shall be awarded.





#### **24. Award of Ranks**

Ranks and Medals shall be awarded on the basis of final CGPA. However, candidates who fail in one or more courses during the B.Pharm program shall not be eligible for award of ranks. Moreover, the candidates should have completed the B. Pharm program in minimum prescribed number of years, (four years) for the award of Ranks.

#### **25. Award of degree**

Candidates who fulfill the requirements mentioned above shall be eligible for award of degree during the ensuing convocation.

#### **26. Duration for completion of the program of study**

The duration for the completion of the program shall be fixed as double the actual duration of the program and the students have to pass within the said period, otherwise they have to get fresh Registration.

#### **27. Re-admission after break of study**

Candidate who seeks re-admission to the program after break of study has to get the approval from the university by paying a condonation fee.

No condonation is allowed for the candidate who has more than 2 years of break up period and he/she has to rejoin the program by paying the required fees.




  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## CHAPTER - II: SYLLABUS




  
PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## Semester I



  
PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP101T. HUMAN ANATOMY AND PHYSIOLOGY-I (Theory)

45 Hours

**Scope:** This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

**Objectives:** Upon completion of this course the student should be able to

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the various experiments related to special senses and nervous system.
5. Appreciate coordinated working pattern of different organs of each system

### Course Content:

#### Unit I

10 hours

- **Introduction to human body**

Definition and scope of anatomy and physiology, levels of structural organization and body systems, basic life processes, homeostasis, basic anatomical terminology.

- **Cellular level of organization**

Structure and functions of cell, transport across cell membrane, cell division, cell junctions. General principles of cell communication, intracellular signaling pathway activation by extracellular signal molecule, Forms of intracellular signaling: a) Contact-dependent b) Paracrine c) Synaptic d) Endocrine

- **Tissue level of organization**

Classification of tissues, structure, location and functions of epithelial, muscular and nervous and connective tissues.

#### Unit II

10 hours

- **Integumentary system**

Structure and functions of skin

- **Skeletal system**

Divisions of skeletal system, types of bone, salient features and functions of bones of axial and appendicular skeletal system

Organization of skeletal muscle, physiology of muscle contraction, neuromuscular junction



  
PRINCIPAL

29 Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



- **Joints**

Structural and functional classification, types of joints movements and its articulation

### Unit III

10 hours

- **Body fluids and blood**

- Body fluids, composition and functions of blood, hemopoiesis, formation of hemoglobin, anemia, mechanisms of coagulation, blood grouping, Rh factors, transfusion, its significance and disorders of blood, Reticulo endothelial system.

- **Lymphatic system**

Lymphatic organs and tissues, lymphatic vessels, lymph circulation and functions of lymphatic system

### Unit IV

08 hours

**Peripheral nervous system:**

Classification of peripheral nervous system: Structure and functions of sympathetic and parasympathetic nervous system.

Origin and functions of spinal and cranial nerves.

- **Special senses**

Structure and functions of eye, ear, nose and tongue and their disorders.


### Unit V

07 hours

- **Cardiovascular system**

Heart – anatomy of heart, blood circulation, blood vessels, structure and functions of artery, vein and capillaries, elements of conduction system of heart and heart beat, its regulation by autonomic nervous system, cardiac output, cardiac cycle. Regulation of blood pressure, pulse, electrocardiogram and disorders of heart.



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

## **BP107P. HUMAN ANATOMY AND PHYSIOLOGY (Practical)**

**4 Hours/week**

Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.

1. Study of compound microscope.
2. Microscopic study of epithelial and connective tissue
3. Microscopic study of muscular and nervous tissue
4. Identification of axial bones
5. Identification of appendicular bones
6. Introduction to hemocytometry.
7. Enumeration of white blood cell (WBC) count
8. Enumeration of total red blood corpuscles (RBC) count
9. Determination of bleeding time
10. Determination of clotting time
11. Estimation of hemoglobin content
12. Determination of blood group.
13. Determination of erythrocyte sedimentation rate (ESR).
14. Determination of heart rate and pulse rate.
15. Recording of blood pressure.

### **Recommended Books (Latest Editions)**

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
4. Text book of Medical Physiology- Arthur C, Guyton and John E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.





6. Textbook of Human Histology by Inderbir Singh, Jaypee brother's medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brother's medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

**Reference Books (Latest Editions)**

1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje ,Academic Publishers Kolkata



*th*

**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

## BP102T. PHARMACEUTICAL ANALYSIS (Theory)

45 Hours

**Scope:** This course deals with the fundamentals of analytical chemistry and principles of electrochemical analysis of drugs

**Objectives:** Upon completion of the course student shall be able to

- understand the principles of volumetric and electro chemical analysis
- carryout various volumetric and electrochemical titrations
- develop analytical skills

### Course Content:

#### UNIT-I

10 Hours

(a) **Pharmaceutical analysis-** Definition and scope

- i) Different techniques of analysis
- ii) Methods of expressing concentration
- iii) Primary and secondary standards.
- iv) Preparation and standardization of various molar and normal solutions- Oxalic acid, sodium hydroxide, hydrochloric acid, sodium thiosulphate, sulphuric acid, potassium permanganate and ceric ammonium sulphate

(b)**Errors:** Sources of errors, types of errors, methods of minimizing errors, accuracy, precision and significant figures

(c)Pharmacopoeia, Sources of impurities in medicinal agents,limit tests.

#### UNIT-II

10 Hours

- **Acid base titration:** Theories of acid base indicators, classification of acid base titrations and theory involved in titrations of strong, weak, and very weak acids and bases, neutralization curves
- **Non aqueous titration:** Solvents, acidimetry and alkalimetry titration and estimation of Sodium benzoate and Ephedrine HCl

#### UNIT-III

10 Hours

- **Precipitation titrations:** Mohr's method, Volhard's, Modified Volhard's, Fajans method, estimation of sodium chloride.
- **Complexometric titration:** Classification, metal ion indicators, masking and demasking reagents, estimation of Magnesium sulphate, and calcium gluconate.
- **Gravimetry:** Principle and steps involved in gravimetric analysis. Purity of the precipitate: co-precipitation and post precipitation, Estimation of barium sulphate.
- Basic Principles,methods and application of diazotisation titration.





#### UNIT-IV

08 Hours

##### Redox titrations

- (a) Concepts of oxidation and reduction
  - (b) Types of redox titrations (Principles and applications)
- Cerimetry, Iodimetry, Iodometry, Bromatometry, Dichrometry, Titration with potassium iodate

#### UNIT-V

07 Hours

- **Electrochemical methods of analysis**
  - **Conductometry**- Introduction; Conductivity cell, Conductometric titrations, applications.
  - **Potentiometry** - Electrochemical cell, construction and working of reference (Standard hydrogen, silver chloride electrode and calomel electrode) and indicator electrodes (metal electrodes and glass electrode), methods to determine end point of potentiometric titration and applications.
  - **Polarography** - Principle, Ilkovic equation, construction and working of dropping mercury electrode and rotating platinum electrode, applications



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP108P. PHARMACEUTICAL ANALYSIS (Practical)

4 Hours / Week

- I **Limit Test of the following**
  - (1) Chloride
  - (2) Sulphate
  - (3) Iron
  - (4) Arsenic
- II **Preparation and standardization of**
  - (1) Sodium hydroxide
  - (2) Sulphuric acid
  - (3) Sodium thiosulfate
  - (4) Potassium permanganate
  - (5) Ceric ammonium sulphate
- III **Assay of the following compounds along with Standardization of Titrant**
  - (1) Ammonium chloride by acid base titration
  - (2) Ferrous sulphate by Cerimetry
  - (3) Copper sulphate by Iodometry
  - (4) Calcium gluconate by complexometry
  - (5) Hydrogen peroxide by Permanganometry
  - (6) Sodium benzoate by non-aqueous titration
  - (7) Sodium Chloride by precipitation titration
- IV **Determination of Normality by electro-analytical methods**
  - (1) Conductometric titration of strong acid against strong base
  - (2) Conductometric titration of strong acid and weak acid against strong base
  - (3) Potentiometric titration of strong acid against strong base

### Recommended Books: (Latest Editions)

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry
4. Bentley and Driver's Textbook of Pharmaceutical Chemistry
5. John H. Kennedy, Analytical chemistry principles
6. Indian Pharmacopoeia.





## BP103T. PHARMACEUTICS- I (Theory)

45 Hours

**Scope:** This course is designed to impart a fundamental knowledge on the preparatory pharmacy with arts and science of preparing the different conventional dosage forms.

**Objectives:** Upon completion of this course the student should be able to:

- Know the history of profession of pharmacy
- Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
- Understand the professional way of handling the prescription
- Preparation of various conventional dosage forms

### Course Content:

#### UNIT – I

10 Hours

- **Historical background and development of profession of pharmacy:** History of profession of Pharmacy in India in relation to pharmacy education, industry and organization, Pharmacy as a career, Pharmacopoeias: Introduction to IP, BP, USP and Extra Pharmacopoeia.
- **Dosage forms:** Introduction to dosage forms, classification and definitions
- **Prescription:** Definition, Parts of prescription, handling of Prescription and Errors in prescription.
- **Posology:** Definition, Factors affecting posology. Pediatric dose calculations based on age, body weight and body surface area.

#### UNIT – II

10 Hours

- **Pharmaceutical calculations:** Weights and measures – Imperial & Metric system, Calculations involving percentage solutions, alligation, proof spirit and isotonic solutions based on freezing point and molecular weight.
- **Powders:** Definition, classification, advantages and disadvantages, Simple & compound powders – official preparations, dusting powders, effervescent, efflorescent and hygroscopic powders, eutectic mixtures. Geometric dilutions.
- **Liquid dosage forms:** Advantages and disadvantages of liquid dosage forms. Excipients used in formulation of liquid dosage forms. Solubility enhancement techniques



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

### UNIT – III

08 Hours

- **Monophasic liquids:** Definitions and preparations of Gargles, Mouthwashes, Throat Paint, Eardrops, Nasal drops, Enemas, Syrups, Elixirs, Liniments and Lotions
- **Biphasic liquids:**
- **Suspensions:** Definition, advantages and disadvantages, classifications, Preparation of suspensions; Flocculated and Deflocculated suspension & stability problems and methods to overcome.
- **Emulsions:** Definition, classification, emulsifying agent, test for the identification of type of Emulsion, Methods of preparation & stability problems and methods to overcome.

### UNIT – IV

08 Hours

- **Suppositories:** Definition, types, advantages and disadvantages, types of bases, methods of preparations. Displacement value & its calculations, evaluation of suppositories.
- **Pharmaceutical incompatibilities:** Definition, classification, physical, chemical and therapeutic incompatibilities with examples.

### UNIT – V

07 Hours

- **Semisolid dosage forms:** Definitions, classification, mechanisms and factors influencing dermal penetration of drugs. Preparation of ointments, pastes, creams and gels. Excipients used in semi solid dosage forms. Evaluation of semi solid dosage forms



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**1. Syrups**

- a) Syrup IP'66
- b) Compound syrup of Ferrous Phosphate BPC'68

**2. Elixirs**

- a) Piperazine citrate elixir
- b) Paracetamol pediatric elixir

**3. Linctus**

- a) Terpin Hydrate Linctus IP'66

- b) Iodine Throat Paint (Mandles Paint)

**4. Solutions**

- a) Strong solution of ammonium acetate
- b) Cresol with soap solution
- c) Lugol's solution

**5. Suspensions**

- a) Calamine lotion
- b) Magnesium Hydroxide mixture
- c) Aluminium Hydroxide gel

**6. Emulsions**

- a) Turpentine Liniment
- b) Liquid paraffin emulsion

**7. Powders and Granules**

- a) ORS powder (WHO)
- b) Effervescent granules
- c) Dusting powder
- d) Divided powders

**8. Suppositories**

- a) Glycero gelatin suppository
- b) Cocoa butter suppository
- c) Zinc Oxide suppository

**8. Semisolids**

- a) Sulphur ointment
- b) Non staining-iodine ointment with methyl salicylate
- c) Carbopal gel

**9. Gargles and Mouthwashes**

- a) Iodine gargle
- b) Chlorhexidine mouthwash

**Recommended Books: (Latest Editions)**



1. H.C. Ansel et al., Pharmaceutical Dosage Form and Drug Delivery System, Lippincott Williams and Walkins, New Delhi.
2. Carter S.J., Cooper and Gunn's-Dispensing for Pharmaceutical Students, CBS publishers, New Delhi.
3. M.E. Aulton, Pharmaceutics, The Science & Dosage Form Design, Churchill Livingstone, Edinburgh.
4. Indian pharmacopoeia.
5. British pharmacopoeia.
6. Lachmann. Theory and Practice of Industrial Pharmacy, Lea & Febiger Publisher, The University of Michigan.
7. Alfonso R. Gennaro Remington. The Science and Practice of Pharmacy, Lippincott Williams, New Delhi.
8. Carter S.J., Cooper and Gunn's. Tutorial Pharmacy, CBS Publications, New Delhi.
9. E.A. Rawlins, Bentley's Text Book of Pharmaceutics, English Language Book Society, Elsevier Health Sciences, USA.
10. Isaac Ghebre Sellassie: Pharmaceutical Pelletization Technology, Marcel Dekker, INC, New York.
11. Dilip M. Parikh: Handbook of Pharmaceutical Granulation Technology, Marcel Dekker, INC, New York.
12. Francoise Nieloud and Gilberte Marti-Mestres: Pharmaceutical Emulsions and Suspensions, Marcel Dekker, INC, New York.



*Handwritten signature*

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP104T. PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)

45 Hours

**Scope:** This subject deals with the monographs of inorganic drugs and pharmaceuticals.

**Objectives:** Upon completion of course student shall be able to

- know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
- understand the medicinal and pharmaceutical importance of inorganic compounds

### Course Content:

#### UNIT I

10 Hours

- **Impurities in pharmaceutical substances:** History of Pharmacopoeia, Sources and types of impurities, principle involved in the limit test for Chloride, Sulphate, Iron, Arsenic, Lead and Heavy metals, modified limit test for Chloride and Sulphate

**General methods of preparation,** assay for the compounds superscripted with asterisk (\*), properties and medicinal uses of inorganic compounds belonging to the following classes

#### UNIT II

10 Hours

- **Acids, Bases and Buffers:** Buffer equations and buffer capacity in general, buffers in pharmaceutical systems, preparation, stability, buffered isotonic solutions, measurements of tonicity, calculations and methods of adjusting isotonicity.
- **Major extra and intracellular electrolytes:** Functions of major physiological ions, Electrolytes used in the replacement therapy: Sodium chloride\*, Potassium chloride, Calcium gluconate\* and Oral Rehydration Salt (ORS), Physiological acid base balance.
- **Dental products:** Dentifrices, role of fluoride in the treatment of dental caries, Desensitizing agents, Calcium carbonate, Sodium fluoride, and Zinc eugenol cement.

#### UNIT III

10 Hours

- **Gastrointestinal agents**

**Acidifiers:** Ammonium chloride\* and Dil. HCl

**Antacid:** Ideal properties of antacids, combinations of antacids, Sodium



Bicarbonate\*, Aluminum hydroxide gel, Magnesium hydroxide mixture  
**Cathartics:** Magnesium sulphate, Sodium orthophosphate, Kaolin and Bentonite

**Antimicrobials:** Mechanism, classification, Potassium permanganate, Boric acid, Hydrogen peroxide\*, Chlorinated lime\*, Iodine and its preparations

#### UNIT IV

08 Hours

- **Miscellaneous compounds**

**Expectorants:** Potassium iodide, Ammonium chloride\*.

**Emetics:** Copper sulphate\*, Sodium potassium tartarate

**Haematinics:** Ferrous sulphate\*, Ferrous gluconate

**Poison and Antidote:** Sodium thiosulphate\*, Activated charcoal, Sodium nitrite333

**Astringents:** Zinc Sulphate, Potash Alum

#### UNIT V

07 Hours

- **Radiopharmaceuticals:** Radio activity, Measurement of radioactivity, Properties of  $\alpha$ ,  $\beta$ ,  $\gamma$  radiations, Half life, radio isotopes and study of radio isotopes - Sodium iodide  $I^{131}$ , Storage conditions, precautions & pharmaceutical application of radioactive substances.



*tvz*  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP110P. PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)

4 Hours / Week

- I **Limit tests for following ions**
  - Limit test for Chlorides and Sulphates
  - Modified limit test for Chlorides and Sulphates
  - Limit test for Iron
  - Limit test for Heavy metals
  - Limit test for Lead
  - Limit test for Arsenic
- II **Identification test**
  - Magnesium hydroxide
  - Ferrous sulphate
  - Sodium bicarbonate
  - Calcium gluconate
  - Copper sulphate
- III **Test for purity**
  - Swelling power of Bentonite
  - Neutralizing capacity of aluminum hydroxide gel
  - Determination of potassium iodate and iodine in potassium Iodide
- IV **Preparation of inorganic pharmaceuticals**
  - Boric acid
  - Potash alum
  - Ferrous sulphate

### Recommended Books (Latest Editions)

1. A.H. Beckett & J.B. Stenlake's, Practical Pharmaceutical Chemistry Vol I & II, Stahlone Press of University of London, 4<sup>th</sup> edition.
2. A.I. Vogel, Text Book of Quantitative Inorganic analysis
3. P. Gundu Rao, Inorganic Pharmaceutical Chemistry, 3<sup>rd</sup> Edition
4. M.L Schroff, Inorganic Pharmaceutical Chemistry
5. Bentley and Driver's Textbook of Pharmaceutical Chemistry
6. Anand & Chatwal, Inorganic Pharmaceutical Chemistry
7. Indian

Pharmacopocia



## BP105T.COMMUNICATION SKILLS (Theory)

30 Hours

**Scope:** This course will prepare the young pharmacy student to interact effectively with doctors, nurses, dentists, physiotherapists and other health workers. At the end of this course the student will get the soft skills set to work cohesively with the team as a team player and will add value to the pharmaceutical business.

### Objectives:

Upon completion of the course the student shall be able to

1. Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
2. Communicate effectively (Verbal and Non Verbal)
3. Effectively manage the team as a team player
4. Develop interview skills
5. Develop Leadership qualities and essentials

### Course content:

#### UNIT – I

07 Hours

- **Communication Skills:** Introduction, Definition, The Importance of Communication, The Communication Process – Source, Message, Encoding, Channel, Decoding, Receiver, Feedback, Context
- **Barriers to communication:** Physiological Barriers, Physical Barriers, Cultural Barriers, Language Barriers, Gender Barriers, Interpersonal Barriers, Psychological Barriers, Emotional barriers
- **Perspectives in Communication:** Introduction, Visual Perception, Language, Other factors affecting our perspective - Past Experiences, Prejudices, Feelings, Environment

#### UNIT – II

07 Hours

- **Elements of Communication:** Introduction, Face to Face Communication - Tone of Voice, Body Language (Non-verbal communication), Verbal Communication, Physical Communication
- **Communication Styles:** Introduction, The Communication Styles Matrix with example for each -Direct Communication Style, Spirited Communication Style, Systematic Communication Style, Considerate Communication Style





### UNIT – III

07 Hours

- **Basic Listening Skills:** Introduction, Self-Awareness, Active Listening, Becoming an Active Listener, Listening in Difficult Situations
- **Effective Written Communication:** Introduction, When and When Not to Use Written Communication - Complexity of the Topic, Amount of Discussion' Required, Shades of Meaning, Formal Communication
- **Writing Effectively:** Subject Lines, Put the Main Point First, Know Your Audience, Organization of the Message

### UNIT – IV

05 Hours

- **Interview Skills:** Purpose of an interview, Do's and Dont's of an interview
- **Giving Presentations:** Dealing with Fears, Planning your Presentation, Structuring Your Presentation, Delivering Your Presentation, Techniques of Delivery

### UNIT – V

04 Hours

- **Group Discussion:** Introduction, Communication skills in group discussion, Do's and Dont's of group discussion



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## **BP111P.COMMUNICATION SKILLS (Practical)**

**2 Hours / week**

The following learning modules are to be conducted using wordsworth<sup>®</sup> English language lab software

### **Basic communication covering the following topics**

Meeting People  
Asking Questions  
Making Friends  
What did you do?  
Do's and Dont's

### **Pronunciations covering the following topics**

Pronunciation (Consonant Sounds)  
Pronunciation and Nouns  
Pronunciation (Vowel Sounds)

### **Advanced Learning**

Listening Comprehension / Direct and Indirect Speech  
Figures of Speech  
Effective Communication  
Writing Skills  
Effective Writing  
Interview Handling Skills  
E-Mail etiquette  
Presentation Skills



  
**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**Recommended Books: (Latest Edition)**

1. Basic communication skills for Technology, Andreja. J. Ruther Ford, 2<sup>nd</sup> Edition, Pearson Education, 2011
2. Communication skills, Sanjay Kumar, Pushpalata, 1<sup>st</sup> Edition, Oxford Press, 2011
3. Organizational Behaviour, Stephen .P. Robbins, 1<sup>st</sup> Edition, Pearson, 2013
4. Brilliant- Communication skills, Gill Hasson, 1<sup>st</sup> Edition, Pearson Life, 2011
5. The Ace of Soft Skills: Attitude, Communication and Etiquette for success, Gopala Swamy Ramesh, 5<sup>th</sup> Edition, Pearson, 2013
6. Developing your influencing skills, Deborah Dalley, Lois Burton, Margaret, Green hall, 1st Edition Universe of Learning LTD, 2010
7. Communication skills for professionals, Konar nira, 2<sup>nd</sup> Edition, New arrivals – PHI, 2011
8. Personality development and soft skills, Barun K Mitra, 1<sup>st</sup> Edition, Oxford Press, 2011
9. Soft skill for everyone, Butter Field, 1st Edition, Cengage Learning india pvt.ltd, 2011
10. Soft skills and professional communication, Francis Peters SJ, 1<sup>st</sup> Edition, Mc Graw Hill Education, 2011
11. Effective communication, John Adair, 4<sup>th</sup> Edition, Pan Mac Millan, 2009
12. Bringing out the best in people, Aubrey Daniels, 2<sup>nd</sup> Edition, Mc Graw Hill, 1999



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP 106RBT.REMEDIAL BIOLOGY (Theory)

30 Hours

**Scope:** To learn and understand the components of living world, structure and functional system of plant and animal kingdom.

**Objectives:** Upon completion of the course, the student shall be able to

- know the classification and salient features of five kingdoms of life
- understand the basic components of anatomy & physiology of plant
- know understand the basic components of anatomy & physiology animal with special reference to human

### UNIT I

07 Hours

#### Living world:

- Definition and characters of living organisms
- Diversity in the living world
- Binomial nomenclature
- Five kingdoms of life and basis of classification. Salient features of Monera, Protista, Fungi, Animalia and Plantae, Virus,

#### Morphology of Flowering plants

- Morphology of different parts of flowering plants – Root, stem, inflorescence, flower, leaf, fruit, seed.
- General Anatomy of Root, stem, leaf of monocotyledons & Dicotyledones.

### UNIT II

07 Hours

#### Body fluids and circulation

- Composition of blood, blood groups, coagulation of blood
- Composition and functions of lymph
- Human circulatory system
- Structure of human heart and blood vessels
- Cardiac cycle, cardiac output and ECG

#### Digestion and Absorption

- Human alimentary canal and digestive glands
- Role of digestive enzymes
- Digestion, absorption and assimilation of digested food

#### Breathing and respiration

- Human respiratory system
- Mechanism of breathing and its regulation
- Exchange of gases, transport of gases and regulation of respiration
- Respiratory volumes





### UNIT III

07 Hours

#### **Excretory products and their elimination**

- Modes of excretion
- Human excretory system- structure and function
- Urine formation
- Rennin angiotensin system

#### **Neural control and coordination**

- Definition and classification of nervous system
- Structure of a neuron
- Generation and conduction of nerve impulse
- Structure of brain and spinal cord
- Functions of cerebrum, cerebellum, hypothalamus and medulla oblongata

#### **Chemical coordination and regulation**

- Endocrine glands and their secretions
- Functions of hormones secreted by endocrine glands

#### **Human reproduction**

- Parts of female reproductive system
- Parts of male reproductive system
- Spermatogenesis and Oogenesis
- Menstrual cycle

### UNIT IV

05 Hours

#### **Plants and mineral nutrition:**

- Essential mineral, macro and micronutrients
- Nitrogen metabolism, Nitrogen cycle, biological nitrogen fixation

#### **Photosynthesis**

- Autotrophic nutrition, photosynthesis, Photosynthetic pigments, Factors affecting photosynthesis.

### UNIT V

04 Hours

**Plant respiration:**Respiration, glycolysis, fermentation (anaerobic).

#### **Plant growth and development**

- Phases and rate of plant growth, Condition of growth,Introduction to plant growth regulators

#### **Cell - The unit of life**

- Structure and functions of cell and cell organelles.Cell division

#### **Tissues**

- Definition, types of tissues, location and functions.



**Text Books**

- a. Text book of Biology by S. B. Gokhale
- b. A Text book of Biology by Dr. Thulajappa and Dr. Seetaram.

**Reference Books**

- a. A Text book of Biology by B.V. Sreenivasa Naidu
- b. A Text book of Biology by Naidu and Murthy
- c. Botany for Degree students By A.C.Dutta.
- d.Outlines of Zoology by M. Ekambaranatha ayyer and T. N. Ananthakrishnan.
- e. A manual for pharmaceutical biology practical by S.B. Gokhale and C. K. Kokate

**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP112RBP.REMEDIAL BIOLOGY (Practical)

30 Hours

1. Introduction to experiments in biology
  - a) Study of Microscope
  - b) Section cutting techniques
  - c) Mounting and staining
  - d) Permanent slide preparation
2. Study of cell and its inclusions
3. Study of Stem, Root, Leaf, seed, fruit, flower and their modifications
4. Detailed study of frog by using computer models
5. Microscopic study and identification of tissues pertinent to Stem, Root  
Leaf, seed, fruit and flower
6. Identification of bones
7. Determination of blood group
8. Determination of blood pressure
9. Determination of tidal volume

### Reference Books

1. Practical human anatomy and physiology. by S.R.Kale and R.R.Kale.
2. A Manual of pharmaceutical biology practical by S.B.Gokhale, C.K.Kokate and S.P.Shriwastava.
3. Biology practical manual according to National core curriculum .Biology forum of Karnataka. Prof .M.J.H.Shafi



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP 106RMT.REMEDIAL MATHEMATICS (Theory)

30 Hours

**Scope:** This is an introductory course in mathematics. This subject deals with the introduction to Partial fraction, Logarithm, matrices and Determinant, Analytical geometry, Calculus, differential equation and Laplace transform.

**Objectives:** Upon completion of the course the student shall be able to:-

1. Know the theory and their application in Pharmacy
2. Solve the different types of problems by applying theory
3. Appreciate the important application of mathematics in Pharmacy

### Course Content:

#### UNIT – I

06 Hours

- **Partial fraction**

Introduction, Polynomial, Rational fractions, Proper and Improper fractions, Partial fraction, Resolving into Partial fraction, Application of Partial Fraction in Chemical Kinetics and Pharmacokinetics

- **Logarithms**

Introduction, Definition, Theorems/Properties of logarithms, Common logarithms, Characteristic and Mantissa, worked examples, application of logarithm to solve pharmaceutical problems.

- **Function:**

Real Valued function, Classification of real valued functions,

- **Limits and continuity :**

Introduction, Limit of a function, Definition of limit of a function ( $\epsilon - \delta$  definition),  $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = na^{n-1}$ ,  $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\theta} = 1$ ,

#### UNIT –II

06 Hours

- **Matrices and Determinant:**

Introduction matrices, Types of matrices, Operation on matrices, Transpose of a matrix, Matrix Multiplication, Determinants, Properties of determinants, Product of determinants, Minors and co-Factors, Adjoint or adjugate of a square matrix, Singular and non-singular matrices, Inverse of a matrix, Solution of system of linear of equations using matrix method, Cramer's rule, Characteristic equation and roots of a square matrix, Cayley-Hamilton theorem, Application of Matrices in solving Pharmacokinetic equations





### UNIT – III

06 Hours

- **Calculus**

**Differentiation** : Introductions, Derivative of a function, Derivative of a constant, Derivative of a product of a constant and a function, Derivative of the sum or difference of two functions, Derivative of the product of two functions (product formula), Derivative of the quotient of two functions (Quotient formula) – **Without Proof**, Derivative of  $x^n$  w.r.t.x, where  $n$  is any rational number, Derivative of  $e^x$ , Derivative of  $\log_e x$ , Derivative of  $a^x$ , Derivative of trigonometric functions from first principles (**without Proof**), Successive Differentiation, Conditions for a function to be a maximum or a minimum at a point. Application

### UNIT – IV

06 Hours

- **Analytical Geometry**

**Introduction**: Signs of the Coordinates, Distance formula,

**Straight Line** : Slope or gradient of a straight line, Conditions for parallelism and perpendicularity of two lines, Slope of a line joining two points, Slope – intercept form of a straight line

**Integration**:

Introduction, Definition, Standard formulae, Rules of integration, Method of substitution, Method of Partial fractions, Integration by parts, definite integrals, application

### UNIT-V

06 Hours

- **Differential Equations** : Some basic definitions, Order and degree, Equations in separable form, Homogeneous equations, Linear Differential equations, Exact equations, **Application in solving Pharmacokinetic equations**
- **Laplace Transform** : Introduction, Definition, Properties of Laplace transform, Laplace Transforms of elementary functions, Inverse Laplace transforms, Laplace transform of derivatives, Application to solve Linear differential equations, **Application in solving Chemical kinetics and Pharmacokinetics equations**

### Recommended Books (Latest Edition)

1. Differential Calculus by Shanthinarayan
2. Pharmaceutical Mathematics with application to Pharmacy by Panchaksharappa Gowda D.H.
3. Integral Calculus by Shanthinarayan
4. Higher Engineering Mathematics by Dr.B.S.Grewal



## Semester II





## BP 201T. HUMAN ANATOMY AND PHYSIOLOGY-II (Theory)

45 Hours

**Scope:** This subject is designed to impart fundamental knowledge on the structure and functions of the various systems of the human body. It also helps in understanding both homeostatic mechanisms. The subject provides the basic knowledge required to understand the various disciplines of pharmacy.

**Objectives:** Upon completion of this course the student should be able to:

1. Explain the gross morphology, structure and functions of various organs of the human body.
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.
5. Appreciate coordinated working pattern of different organs of each system
6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.

### Course Content:

#### Unit I

10 hours

- **Nervous system**

Organization of nervous system, neuron, neuroglia, classification and properties of nerve fibre, electrophysiology, action potential, nerve impulse, receptors, synapse, neurotransmitters.

Central nervous system: Meninges, ventricles of brain and cerebrospinal fluid. structure and functions of brain (cerebrum, brain stem, cerebellum), spinal cord (gross structure, functions of afferent and efferent nerve tracts, reflex activity)

#### Unit II

06 hours

- **Digestive system**

Anatomy of GI Tract with special reference to anatomy and functions of stomach, ( Acid production in the stomach, regulation of acid production through parasympathetic nervous system, pepsin role in protein digestion) small intestine



and large intestine, anatomy and functions of salivary glands, pancreas and liver, movements of GIT, digestion and absorption of nutrients and disorders of GIT.

- **Energetics**

Formation and role of ATP, Creatinine Phosphate and BMR.

### Unit III

- **Respiratory system**

**10 hours**

Anatomy of respiratory system with special reference to anatomy of lungs, mechanism of respiration, regulation of respiration

Lung Volumes and capacities transport of respiratory gases, artificial respiration, and resuscitation methods.

- **Urinary system**

Anatomy of urinary tract with special reference to anatomy of kidney and nephrons, functions of kidney and urinary tract, physiology of urine formation, micturition reflex and role of kidneys in acid base balance, role of RAS in kidney and disorders of kidney.

### Unit IV

**10 hours**

- **Endocrine system**

Classification of hormones, mechanism of hormone action, structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders.

### Unit V

**09 hours**

- **Reproductive system**

Anatomy of male and female reproductive system, Functions of male and female reproductive system, sex hormones, physiology of menstruation, fertilization, spermatogenesis, oogenesis, pregnancy and parturition

- **Introduction to genetics**

Chromosomes, genes and DNA, protein synthesis, genetic pattern of inheritance





## BP 207 P. HUMAN ANATOMY AND PHYSIOLOGY (Practical)

4 Hours/week

Practical physiology is complimentary to the theoretical discussions in physiology. Practicals allow the verification of physiological processes discussed in theory classes through experiments on living tissue, intact animals or normal human beings. This is helpful for developing an insight on the subject.

1. To study the integumentary and special senses using specimen, models, etc.,
2. To study the nervous system using specimen, models, etc.,
3. To study the endocrine system using specimen, models, etc
4. To demonstrate the general neurological examination
5. To demonstrate the function of olfactory nerve
6. To examine the different types of taste.
7. To demonstrate the visual acuity
8. To demonstrate the reflex activity
9. Recording of body temperature
10. To demonstrate positive and negative feedback mechanism.
11. Determination of tidal volume and vital capacity.
12. Study of digestive, respiratory, cardiovascular systems, urinary and reproductive systems with the help of models, charts and specimens.
13. Recording of basal mass index
14. Study of family planning devices and pregnancy diagnosis test.
15. Demonstration of total blood count by cell analyser
16. Permanent slides of vital organs and gonads.

### Recommended Books (Latest Editions)

1. Essentials of Medical Physiology by K. Sembulingam and P. Sembulingam. Jaypee brothers medical publishers, New Delhi.
2. Anatomy and Physiology in Health and Illness by Kathleen J.W. Wilson, Churchill Livingstone, New York
3. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA




4. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
5. Principles of Anatomy and Physiology by Tortora Grabowski. Palmetto, GA, U.S.A.
6. Textbook of Human Histology by Inderbir Singh, Jaypee brothers medical publishers, New Delhi.
7. Textbook of Practical Physiology by C.L. Ghai, Jaypee brothers medical publishers, New Delhi.
8. Practical workbook of Human Physiology by K. Srinageswari and Rajeev Sharma, Jaypee brother's medical publishers, New Delhi.

**Reference Books:**

1. Physiological basis of Medical Practice-Best and Tailor. Williams & Wilkins Co, Riverview, MI USA
2. Text book of Medical Physiology- Arthur C, Guyton and John. E. Hall. Miamisburg, OH, U.S.A.
3. Human Physiology (vol 1 and 2) by Dr. C.C. Chatterrje ,Academic Publishers Kolkata



  
**PRINCIPAL**  
**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP202T. PHARMACEUTICAL ORGANIC CHEMISTRY –I (Theory)

45 Hours

**Scope:** This subject deals with classification and nomenclature of simple organic compounds, structural isomerism, intermediates forming in reactions, important physical properties, reactions and methods of preparation of these compounds. The syllabus also emphasizes on mechanisms and orientation of reactions.

**Objectives:** Upon completion of the course the student shall be able to

1. write the structure, name and the type of isomerism of the organic compound
2. write the reaction, name the reaction and orientation of reactions
3. account for reactivity/stability of compounds,
4. identify/confirm the identification of organic compound

### Course Content:

General methods of preparation and reactions of compounds superscripted with asterisk (\*) to be explained

To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences

### UNIT-I

07 Hours

- **Classification, nomenclature and isomerism**

Classification of Organic Compounds

Common and IUPAC systems of nomenclature of organic compounds

(up to 10 Carbons open chain and carbocyclic compounds)

Structural isomerisms in organic compounds

### UNIT-II 10 Hours

- **Alkanes\*, Alkenes\* and Conjugated dienes\***

SP<sup>3</sup> hybridization in alkanes, Halogenation of alkanes, uses of paraffins.

Stabilities of alkenes, SP<sup>2</sup> hybridization in alkenes

E<sub>1</sub> and E<sub>2</sub> reactions – kinetics, order of reactivity of alkyl halides, rearrangement of carbocations, Saytzeffs orientation and evidences. E<sub>1</sub> verses E<sub>2</sub> reactions, Factors affecting E<sub>1</sub> and E<sub>2</sub> reactions. Ozonolysis, electrophilic addition reactions of alkenes, Markownikoff's orientation, free radical addition reactions of alkenes, Anti Markownikoff's orientation.

Stability of conjugated dienes, Diel-Alder, electrophilic addition, free radical addition reactions of conjugated dienes, allylic rearrangement

### UNIT-III 10 Hours



- **Alkyl halides\***

$SN_1$  and  $SN_2$  reactions - kinetics, order of reactivity of alkyl halides, stereochemistry and rearrangement of carbocations.

$SN_1$  versus  $SN_2$  reactions, Factors affecting  $SN_1$  and  $SN_2$  reactions

Structure and uses of ethylchloride, Chloroform, trichloroethylene, tetrachloroethylene, dichloromethane, tetrachloromethane and iodoform.

- **Alcohols\***- Qualitative tests, Structure and uses of Ethyl alcohol, Methyl alcohol, chlorobutanol, Cetosteryl alcohol, Benzyl alcohol, Glycerol, Propylene glycol

#### UNIT-IV 10 Hours

- **Carbonyl compounds\* (Aldehydes and ketones)**

Nucleophilic addition, Electromeric effect, aldol condensation, Crossed Aldol condensation, Cannizzaro reaction, Crossed Cannizzaro reaction, Benzoin condensation, Perkin condensation, qualitative tests, Structure and uses of Formaldehyde, Paraldehyde, Acetone, Chloral hydrate, Hexamine, Benzaldehyde, Vanilin, Cinnamaldehyde.

#### UNIT-V

08 Hours

- **Carboxylic acids\***

Acidity of carboxylic acids, effect of substituents on acidity, inductive effect and qualitative tests for carboxylic acids, amide and ester

Structure and Uses of Acetic acid, Lactic acid, Tartaric acid, Citric acid, Succinic acid. Oxalic acid, Salicylic acid, Benzoic acid, Benzyl benzoate, Dimethyl phthalate, Methyl salicylate and Acetyl salicylic acid

- **Aliphatic amines\*** - Basicity, effect of substituent on Basicity. Qualitative test, Structure and uses of Ethanolamine, Ethylenediamine, Amphetamine



*hrs*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP208P. PHARMACEUTICAL ORGANIC CHEMISTRY -I (Practical)

4 Hours / week

1. Systematic qualitative analysis of unknown organic compounds like
  1. Preliminary test: Color, odour, aliphatic/aromatic compounds, saturation and unsaturation, etc.
  2. Detection of elements like Nitrogen, Sulphur and Halogen by Lassaigne's test
  3. Solubility test
  4. Functional group test like Phenols, Amides/ Urea, Carbohydrates, Amines, Carboxylic acids, Aldehydes and Ketones, Alcohols, Esters, Aromatic and Halogenated Hydrocarbons, Nitro compounds and Anilides.
  5. Melting point/Boiling point of organic compounds
  6. Identification of the unknown compound from the literature using melting point/ boiling point.
  7. Preparation of the derivatives and confirmation of the unknown compound by melting point/ boiling point.
  8. Minimum 5 unknown organic compounds to be analysed systematically.
2. Preparation of suitable solid derivatives from organic compounds
3. Construction of molecular models

### Recommended Books (Latest Editions)

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar , Volume-I
3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
4. Organic Chemistry by P.L.Soni
5. Practical Organic Chemistry by Mann and Saunders.
6. Vogel's text book of Practical Organic Chemistry
7. Advanced Practical organic chemistry by N.K.Vishnoi.
8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.
9. Reaction and reaction mechanism by Ahluwalia/Chatwal.



## BP203 T. BIOCHEMISTRY (Theory)

45 Hours

**Scope:** Biochemistry deals with complete understanding of the molecular levels of the chemical process associated with living cells. The scope of the subject is providing biochemical facts and the principles to understand metabolism of nutrient molecules in physiological and pathological conditions. It is also emphasizing on genetic organization of mammalian genome and hetero & autocatalytic functions of DNA.

**Objectives:** Upon completion of course student shall be able to

1. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
2. Understand the metabolism of nutrient molecules in physiological and pathological conditions.
3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.

### Course Content:

#### UNIT I

08 Hours

- **Biomolecules**

Introduction, classification, chemical nature and biological role of carbohydrate, lipids, nucleic acids, amino acids and proteins.

- **Bioenergetics**

Concept of free energy, endergonic and exergonic reaction, Relationship between free energy, enthalpy and entropy; Redox potential.

Energy rich compounds; classification; biological significances of ATP and cyclic AMP

#### UNIT II

10 Hours

- **Carbohydrate metabolism**

Glycolysis – Pathway, energetics and significance

Citric acid cycle- Pathway, energetics and significance

HMP shunt and its significance; Glucose-6-Phosphate dehydrogenase (G6PD) deficiency

Glycogen metabolism Pathways and glycogen storage diseases (GSD)

Gluconeogenesis- Pathway and its significance

Hormonal regulation of blood glucose level and Diabetes mellitus

- **Biological oxidation**

Electron transport chain (ETC) and its mechanism.



*Handwritten signature*  
**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Oxidative phosphorylation & its mechanism and substrate level phosphorylation

Inhibitors ETC and oxidative phosphorylation/Uncouplers

### UNIT III

10 Hours

- **Lipid metabolism**

$\beta$ -Oxidation of saturated fatty acid (Palmitic acid)



*Handwritten signature in green ink*

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Formation and utilization of ketone bodies; ketoacidosis

De novo synthesis of fatty acids (Palmitic acid)

Biological significance of cholesterol and conversion of cholesterol into bile acids, steroid hormone and vitamin D

Disorders of lipid metabolism. Hypercholesterolemia, atherosclerosis, fatty liver and obesity.

- **Amino acid metabolism**

General reactions of amino acid metabolism: Transamination, deamination & decarboxylation, urea cycle and its disorders

Catabolism of phenylalanine and tyrosine and their metabolic disorders (Phenylketonuria, Albinism, alcaptonuria, tyrosinemia)

Synthesis and significance of biological substances; 5-HT, melatonin, dopamine, noradrenaline, adrenaline

Catabolism of heme; hyperbilirubinemia and jaundice

#### UNIT IV

10 Hours

- **Nucleic acid metabolism and genetic information transfer**

Biosynthesis of purine and pyrimidine nucleotides

Catabolism of purine nucleotides and Hyperuricemia and Gout disease

Organization of mammalian genome

Structure of DNA and RNA and their functions

DNA replication (semi conservative model)

Transcription or RNA synthesis

Genetic code, Translation or Protein synthesis and inhibitors





- **Enzymes**

Introduction, properties, nomenclature and IUB classification of enzymes

Enzyme kinetics (Michaelis plot, Line Weaver Burke plot)

Enzyme inhibitors with examples

Regulation of enzymes: enzyme induction and repression, allosteric enzymes regulation

Therapeutic and diagnostic applications of enzymes and isoenzymes

Coenzymes –Structure and biochemical functions

**BP 209 P. BIOCHEMISTRY (Practical)****4 Hours / Week**

1. Qualitative analysis of carbohydrates (Glucose, Fructose, Lactose, Maltose, Sucrose and starch)
2. Identification tests for Proteins (albumin and Casein)
3. Quantitative analysis of reducing sugars (DNSA method) and Proteins (Biuret method)
4. Qualitative analysis of urine for abnormal constituents
5. Determination of blood creatinine
6. Determination of blood sugar
7. Determination of serum total cholesterol
8. Preparation of buffer solution and measurement of pH
9. Study of enzymatic hydrolysis of starch
10. Determination of Salivary amylase activity
11. Study the effect of Temperature on Salivary amylase activity.
12. Study the effect of substrate concentration on salivary amylase activity.



### Recommended Books (Latest Editions)

1. Principles of Biochemistry by Lehninger.
2. Harper's Biochemistry by Robert K. Murry, Daryl K. Granner and Victor W. Rodwell.
3. Biochemistry by Stryer.
4. Biochemistry by D. Satyanarayan and U.Chakrapani
5. Textbook of Biochemistry by Rama Rao.
6. Textbook of Biochemistry by Deb.
7. Outlines of Biochemistry by Conn and Stumpf
8. Practical Biochemistry by R.C. Gupta and S. Bhargavan.
9. Introduction of Practical Biochemistry by David T. Plummer. (3rd Edition)
10. Practical Biochemistry for Medical students by Rajagopal and Ramakrishna.
11. Practical Biochemistry by Harold Varley.

### BP 204T.PATHOPHYSIOLOGY (THEORY)

45Hours

**Scope:** Pathophysiology is the study of causes of diseases and reactions of the body to such disease producing causes. This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge required to practice medicine safely, confidently, rationally and effectively.

**Objectives:** Upon completion of the subject student shall be able to –

1. Describe the etiology and pathogenesis of the selected disease states;
2. Name the signs and symptoms of the diseases; and
3. Mention the complications of the diseases.

### Course content:

#### Unit I

10Hours

- **Basic principles of Cell injury and Adaptation:**

Introduction, definitions, Homeostasis, Components and Types of Feedback systems, Causes of cellular injury, Pathogenesis (Cell membrane damage, Mitochondrial damage, Ribosome damage, Nuclear damage), Morphology of cell injury – Adaptive changes (Atrophy, Hypertrophy, hyperplasia, Metaplasia, Dysplasia), Cell swelling, Intra cellular accumulation, Calcification, Enzyme leakage and Cell Death Acidosis & Alkalosis, Electrolyte imbalance





- **Basic mechanism involved in the process of inflammation and repair:**  
Introduction, Clinical signs of inflammation, Different types of Inflammation, Mechanism of Inflammation – Alteration in vascular permeability and blood flow, migration of WBC's, Mediators of inflammation, Basic principles of wound healing in the skin, Pathophysiology of Atherosclerosis

## Unit II

10Hours

- **Cardiovascular System:**  
Hypertension, congestive heart failure, ischemic heart disease (angina, myocardial infarction, atherosclerosis and arteriosclerosis)
- **Respiratory system:** Asthma, Chronic obstructive airways diseases.
- **Renal system:** Acute and chronic renal failure

## Unit II

10Hours

- **Haematological Diseases:**  
Iron deficiency, megaloblastic anemia (Vit B12 and folic acid), sickle cell anemia, thalassemia, hereditary acquired anemia, hemophilia
- **Endocrine system:** Diabetes, thyroid diseases, disorders of sex hormones
- **Nervous system:** Epilepsy, Parkinson's disease, stroke, psychiatric disorders: depression, schizophrenia and Alzheimer's disease.
- **Gastrointestinal system:** Peptic Ulcer
- 

## Unit IV

8 Hours

- Inflammatory bowel diseases, jaundice, hepatitis (A,B,C,D,E,F) alcoholic liver disease.
- **Disease of bones and joints:** Rheumatoid arthritis, osteoporosis and gout
- **Principles of cancer:** classification, etiology and pathogenesis of cancer
- **Diseases of bones and joints:** Rheumatoid Arthritis, Osteoporosis, Gout
- **Principles of Cancer:** Classification, etiology and pathogenesis of Cancer

## Unit V

7 Hours

- **Infectious diseases:** Meningitis, Typhoid, Leprosy, Tuberculosis

Urinary tract infections

- **Sexually transmitted diseases:** AIDS, Syphilis, Gonorrhea

**Recommended Books (Latest Editions)**



1. Vinay Kumar, Abul K. Abas, Jon C. Aster; Robbins & Cotran Pathologic Basis of Disease; South Asia edition; India; Elsevier; 2014.
2. Harsh Mohan; Text book of Pathology; 6<sup>th</sup> edition; India; Jaypee Publications; 2010.
3. Laurence B, Bruce C, Bjorn K. ; Goodman Gilman's The Pharmacological Basis of Therapeutics; 12<sup>th</sup> edition; New York; McGraw-Hill; 2011.
4. Best, Charles Herbert 1899-1978; Taylor, Norman Burke 1885-1972; West, John B (John Burnard); Best and Taylor's Physiological basis of medical practice; 12th ed; united states;
5. William and Wilkins, Baltimore; 1991 [1990 printing].
6. Nicki R. Colledge, Brian R. Walker, Stuart H. Ralston; Davidson's Principles and Practice of Medicine; 21<sup>st</sup> edition; London; ELBS/Churchill Livingstone; 2010.
7. Guyton A, John .E Hall; Textbook of Medical Physiology; 12<sup>th</sup> edition; WB Saunders Company; 2010.
8. Joseph DiPiro, Robert L. Talbert, Gary Yee, Barbara Wells, L. Michael Posey; Pharmacotherapy: A Pathophysiological Approach; 9<sup>th</sup> edition; London; McGraw-Hill Medical; 2014.
9. V. Kumar, R. S. Cotran and S. L. Robbins; Basic Pathology; 6<sup>th</sup> edition; Philadelphia; WB Saunders Company; 1997.
10. Roger Walker, Clive Edwards; Clinical Pharmacy and Therapeutics; 3<sup>rd</sup> edition; London; Churchill Livingstone publication; 2003.

#### Recommended Journals

1. The Journal of Pathology. ISSN: 1096-9896 (Online)
2. The American Journal of Pathology. ISSN: 0002-9440
3. Pathology. 1465-3931 (Online)
4. International Journal of Physiology, Pathophysiology and Pharmacology. ISSN: 1944-8171 (Online)
5. Indian Journal of Pathology and Microbiology. ISSN-0377-4929.



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



## BP205 T. COMPUTER APPLICATIONS IN PHARMACY (Theory)

30 Hrs (2 Hrs/Week)

**Scope:** This subject deals with the introduction Database, Database Management system, computer application in clinical studies and use of databases.

**Objectives:** Upon completion of the course the student shall be able to

1. know the various types of application of computers in pharmacy
2. know the various types of databases
3. know the various applications of databases in pharmacy

### Course content:

#### UNIT – I

06 hours

**Number system:** Binary number system, Decimal number system, Octal number system, Hexadecimal number systems, conversion decimal to binary, binary to decimal, octal to binary etc, binary addition, binary subtraction – One's complement, Two's complement method, binary multiplication, binary division

**Concept of Information Systems and Software :** Information gathering, requirement and feasibility analysis, data flow diagrams, process specifications, input/output design, process life cycle, planning and managing the project

#### UNIT –II

06 hours

**Web technologies:** Introduction to HTML, XML, CSS and Programming languages, introduction to web servers and Server Products

Introduction to databases, MYSQL, MS ACCESS, Pharmacy Drug database

#### UNIT – III

06 hours

**Application of computers in Pharmacy –** Drug information storage and retrieval, Pharmacokinetics, Mathematical model in Drug design, Hospital and Clinical Pharmacy, Electronic Prescribing and discharge (EP) systems, barcode medicine identification and automated dispensing of drugs, mobile technology and adherence monitoring

Diagnostic System, Lab-diagnostic System, Patient Monitoring System, Pharma Information System



#### UNIT – IV

06 hours

**Bioinformatics:** Introduction, Objective of Bioinformatics, Bioinformatics Databases, Concept of Bioinformatics, Impact of Bioinformatics in Vaccine Discovery

#### UNIT-V

06 hours

**Computers as data analysis in Preclinical development:**

Chromatographic data analysis(CDS), Laboratory Information management System (LIMS) and Text Information Management System(TIMs)



  
PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



### **BP210P. COMPUTER APPLICATIONS IN PHARMACY (Practical)**

1. Design a questionnaire using a word processing package to gather information about a particular disease.
2. Create a HTML web page to show personal information.
3. Retrieve the information of a drug and its adverse effects using online tools
4. Creating mailing labels Using Label Wizard , generating label in MS WORD
5. Create a database in MS Access to store the patient information with the required fields Using access
6. Design a form in MS Access to view, add, delete and modify the patient record in the database
7. Generating report and printing the report from patient database
8. Creating invoice table using – MS Access
9. Drug information storage and retrieval using MS Access
10. Creating and working with queries in MS Access
11. Exporting Tables, Queries, Forms and Reports to web pages
12. Exporting Tables, Queries, Forms and Reports to XML pages

#### **Recommended books (Latest edition):**

1. Computer Application in Pharmacy – William E.Fassett –Lea and Febiger, 600 South Washington Square, USA, (215) 922-1330.
2. Computer Application in Pharmaceutical Research and Development –Sean Ekins – Wiley-Interscience, A John Willey and Sons, INC., Publication, USA
3. Bioinformatics (Concept, Skills and Applications) – S.C.Rastogi-CBS Publishers and Distributors, 4596/1- A, 11 Darya Gani, New Delhi – 110 002(INDIA)
4. Microsoft office Access - 2003, Application Development Using VBA, SQL Server, DAP and Infopath – Cary N.Prague – Wiley Dreamtech India (P) Ltd., 4435/7, Ansari Road, Daryagani, New Delhi - 110002



## BP 206 T. ENVIRONMENTAL SCIENCES (Theory)

30 hours

**Scope:** Environmental Sciences is the scientific study of the environmental system and the status of its inherent or induced changes on organisms. It includes not only the study of physical and biological characters of the environment but also the social and cultural factors and the impact of man on environment.

**Objectives:** Upon completion of the course the student shall be able to:

1. Create the awareness about environmental problems among learners.
2. Impart basic knowledge about the environment and its allied problems.
3. Develop an attitude of concern for the environment.
4. Motivate learner to participate in environment protection and environment improvement.
5. Acquire skills to help the concerned individuals in identifying and solving environmental problems.
6. Strive to attain harmony with Nature.

### Course content:

#### Unit-I

10hours

The Multidisciplinary nature of environmental studies

Natural Resources

Renewable and non-renewable resources:

Natural resources and associated problems

a) Forest resources; b) Water resources; c) Mineral resources; d) Food resources; e) Energy resources; f) Land resources: Role of an individual in conservation of natural resources.

#### Unit-II

10hours

Ecosystems

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Introduction, types, characteristic features, structure and function of the ecosystems: Forest ecosystem; Grassland ecosystem; Desert ecosystem; Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

#### Unit- III

10hours

Environmental Pollution: Air pollution; Water pollution, Soil pollution





**Recommended Books (Latest edition):**

1. Y.K. Sing, Environmental Science, New Age International Pvt, Publishers, Bangalore
2. Agarwal, K.C. 2001 Environmental Biology, Nidi Publ. Ltd. Bikaner.
3. Bharucha Frach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad – 380 013, India,
4. Brunner R.C., 1989, Hazardous Waste Incineration, McGraw Hill Inc. 480p
5. Clark R.S., Marine Pollution, Clanderson Press Oxford
6. Cunningham, W.P. Cooper, T.H. Gorhani, E & Hepworth, M.T. 2001, Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
7. De A.K., Environmental Chemistry, Wiley Eastern Ltd.
8. Down of Earth, Centre for Science and Environment



*Handwritten signature in green ink.*

**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## SEMESTER III



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP301T. PHARMACEUTICAL ORGANIC CHEMISTRY –II (Theory)

45 Hours

**Scope:** This subject deals with general methods of preparation and reactions of some organic compounds. Reactivity of organic compounds are also studied here. The syllabus emphasizes on mechanisms and orientation of reactions. Chemistry of fats and oils are also included in the syllabus.

**Objectives:** Upon completion of the course the student shall be able to

1. write the structure, name and the type of isomerism of the organic compound
2. write the reaction, name the reaction and orientation of reactions
3. account for reactivity/stability of compounds,
4. prepare organic compounds

### Course Content:

General methods of preparation and reactions of compounds superscripted with asterisk (\*) to be explained

To emphasize on definition, types, classification, principles/mechanisms, applications, examples and differences

### UNIT I

10 Hours

- **Benzene and its derivatives**
  - A. Analytical, synthetic and other evidences in the derivation of structure of benzene, Orbital picture, resonance in benzene, aromatic characters, Huckel's rule
  - B. Reactions of benzene - nitration, sulphonation, halogenation- reactivity, Friedelcrafts alkylation- reactivity, limitations, Friedelcrafts acylation.
  - C. Substituents, effect of substituents on reactivity and orientation of mono substituted benzene compounds towards electrophilic substitution reaction
  - D. Structure and uses of DDT, Saccharin, BHC and Chloramine

### UNIT II

10 Hours

- **Phenols\*** - Acidity of phenols, effect of substituents on acidity, qualitative tests, Structure and uses of phenol, cresols, resorcinol, naphthols
- **Aromatic Amines\*** - Basicity of amines, effect of substituents on basicity, and synthetic uses of aryl diazonium salts
- **Aromatic Acids\*** -Acidity, effect of substituents on acidity and important reactions of benzoic acid.


### UNIT III

10 Hours

- **Fats and Oils**
  - a. Fatty acids – reactions.



73

  
**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

- b. Hydrolysis, Hydrogenation, Saponification and Rancidity of oils, Drying oils.
- c. Analytical constants – Acid value, Saponification value, Ester value, Iodine value, Acetyl value, Reichert Meissl (RM) value – significance and principle involved in their determination.

#### UNIT IV

08 Hours

- **Polynuclear hydrocarbons:**
  - a. Synthesis, reactions
  - b. Structure and medicinal uses of Naphthalene, Phenanthrene, Anthracene, Diphenylmethane, Triphenylmethane and their derivatives

#### UNIT V

07 Hours

- **Cyclo alkanes\***  
Stabilities – Baeyer's strain theory, limitation of Baeyer's strain theory, Coulson and Moffitt's modification, Sachse Mohr's theory (Theory of strainless rings), reactions of cyclopropane and cyclobutane only



*[Signature]*

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP305P. PHARMACEUTICAL ORGANIC CHEMISTRY -II (Practical)

4 Hrs/week

### I Experiments involving laboratory techniques

- Recrystallization
- Steam distillation

### II Determination. of following oil values (including standardization of reagents)

- Acid value
- Saponification value
- Iodine value

### III Preparation of compounds

- Benzanilide/Phenyl benzoate/Acetanilide from Aniline/ Phenol /Aniline by acylation reaction.
- 2,4,6-Tribromo aniline/Para bromo acetanilide from Aniline/
- Acetanilide by halogenation (Bromination) reaction.
- 5-Nitro salicylic acid/Meta di nitro benzene from Salicylic acid / Nitro benzene by nitration reaction.
- Benzoic acid from Benzyl chloride by oxidation reaction.
- Benzoic acid/ Salicylic acid from alkyl benzoate/ alkyl salicylate by hydrolysis reaction.
- 1-Phenyl azo-2-naphthol from Aniline by diazotization and coupling reactions.
- Benzil from Benzoin by oxidation reaction.
- Dibenzal acetone from Benzaldehyde by Claisen Schmidt reaction
- Cinnamic acid from Benzaldehyde by Perkin reaction
- *P*-Iodo benzoic acid from *P*-amino benzoic acid

### Recommended Books (Latest Editions)

1. Organic Chemistry by Morrison and Boyd
2. Organic Chemistry by I.L. Finar , Volume-I
3. Textbook of Organic Chemistry by B.S. Bahl & Arun Bahl.
4. Organic Chemistry by P.L.Soni
5. Practical Organic Chemistry by Mann and Saunders.
6. Vogel's text book of Practical Organic Chemistry
7. Advanced Practical organic chemistry by N.K. Vishnoi.





PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

8. Introduction to Organic Laboratory techniques by Pavia, Lampman and Kriz.

**BP302T. PHYSICAL PHARMACEUTICS-I (Theory)**

**45Hours**

**Scope:** The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

**Objectives:** Upon the completion of the course student shall be able to

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

**Course Content:**

**UNIT-I**

**10 Hours**

**Solubility of drugs:** Solubility expressions, mechanisms of solute solvent interactions, ideal solubility parameters, solvation & association, quantitative approach to the factors influencing solubility of drugs, diffusion principles in biological systems. Solubility of gas in liquids, solubility of liquids in liquids, (Binary solutions, ideal solutions) Raoult's law, real solutions. Partially miscible liquids, Critical solution temperature and applications. Distribution law, its limitations and applications

**UNIT-II**

**10Hours**

**States of Matter and properties of matter:** State of matter, changes in the state of matter, latent heats, vapour pressure, sublimation critical point, eutectic mixtures, gases, aerosols – inhalers, relative humidity, liquid complexes, liquid crystals, glassy states, solid-crystalline, amorphous & polymorphism.

**Physicochemical properties of drug molecules:** Refractive index, optical rotation, dielectric constant, dipole moment, dissociation constant, determinations and applications

**UNIT-III**

**08 Hours**

**Surface and interfacial phenomenon:** Liquid interface, surface & interfacial tensions,

surface free energy, measurement of surface & interfacial tensions, spreading coefficient, adsorption at liquid interfaces, surface active agents, HLB Scale, solubilisation, detergency, adsorption at solid interface.





#### UNIT-IV

08Hours

**Complexation and protein binding:** Introduction, Classification of Complexation, Applications, methods of analysis, protein binding, Complexation and drug action, crystalline structures of complexes and thermodynamic treatment of stability constants.

#### UNIT-V

07 Hours

**pH, buffers and Isotonic solutions:** Sorensen's pH scale, pH determination (electrometric and calorimetric), applications of buffers, buffer equation, buffer capacity, buffers in pharmaceutical and biological systems, buffered isotonic solutions.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**BP306P. PHYSICAL PHARMACEUTICS – I (Practical)**

**4 Hrs/week**

1. Determination the solubility of drug at room temperature
2. Determination of pK<sub>a</sub> value by Half Neutralization/ Henderson Hasselbalch equation.
3. Determination of Partition co- efficient of benzoic acid in benzene and water
4. Determination of Partition co- efficient of Iodine in CCl<sub>4</sub> and water
5. Determination of % composition of NaCl in a solution using phenol-water system by CST method
6. Determination of surface tension of given liquids by drop count and drop weight method
7. Determination of HLB number of a surfactant by saponification method
8. Determination of Freundlich and Langmuir constants using activated char coal
9. Determination of critical micellar concentration of surfactants
10. Determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method
11. Determination of stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method

**Recommended Books: (Latest Editions)**

1. Physical Pharmacy by Alfred Martin
2. Experimental Pharmaceutics by Eugene, Parott.
3. Tutorial Pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical Calculations, Lea &Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, MarcelDekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical Dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C and ManavalanR.
8. Laboratory Manual of Physical Pharmaceutics, C.V.S. Subramanyam, J. Thimma settee
9. Physical Pharmaceutics by C.V.S. Subramanyam
10. Test book of Physical Pharmacy, by Gaurav Jain & Roop K. Khar





## BP 303 T. PHARMACEUTICAL MICROBIOLOGY (Theory)

45Hours

### Scope:

- Study of all categories of microorganisms especially for the production of alcohol antibiotics, vaccines, vitamins enzymes etc..

**Objectives:** Upon completion of the subject student shall be able to;

1. Understand methods of identification, cultivation and preservation of various microorganisms
2. To understand the importance and implementation of sterilization in pharmaceutical processing and industry
3. Learn sterility testing of pharmaceutical products.
4. Carried out microbiological standardization of Pharmaceuticals.
5. Understand the cell culture technology and its applications in pharmaceutical industries.

### Course content:

#### Unit I

10 Hours

Introduction, history of microbiology, its branches, scope and its importance.

Introduction to Prokaryotes and Eukaryotes

Study of ultra-structure and morphological classification of bacteria, nutritional requirements, raw materials used for culture media and physical parameters for growth, growth curve, isolation and preservation methods for pure cultures, cultivation of anaerobes, quantitative measurement of bacterial growth (total & viable count).

Study of different types of phase contrast microscopy, dark field microscopy and electron microscopy.

#### Unit II

10 Hours

Identification of bacteria using staining techniques (simple, Gram's & Acid fast staining) and biochemical tests (IMViC).

Study of principle, procedure, merits, demerits and applications of physical, chemical gaseous, radiation and mechanical method of sterilization.

Evaluation of the efficiency of sterilization methods.



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Equipments employed in large scale sterilization.

Sterility indicators.

### Unit III

10 Hours

Study of morphology, classification, reproduction/replication and cultivation of Fungi and Viruses.

Classification and mode of action of disinfectants

Factors influencing disinfection, antiseptics and their evaluation. For bacteriostatic and bactericidal actions

Evaluation of bactericidal & Bacteriostatic.

Sterility testing of products (solids, liquids, ophthalmic and other sterile products) according to IP, BP and USP.

### Unit IV

08 Hours

Designing of aseptic area, laminar flow equipments; study of different sources of contamination in an aseptic area and methods of prevention, clean area classification.

Principles and methods of different microbiological assay. Methods for standardization of antibiotics, vitamins and amino acids.

Assessment of a new antibiotic.

### Unit V

07Hours

Types of spoilage, factors affecting the microbial spoilage of pharmaceutical products, sources and types of microbial contaminants, assessment of microbial contamination and spoilage.

Preservation of pharmaceutical products using antimicrobial agents, evaluation of microbial stability of formulations.

Growth of animal cells in culture, general procedure for cell culture, Primary, established and transformed cell cultures.

Application of cell cultures in pharmaceutical industry and research.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP 307P.PHARMACEUTICAL MICROBIOLOGY (Practical)

4 Hrs/week

1. Introduction and study of different equipments and processing, e.g., B.O.D. incubator, laminar flow, aseptic hood, autoclave, hot air sterilizer, deep freezer, refrigerator, microscopes used in experimental microbiology.
2. Sterilization of glassware, preparation and sterilization of media.
3. Sub culturing of bacteria and fungus. Nutrient stabs and slants preparations.
4. Staining methods- Simple, Grams staining and acid fast staining (Demonstration with practical).
5. Isolation of pure culture of micro-organisms by multiple streak plate technique and other techniques.
6. Microbiological assay of antibiotics by cup plate method and other methods
7. Motility determination by Hanging drop method.
8. Sterility testing of pharmaceuticals.
9. Bacteriological analysis of water
10. Biochemical test.

### Recommended Books (Latest edition)

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4<sup>th</sup> edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaccutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Peppler: Microbial Technology.
9. I.P., B.P., U.S.P. - latest editions.
10. Ananthnarayan : Text Book of Microbiology, Orient-Longman, Chennai
11. Edward: Fundamentals of Microbiology.
12. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
13. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., 531162



## BP 304 T. PHARMACEUTICAL ENGINEERING (Theory)

45 Hours

**Scope:** This course is designed to impart a fundamental knowledge on the art and science of various unit operations used in pharmaceutical industry.

**Objectives:** Upon completion of the course student shall be able:

1. To know various unit operations used in Pharmaceutical industries.
2. To understand the material handling techniques.
3. To perform various processes involved in pharmaceutical manufacturing process.
4. To carry out various test to prevent environmental pollution.
5. To appreciate and comprehend significance of plant lay out design for optimum use of resources.
6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.

### Course content:

#### UNIT-I

10 Hours

- **Flow of fluids:** Types of manometers, Reynolds number and its significance, Bernoulli's theorem and its applications, Energy losses, Orifice meter, Venturimeter, Pitot tube and Rotometer.
- **Size Reduction:** Objectives, Mechanisms & Laws governing size reduction, factors affecting size reduction, principles, construction, working, uses, merits and demerits of Hammer mill, ball mill, fluid energy mill, Edge runner mill & end runner mill.
- **Size Separation:** Objectives, applications & mechanism of size separation, official standards of powders, sieves, size separation Principles, construction, working, uses, merits and demerits of Sieve shaker, cyclone separator, Air separator, Bag filter & elutriation tank.

#### UNIT-II

10 Hours

- **Heat Transfer:** Objectives, applications & Heat transfer mechanisms. Fourier's law, Heat transfer by conduction, convection & radiation. Heat interchangers & heat exchangers.





PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

- **Evaporation:** Objectives, applications and factors influencing evaporation, differences between evaporation and other heat process. principles, construction, working, uses, merits and demerits of Steam jacketed kettle, horizontal tube evaporator, climbing film evaporator, forced circulation evaporator, multiple effect evaporator & Economy of multiple effect evaporator.
- **Distillation:** Basic Principles and methodology of simple distillation, flash distillation, fractional distillation, distillation under reduced pressure, steam distillation & molecular distillation

### UNIT- III

08 Hours

- **Drying:** Objectives, applications & mechanism of drying process, measurements & applications of Equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of Tray dryer, drum dryer spray dryer, fluidized bed dryer, vacuum dryer, freeze dryer.
- **Mixing:** Objectives, applications & factors affecting mixing, Difference between solid and liquid mixing, mechanism of solid mixing, liquids mixing and semisolids mixing. Principles, Construction, Working, uses, Merits and Demerits of Double cone blender, twin shell blender, ribbon blender, Sigma blade mixer, planetary mixers, Propellers, Turbines, Paddles & Silverson Emulsifier,

### UNIT-IV

08 Hours

- **Filtration:** Objectives, applications, Theories & Factors influencing filtration, filter aids, filter medias. Principle, Construction, Working, Uses, Merits and demerits of plate & frame filter, filter leaf, rotary drum filter, Meta filter & Cartridge filter, membrane filters and Seidtz filter.
- **Centrifugation:** Objectives, principle & applications of Centrifugation, principles, construction, working, uses, merits and demerits of Perforated basket centrifuge, Non-perforated basket centrifuge, semi continuous centrifuge & super centrifuge.

### UNIT- V

07 Hours

- **Materials of pharmaceutical plant construction, Corrosion and its prevention:** Factors affecting during materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention. Ferrous and nonferrous metals, inorganic and organic non metals, basic of material handling systems.





### **Recommended Books: (Latest Editions)**

1. Introduction to chemical engineering – Walter L Badger & Julius Banchero, Latest edition.
2. Solid phase extraction, Principles, techniques and applications by Nigel J.K. Simpson- Latest edition.
3. Unit operation of chemical engineering – McCabe Smith, Latest edition.
4. Pharmaceutical engineering principles and practices – C.V.S Subrahmanyam et al., Latest edition.
5. Remington practice of pharmacy- Martin, Latest edition.
6. Theory and practice of industrial pharmacy by Lachmann., Latest edition.
7. Physical pharmaceutics- C.V.S Subrahmanyam et al., Latest edition.
8. Cooper and Gunn's Tutorial pharmacy, S.J. Carter, Latest edition.



  
PRINCIPAL


Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP308P - PHARMACEUTICAL ENGINEERING (Practical)

4 Hours/week

- I. Determination of radiation constant of brass, iron, unpainted and painted glass.
- II. Steam distillation – To calculate the efficiency of steam distillation.
- III. To determine the overall heat transfer coefficient by heat exchanger.
- IV. Construction of drying curves (for calcium carbonate and starch).
- V. Determination of moisture content and loss on drying.
- VI. Determination of humidity of air – i) From wet and dry bulb temperatures –use of Dew point method.
- VII. Description of Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, de humidifier.
- VIII. Size analysis by sieving – To evaluate size distribution of tablet granulations – Construction of various size frequency curves including arithmetic and logarithmic probability plots.
- IX. Size reduction: To verify the laws of size reduction using ball mill and determining Kicks, Rittinger's, Bond's coefficients, power requirement and critical speed of Ball Mill.
- X. Demonstration of colloid mill, planetary mixer, fluidized bed dryer, freeze dryer and such other major equipment.
- XI. Factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity
- XII. To study the effect of time on the Rate of Crystallization.
- XIII. To calculate the uniformity Index for given sample by using Double Cone Blender.



  
PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## SEMESTER IV



A handwritten signature in green ink, appearing to be "J. S.", written above the printed name of the Principal.

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP401T. PHARMACEUTICAL ORGANIC CHEMISTRY –III (Theory)

45 Hours

**Scope:** This subject imparts knowledge on stereo-chemical aspects of organic compounds and organic reactions, important named reactions, chemistry of important hetero cyclic compounds. It also emphasizes on medicinal and other uses of organic compounds.

**Objectives:** At the end of the course, the student shall be able to

1. understand the methods of preparation and properties of organic compounds
2. explain the stereo chemical aspects of organic compounds and stereo chemical reactions
3. know the medicinal uses and other applications of organic compounds

### Course Content:

**Note:** To emphasize on definition, types, mechanisms, examples, uses/applications

#### UNIT-I

10 Hours

##### Stereo isomerism

Optical isomerism –

Optical activity, enantiomerism, diastereoisomerism, meso compounds

Elements of symmetry, chiral and achiral molecules

DL system of nomenclature of optical isomers, sequence rules, RS system of nomenclature of optical isomers

Reactions of chiral molecules

Racemic modification and resolution of racemic mixture.

Asymmetric synthesis: partial and absolute

#### UNIT-II

10 Hours

Geometrical isomerism

Nomenclature of geometrical isomers (Cis Trans, EZ, Syn Anti systems)

Methods of determination of configuration of geometrical isomers.

Conformational isomerism in Ethane, n-Butane and Cyclohexane.

Stereo isomerism in biphenyl compounds (Atropisomerism) and conditions for optical activity.

Stereospecific and stereoselective reactions

#### UNIT-III

10 Hours



  
PRINCIPAL

**Heterocyclic compounds:**

Nomenclature and classification

Synthesis, reactions and medicinal uses of following compounds/derivatives

Pyrrole, Furan, and Thiophene

Relative aromaticity and reactivity of Pyrrole, Furan and Thiophene

**UNIT-IV****8 Hours**

Synthesis, reactions and medicinal uses of following compounds/derivatives

Pyrazole, Imidazole, Oxazole and Thiazole.

Pyridine, Quinoline, Isoquinoline, Acridine and Indole. Basicity of pyridine

Synthesis and medicinal uses of Pyrimidine, Purine, azepines and their derivatives

**UNIT-V****07 Hours****Reactions of synthetic importance**

Metal hydride reduction ( $\text{NaBH}_4$  and  $\text{LiAlH}_4$ ), Clemmensen reduction, Birch reduction, Wolff Kishner reduction.

Oppenauer-oxidation and Dakin reaction.

Beckmanns rearrangement and Schmidt rearrangement.

Claisen-Schmidt condensation

**Recommended Books (Latest Editions)**

1. Organic chemistry by I.L. Finar, Volume-I & II.
2. A text book of organic chemistry – Arun Bahl, B.S. Bahl.
3. Heterocyclic Chemistry by Raj K. Bansal
4. Organic Chemistry by Morrison and Boyd
5. Heterocyclic Chemistry by T.L. Gilchrist

**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP402T. MEDICINAL CHEMISTRY – I (Theory)

45 Hours

**Scope:** This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.

**Objectives:** Upon completion of the course the student shall be able to

1. understand the chemistry of drugs with respect to their pharmacological activity
2. understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
3. know the Structural Activity Relationship (SAR) of different class of drugs
4. write the chemical synthesis of some drugs

### Course Content:

**Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (\*)**

### UNIT- I

10 Hours

#### Introduction to Medicinal Chemistry

#### History and development of medicinal chemistry

#### Physicochemical properties in relation to biological action

Ionization, Solubility, Partition Coefficient, Hydrogen bonding, Protein binding, Chelation, Bioisosterism, Optical and Geometrical isomerism.

#### Drug metabolism

Drug metabolism principles- Phase I and Phase II.

Factors affecting drug metabolism including stereo chemical aspects.

### UNIT- II

10 Hours

#### Drugs acting on Autonomic Nervous System

#### Adrenergic Neurotransmitters:

Biosynthesis and catabolism of catecholamine.

Adrenergic receptors (Alpha & Beta) and their distribution.

#### Sympathomimetic agents: SAR of Sympathomimetic agents

Direct acting: Nor-epinephrine, Epinephrine, Phenylephrine\*, Dopamine,



Methyldopa, Clonidine, Dobutamine, Isoproterenol, Terbutaline, Salbutamol\*, Bitolterol, Naphazoline, Oxymetazoline and Xylometazoline.

- Indirect acting agents: Hydroxylamphetamine, Pseudoephedrine, Propylhexedrine.
- Agents with mixed mechanism: Ephedrine, Metaraminol.

#### **Adrenergic Antagonists:**

**Alpha adrenergic blockers:** Tolazoline\*, Phentolamine, Phenoxybenzamine, Prazosin, Dihydroergotamine, Methysergide.

**Beta adrenergic blockers:** SAR of beta blockers, Propranolol\*, Metibranolol, Atenolol, Betazolol, Bisoprolol, Esmolol, Metoprolol, Labetolol, Carvedilol.

### **UNIT-III**

**10 Hours**

#### **Cholinergic neurotransmitters:**

Biosynthesis and catabolism of acetylcholine.

Cholinergic receptors (Muscarinic & Nicotinic) and their distribution.

#### **Parasympathomimetic agents: SAR of Parasympathomimetic agents**

**Direct acting agents:** Acetylcholine, Carbachol\*, Bethanechol, Methacholine, Pilocarpine.

**Indirect acting/ Cholinesterase inhibitors (Reversible & Irreversible):** Physostigmine, Neostigmine\*, Pyridostigmine, Edrophonium chloride, Tacrine hydrochloride, Ambenonium chloride, Isofluorophate, Echothiophate iodide, Parathion, Malathion.

**Cholinesterase reactivator:** Pralidoxime chloride.

#### **Cholinergic Blocking agents: SAR of cholinolytic agents**

**Solanaceous alkaloids and analogues:** Atropine sulphate, Hyoscyamine sulphate, Scopolamine hydrobromide, Homatropine hydrobromide, Ipratropium bromide\*.

**Synthetic cholinergic blocking agents:** Tropicamide, Cyclopentolate hydrochloride, Clidinium bromide, Dicyclomine hydrochloride\*, Glycopyrrolate, Methantheline bromide, Propantheline bromide, Benztropine mesylate, Orphenadrine citrate, Biperidine hydrochloride, Procyclidine hydrochloride\*, Tridihexethyl chloride, Isopropamide iodide, Ethopropazine hydrochloride.

### **UNIT- IV**

**08 Hours**

#### **Drugs acting on Central Nervous System**





### A. Sedatives and Hypnotics:

**Benzodiazepines:** SAR of Benzodiazepines, Chlordiazepoxide, Diazepam\*, Oxazepam, Chlorazepate, Lorazepam, Alprazolam, Zolpidem

**Barbiturates:** SAR of barbiturates, Barbitol\*, Phenobarbital, Mephobarbital, Amobarbital, Butobarbital, Pentobarbital, Secobarbital

#### Miscellaneous:

Amides & imides: Glutethimide.

Alcohol & their carbamate derivatives: Meprobamate, Ethchlorvynol.

Aldehyde & their derivatives: Triclofos sodium, Paraldehyde.

### B. Antipsychotics

**Phenothiazines:** SAR of Phenothiazines - Promazine hydrochloride, Chlorpromazine hydrochloride\*, Triflupromazine, Thioridazine hydrochloride, Piperacetazine hydrochloride, Prochlorperazine maleate, Trifluoperazine hydrochloride.

**Ring Analogues of Phenothiazines:** Chlorprothixene, Thiothixene, Loxapine succinate, Clozapine.

**Fluorobutyrophenones:** Haloperidol, Droperidol, Risperidone.

**Beta amino ketones:** Molindone hydrochloride.

**Benzamides:** Sulpieride.

### C. Anticonvulsants: SAR of Anticonvulsants, mechanism of anticonvulsant action

**Barbiturates:** Phenobarbitone, Methobarbital. **Hydantoins:**

Phenytoin\*, Mephentyoin, Ethotoin **Oxazolidine diones:**

Trimethadione, Paramethadione **Succinimides:**

Phensuximide, Methsuximide, Ethosuximide\* **Urea and**

**monoacylureas:** Phenacemide, Carbamazepine\*

**Benzodiazepines:** Clonazepam

**Miscellaneous:** Primidone, Valproic acid, Gabapentin, Felbamate

## UNIT – V

07 Hours

### Drugs acting on Central Nervous System





### **General anesthetics:**

**Inhalation anesthetics:** Halothane\*, Methoxyflurane, Enflurane, Sevoflurane, Isoflurane, Desflurane.

**Ultra short acting barbiturates:** Methohexital sodium\*, Thiamylal sodium, Thiopental sodium.

**Dissociative anesthetics:** Ketamine hydrochloride.\*


### **Narcotic and non-narcotic analgesics**

**Morphine and related drugs:** SAR of Morphine analogues, Morphine sulphate, Codeine, Meperidine hydrochloride, Anileridine hydrochloride, Diphenoxylate hydrochloride, Loperamide hydrochloride, Fentanyl citrate\*, Methadone hydrochloride\*, Propoxyphene hydrochloride, Pentazocine, Levorphanol tartarate.

**Narcotic antagonists:** Nalorphine hydrochloride, Levallorphan tartarate, Naloxone hydrochloride.

**Anti-inflammatory agents:** Sodium salicylate, Aspirin, Mefenamic acid\*, Meclofenamate, Indomethacin, Sulindac, Tolmetin, Zomepirac, Diclofenac, Ketorolac, Ibuprofen\*, Naproxen, Piroxicam, Phenacetin, Acetaminophen, Antipyrine, Phenylbutazone.



  
**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**I Preparation of drugs/ intermediates**

- 1 1,3-pyrazole
- 2 1,3-oxazole
- 3 Benzimidazole
- 4 Benztriazole
- 5 2,3- diphenyl quinoxaline
- 6 Benzocaine
- 7 Phenytoin
- 8 Phenothiazine
- 9 Barbiturate

**II Assay of drugs**

- 1 Chlorpromazine
- 2 Phenobarbitone
- 3 Atropine
- 4 Ibuprofen
- 5 Aspirin
- 6 Furosemide

**III Determination of Partition coefficient for any two drugs**

**Recommended Books (Latest Editions)**

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.



7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I. Vogel.



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP 403 T. PHYSICAL PHARMACEUTICS-II (Theory)

45Hours

**Scope:** The course deals with the various physical and physicochemical properties, and principles involved in dosage forms/formulations. Theory and practical components of the subject help the student to get a better insight into various areas of formulation research and development, and stability studies of pharmaceutical dosage forms.

**Objectives:** Upon the completion of the course student shall be able to

1. Understand various physicochemical properties of drug molecules in the designing the dosage forms
2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.

### Course Content:

#### UNIT-I

07 Hours

**Colloidal dispersions:** Classification of dispersed systems & their general characteristics, size & shapes of colloidal particles, classification of colloids & comparative account of their general properties. Optical, kinetic & electrical properties. Effect of electrolytes, coacervation, peptization & protective action.

#### UNIT-II

10 Hours

**Rheology:** Newtonian systems, law of flow, kinematic viscosity, effect of temperature, non-Newtonian systems, pseudoplastic, dilatant, plastic, thixotropy, thixotropy in formulation, determination of viscosity, capillary, falling Sphere, rotational viscometers

**Deformation of solids:** Plastic and elastic deformation, Heckel equation, Stress, Strain, Elastic Modulus

#### UNIT-III

10 Hours

**Coarse dispersion:** Suspension, interfacial properties of suspended particles, settling in suspensions, formulation of flocculated and deflocculated suspensions. Emulsions and theories of emulsification, microemulsion and multiple emulsions; Stability of emulsions, preservation of emulsions, rheological properties of emulsions and emulsion formulation by HLB method.



## UNIT-V

10 Hours

**Drug stability:** Reaction kinetics: zero, pseudo-zero, first & second order, units of basic rate constants, determination of reaction order. Physical and chemical factors influencing the chemical degradation of pharmaceutical product: temperature, solvent, ionic strength, dielectric constant, specific & general acid base catalysis, Simple numerical problems. Stabilization of medicinal agents against common reactions like hydrolysis & oxidation. Accelerated stability testing in expiration dating of pharmaceutical dosage forms. Photolytic degradation and its prevention





PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**BP 407P. PHYSICAL PHARMACEUTICS- II (Practical)**

**3 Hrs/week**

1. Determination of particle size, particle size distribution using sieving method
2. Determination of particle size, particle size distribution using Microscopic method
3. Determination of bulk density, true density and porosity
4. Determine the angle of repose and influence of lubricant on angle of repose
5. Determination of viscosity of liquid using Ostwald's viscometer
6. Determination sedimentation volume with effect of different suspending agent
7. Determination sedimentation volume with effect of different concentration of single suspending agent
8. Determination of viscosity of semisolid by using Brookfield viscometer
9. Determination of reaction rate constant first order.
10. Determination of reaction rate constant second order
11. Accelerated stability studies

**Recommended Books: (Latest Editions)**

1. Physical Pharmacy by Alfred Martin, Sixth edition
2. Experimental pharmaceutics by Eugene, Parott.
3. Tutorial pharmacy by Cooper and Gunn.
4. Stocklosam J. Pharmaceutical calculations, Lea & Febiger, Philadelphia.
5. Liberman H.A, Lachman C., Pharmaceutical Dosage forms, Tablets, Volume-1 to 3, Marcel Dekkar Inc.
6. Liberman H.A, Lachman C, Pharmaceutical dosage forms. Disperse systems, volume 1, 2, 3. Marcel Dekkar Inc.
7. Physical Pharmaceutics by Ramasamy C, and Manavalan R.





## BP 404 T. PHARMACOLOGY-I (Theory)

45 Hrs

**Scope:** The main purpose of the subject is to understand what drugs do to the living organisms and how their effects can be applied to therapeutics. The subject covers the information about the drugs like, mechanism of action, physiological and biochemical effects (pharmacodynamics) as well as absorption, distribution, metabolism and excretion (pharmacokinetics) along with the adverse effects, clinical uses, interactions, doses, contraindications and routes of administration of different classes of drugs.

**Objectives:** Upon completion of this course the student should be able to

1. Understand the pharmacological actions of different categories of drugs
2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.
3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
4. Observe the effect of drugs on animals by simulated experiments
5. Appreciate correlation of pharmacology with other bio medical sciences

### Course Content:

#### UNIT-I

08 hours

##### 1. General Pharmacology

- a. Introduction to Pharmacology- Definition, historical landmarks and scope of pharmacology, nature and source of drugs, essential drugs concept and routes of drug administration, Agonists, antagonists( competitive and non competitive), spare receptors, addiction, tolerance, dependence, tachyphylaxis, idiosyncrasy, allergy.
- b. Pharmacokinetics- Membrane transport, absorption, distribution, metabolism and excretion of drugs .Enzyme induction, enzyme inhibition, kinetics of elimination

#### UNIT-II

12 Hours

##### General Pharmacology

- a. Pharmacodynamics- Principles and mechanisms of drug action. Receptor theories and classification of receptors, regulation of receptors. drug receptors interactions signal transduction mechanisms, G-protein–coupled receptors, ion channel receptor, transmembrane enzyme linked receptors, transmembrane JAK-STAT binding receptor and receptors that regulate transcription factors, dose response relationship, therapeutic index, combined effects of drugs and factors modifying drug action.
- b. Adverse drug reactions.
- c. Drug interactions (pharmacokinetic and pharmacodynamic)
- d. Drug discovery and clinical evaluation of new drugs -Drug discovery phase, preclinical evaluation phase, clinical trial phase, phases of clinical trials and pharmacovigilance.



**UNIT-III****10 Hours****2. Pharmacology of drugs acting on peripheral nervous system**

- a. Organization and function of ANS.
- b. Neurohumoral transmission, co transmission and classification of neurotransmitters.
- c. Parasympathomimetics, Parasympatholytics, Sympathomimetics, sympatholytics.
- d. Neuromuscular blocking agents and skeletal muscle relaxants (peripheral).
- e. Local anesthetic agents.
- f. Drugs used in myasthenia gravis and glaucoma

**UNIT-IV****08 Hours****3. Pharmacology of drugs acting on central nervous system**

- a. Neurohumoral transmission in the C.N.S. special emphasis on importance of various neurotransmitters like with GABA, Glutamate, Glycine, serotonin, dopamine.
- b. General anesthetics and pre-anesthetics.
- c. Sedatives, hypnotics and centrally acting muscle relaxants.
- d. Anti-epileptics
- e. Alcohols and disulfiram

**UNIT-V****07 Hours****3. Pharmacology of drugs acting on central nervous system**

- a. Psychopharmacological agents: Antipsychotics, antidepressants, anti-anxiety agents, anti-manics and hallucinogens.
- b. Drugs used in Parkinsons disease and Alzheimer's disease.
- c. CNS stimulants and nootropics.
- d. Opioid analgesics and antagonists
- e. Drug addiction, drug abuse, tolerance and dependence.

**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP 408 P.PHARMACOLOGY-I (Practical)

4Hrs/Week

1. Introduction to experimental pharmacology.
2. Commonly used instruments in experimental pharmacology.
3. Study of common laboratory animals.
4. Maintenance of laboratory animals as per CPCSEA guidelines.
5. Common laboratory techniques. Blood withdrawal, serum and plasma separation, anesthetics and euthanasia used for animal studies.
6. Study of different routes of drugs administration in mice/rats.
7. Study of effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
8. Effect of drugs on ciliary motility of frog oesophagus
9. Effect of drugs on rabbit eye.
10. Effects of skeletal muscle relaxants using rota-rod apparatus.
11. Effect of drugs on locomotor activity using actophotometer.
12. Anticonvulsant effect of drugs by MES and PTZ method.
13. Study of stereotype and anti-catatonic activity of drugs on rats/mice.
14. Study of anxiolytic activity of drugs using rats/mice.
15. Study of local anesthetics by different methods

*Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos*

### Recommended Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



6. K.D.Tripathi. Essentials of Medical Pharmacology, JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
8. Modern Pharmacology with clinical Applications, by Charles R.Craig & Robert,
9. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
10. Kulkarni SK. Handbook of experimental pharmacology. VallabhPrakashan,



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP 405 T.PHARMACOGNOSY AND PHYTOCHEMISTRY I (Theory)

45 Hours

**Scope:** The subject involves the fundamentals of Pharmacognosy like scope, classification of crude drugs, their identification and evaluation, phytochemicals present in them and their medicinal properties.

**Objectives:** Upon completion of the course, the student shall be able

1. to know the techniques in the cultivation and production of crude drugs
2. to know the crude drugs, their uses and chemical nature
3. know the evaluation techniques for the herbal drugs
4. to carry out the microscopic and morphological evaluation of crude drugs

### Course Content:

#### UNIT-I

10 Hours

##### Introduction to Pharmacognosy:

- (a) Definition, history, scope and development of Pharmacognosy
- (b) Sources of Drugs – Plants, Animals, Marine & Tissue culture
- (c) Organized drugs, unorganized drugs (dried latex, dried juices, dried extracts, gums and mucilages, oleoresins and oleo- gum -resins).

##### Classification of drugs:

Alphabetical, morphological, taxonomical, chemical, pharmacological, chemo and sero taxonomical classification of drugs

##### Quality control of Drugs of Natural Origin:

Adulteration of drugs of natural origin. Evaluation by organoleptic, microscopic, physical, chemical and biological methods and properties.

Quantitative microscopy of crude drugs including lycopodium spore method, leaf constants, camera lucida and diagrams of microscopic objects to scale with camera lucida.

#### UNIT-II

10 Hours

##### Cultivation, Collection, Processing and storage of drugs of natural origin:

Cultivation and Collection of drugs of natural origin  
Factors influencing cultivation of medicinal plants.  
Plant hormones and their applications.  
Polyploidy, mutation and hybridization with reference to medicinal plants

##### Conservation of medicinal plants

#### UNIT-III

07 Hours

##### Plant tissue culture:

Historical development of plant tissue culture, types of cultures, Nutritional requirements, growth and their maintenance.  
Applications of plant tissue culture in pharmacognosy.  
Edible vaccines



#### UNIT IV

10 Hours

##### **Pharmacognosy in various systems of medicine:**

Role of Pharmacognosy in allopathy and traditional systems of medicine namely, Ayurveda, Unani, Siddha, Homeopathy and Chinese systems of medicine.

##### **Introduction to secondary metabolites:**

Definition, classification, properties and test for identification of Alkaloids, Glycosides, Flavonoids, Tannins, Volatile oil and Resins

#### UNIT V

08 Hours

Study of biological source, chemical nature and uses of drugs of natural origin containing following drugs

##### **Plant Products:**

Fibers - Cotton, Jute, Hemp

Hallucinogens, Teratogens, Natural allergens

##### **Primary metabolites:**

General introduction, detailed study with respect to chemistry, sources, preparation, evaluation, preservation, storage, therapeutic used and commercial utility as Pharmaceutical Aids and/or Medicines for the following Primary metabolites:

**Carbohydrates:** Acacia, Agar, Tragacanth, Honey

**Proteins and Enzymes :** Gelatin, casein, proteolytic enzymes (Papain, bromelain, serratiopeptidase, urokinase, streptokinase, pepsin).

**Lipids(Waxes, fats, fixed oils) :** Castor oil, Chaulmoogra oil, Wool Fat, Bees Wax

##### **Marine Drugs:**

Novel medicinal agents from marine sources



*hsl*

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## **BP408 P. PHARMACOGNOSY AND PHYTOCHEMISTRY I (Practical)**

**4 Hours/Week**

1. Analysis of crude drugs by chemical tests: (i) Tragacanth (ii) Acacia (iii) Agar (iv) Gelatin (v) starch (vi) Honey (vii) Castor oil
2. Determination of stomatal number and index
3. Determination of vein islet number, vein islet termination and palisade ratio.
4. Determination of size of starch grains, calcium oxalate crystals by eye piece micrometer
5. Determination of Fiber length and width
6. Determination of number of starch grains by Lycopodium spore method
7. Determination of Ash value
8. Determination of Extractive values of crude drugs
9. Determination of moisture content of crude drugs
10. Determination of swelling index and foaming

### **Recommended Books: (Latest Editions)**

1. W.C. Evans, Trease and Evans Pharmacognosy, 16th edition, W.B. Saunders & Co., London, 2009.
2. Tyler, V.E., Brady, L.R. and Robbers, J.E., Pharmacognosy, 9th Edn., Lea and Febiger, Philadelphia, 1988.
3. Text Book of Pharmacognosy by T.E. Wallis
4. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
5. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhale (2007), 37th Edition, Nirali Prakashan, New Delhi.
6. Herbal drug industry by R.D. Choudhary (1996), 1st Edn, Eastern Publisher, New Delhi.
7. Essentials of Pharmacognosy, Dr. S.H. Ansari, 11th edition, Birla publications, New Delhi, 2007
8. Practical Pharmacognosy: C.K. Kokate, Purohit, Gokhale
9. Anatomy of Crude Drugs by M.A. Iyengar



**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## SEMESTER V



*tr*

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP501T. MEDICINAL CHEMISTRY – II (Theory)

45 Hours

**Scope:** This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasizes on structure activity relationships of drugs, importance of physicochemical properties and metabolism of drugs. The syllabus also emphasizes on chemical synthesis of important drugs under each class.

**Objectives:** Upon completion of the course the student shall be able to

1. Understand the chemistry of drugs with respect to their pharmacological activity
2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
3. Know the Structural Activity Relationship of different class of drugs
4. Study the chemical synthesis of selected drugs

### Course Content:

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted (\*)

### UNIT- I

10 Hours

**Antihistaminic agents:** Histamine, receptors and their distribution in the humanbody

**H<sub>1</sub>-antagonists:** Diphenhydramine hydrochloride\*, Dimenhydrinate, Doxylamines succinate, Clemastine fumarate, Diphenylpyraline hydrochloride, Tripelenamine hydrochloride, Chlorcyclizine hydrochloride, Meclizine hydrochloride, Ruclizine hydrochloride, Chlorpheniramine maleate, Triprolidine hydrochloride\*, Phenidamine tartarate, Promethazine hydrochloride\*, Trimeprazine tartrate, Cyproheptadine hydrochloride, Azatidine maleate, Astemizole, Loratadine, Cetirizine, Levocetrazine Cromolyn sodium

**H<sub>2</sub>-antagonists:** Cimetidine\*, Famotidine, Ranitidin.

**Gastric Proton pump inhibitors:** Omeprazole, Lansoprazole, Rabeprazole, Pantoprazole

**Anti-neoplastic agents:**

**Alkylating agents:** Meclorethamine\*, Cyclophosphamide, Melphalan,





Chlorambucil, Busulfan, Thiotepea

**Antimetabolites:** Mercaptopurine\*, Thioguanine, Fluorouracil, Floxuridine, Cytarabine, Methotrexate\*, Azathioprine

**Antibiotics:** Dactinomycin, Daunorubicin, Doxorubicin, Bleomycin

**Plant products:** Etoposide, Vinblastin sulphate, Vincristin sulphate

**Miscellaneous:** Cisplatin, Mitotane.

## UNIT – II

10 Hours

**Anti-anginal:**

**Vasodilators:** Amyl nitrite, Nitroglycerin\*, Pentaerythritol tetranitrate, Isosorbide dinitrite\*, Dipyridamole.

**Calcium channel blockers:** Verapamil, Bepridil hydrochloride, Diltiazem hydrochloride, Nifedipine, Amlodipine, Felodipine, Nicardipine, Nimodipine.

**Diuretics:**

Carbonic anhydrase inhibitors: Acetazolamide\*, Methazolamide, Dichlorphenamide.

Thiazides: Chlorthiazide\*, Hydrochlorothiazide, Hydroflumethiazide, Cyclothiazide,

Loop diuretics: Furosemide\*, Bumetanide, Ethacrynic acid.

Potassium sparing Diuretics: Spironolactone, Triamterene, Amiloride.

Osmotic Diuretics: Mannitol

**Anti-hypertensive Agents:** Timolol, Captopril, Lisinopril, Enalapril, Benazepril hydrochloride, Quinapril hydrochloride, Methyldopate hydrochloride\*, Clonidine hydrochloride, Guanethidine monosulphate, Guanabenz acetate, Sodium nitroprusside, Diazoxide, Minoxidil, Reserpine, Hydralazine hydrochloride.

## UNIT- III

10 Hours

**Anti-arrhythmic Drugs:** Quinidine sulphate, Procainamide hydrochloride, Disopyramide phosphate\*, Phenytoin sodium, Lidocaine hydrochloride, Tocainide hydrochloride, Mexiletine hydrochloride, Lorcaïnide hydrochloride, Amiodarone, Sotalol.

**Anti-hyperlipidemic agents:** Clofibrate, Lovastatin, Cholesteramine and Cholestipol

**Coagulant & Anticoagulants:** Menadione, Acetomenadione, Warfarin\*, Anisindione, clopidogrel

**Drugs used in Congestive Heart Failure:** Digoxin, Digitoxin, Nesiritide, Bosentan, Tezosentan.



## UNIT- IV

08 Hours

### Drugs acting on Endocrine system

Nomenclature, Stereochemistry and metabolism of steroids

**Sex hormones:** Testosterone, Nandrolone, Progestones, Oestriol, Oestradiol, Oestrone, Diethyl stilbestrol.

**Drugs for erectile dysfunction:** Sildenafil, Tadalafil.

**Oral contraceptives:** Mifepristone, Norgestrel, Levonorgestrol

**Corticosteroids:** Cortisone, Hydrocortisone, Prednisolone, Betamethasone, Dexamethasone

**Thyroid and antithyroid drugs:** L-Thyroxine, L-Thyronine, Propylthiouracil, Methimazole.

## UNIT - V

07 Hours

### Antidiabetic agents:

Insulin and its preparations

Sulfonyl ureas: Tolbutamide\*, Chlorpropamide, Glipizide, Glimepiride.

Biguanides: Metformin.

Thiazolidinediones: Pioglitazone, Rosiglitazone.

Meglitinides: Repaglinide, Nateglinide.

Glucosidase inhibitors: Acarbose, Voglibose.

### Local Anesthetics: SAR of Local anesthetics

**Benzoic Acid derivatives;** Cocaine, Hexylcaine, Mepylcaine, Cyclomethycaine, Piperocaine.

**Amino Benzoic acid derivatives:** Benzocaine\*, Butamben, Procaine\*, Butacaine, Propoxycaine, Tetracaine, Benoxinate.

**Lidocaine/Anilide derivatives:** Lignocaine, Mepivacaine, Prilocaine, Etidocaine.

**Miscellaneous:** Phenacaine, Dipreron, Dibucaine.\*

### Recommended Books (Latest Editions)

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.
7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1 to 5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I. Vogel.





## BP 502 T. Industrial PharmacyI (Theory)

45 Hours

**Scope:** Course enables the student to understand and appreciate the influence of pharmaceutical additives and various pharmaceutical dosage forms on the performance of the drug product.

**Objectives:** Upon completion of the course the student shall be able to

1. Know the various pharmaceutical dosage forms and their manufacturing techniques.
2. Know various considerations in development of pharmaceutical dosage forms
3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality

### Course content:

3 hours/ week

#### UNIT-I

07 Hours

**Preformulation Studies:** Introduction to preformulation, goals and objectives, study of physicochemical characteristics of drug substances.

*a. Physical properties:* Physical form (crystal & amorphous), particle size, shape, flow properties, solubility profile (pKa, pH, partition coefficient), polymorphism

*b. Chemical Properties:* Hydrolysis, oxidation, reduction, racemisation, polymerization  
BCS classification of drugs & its significant

Application of preformulation considerations in the development of solid, liquid oral and parenteral dosage forms and its impact on stability of dosage forms.

#### UNIT-II

10 Hours

##### Tablets:

- a. Introduction, ideal characteristics of tablets, classification of tablets. Excipients, Formulation of tablets, granulation methods, compression and processing problems. Equipments and tablet tooling.
- b. Tablet coating: Types of coating, coating materials, formulation of coating composition, methods of coating, equipment employed and defects in coating.
- c. Quality control tests: In process and finished product tests

**Liquid orals:** Formulation and manufacturing consideration of syrups and elixirs suspensions and emulsions; Filling and packaging; evaluation of liquid orals official in pharmacopoeia





### UNIT-III

08 Hours

#### Capsules:

- a. **Hard gelatin capsules:** Introduction, Production of hard gelatin capsule shells. size of capsules, Filling, finishing and special techniques of formulation of hard gelatin capsules, manufacturing defects. In process and final product quality control tests for capsules.
- b. **Soft gelatin capsules:** Nature of shell and capsule content, size of capsules, importance of base adsorption and minim/gram factors, production, in process and final product quality control tests. Packing, storage and stability testing of soft gelatin capsules and their applications.

**Pellets:** Introduction, formulation requirements, pelletization process, equipments for manufacture of pellets

### UNIT-IV

10 Hours

#### Parenteral Products:

- a. Definition, types, advantages and limitations. Preformulation factors and essential requirements, vehicles, additives, importance of isotonicity
- b. Production procedure, production facilities and controls, aseptic processing
- c. Formulation of injections, sterile powders, large volume parenterals and lyophilized products.
- d. Containers and closures selection, filling and sealing of ampoules, vials and infusion fluids. Quality control tests of parenteral products.

**Ophthalmic Preparations:** Introduction, formulation considerations; formulation of eye drops, eye ointments and eye lotions; methods of preparation; labeling, containers; evaluation of ophthalmic preparations

### UNIT-V

10 Hours

**Cosmetics:** Formulation and preparation of the following cosmetic preparations: lipsticks, shampoos, cold cream and vanishing cream, tooth pastes, hair dyes and sunscreens.

**Pharmaceutical Aerosols:** Definition, propellants, containers, valves, types of aerosol systems; formulation and manufacture of aerosols; Evaluation of aerosols; Quality control and stability studies.

**Packaging Materials Science:** Materials used for packaging of pharmaceutical products, factors influencing choice of containers, legal and official requirements for containers, stability aspects of packaging materials, quality control tests.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP 506 P. Industrial PharmacyI (Practical)

4 Hours/week

1. Preformulation studies on paracetamol/asparin/or any other drug
2. Preparation and evaluation of Paracetamol tablets
3. Preparation and evaluation of Aspirin tablets
4. Coating of tablets- film coating of tables/granules
5. Preparation and evaluation of Tetracycline capsules
6. Preparation of Calcium Gluconate injection
7. Preparation of Ascorbic Acid injection
8. Qulaity control test of (as per IP) marketed tablets and capsules
9. Preparation of Eye drops/ and Eye ointments
10. Preparation of Creams (cold / vanishing cream)
11. Evaluation of Glass containers (as per IP)

### Recommended Books: (Latest Editions)

1. Pharmaceutical dosage forms - Tablets, volume 1 -3 by H.A. Liberman, Leon Lachman &J.B.Schwartz
2. Pharmaceutical dosage form - Parenteral medication vol- 1&2 by Liberman & Lachman
3. Pharmaceutical dosage form disperse system VOL-1 by Liberman & Lachman
4. Modern Pharmaceutics by Gilbert S. Banker & C.T. Rhodes, 3rd Edition
5. Remington: The Science and Practice of Pharmacy, 20th edition Pharmaceutical Science (RPS)
6. Theory and Practice of Industrial Pharmacy by Liberman & Lachman
7. Pharmaceutics- The science of dosage form design by M.E.Aulton, Churchill livingstone, Latest edition
8. Introduction to Pharmaceutical Dosage Forms by H. C.Ansel, Lea &Febiger, Philadelphia, 5<sup>th</sup> edition, 2005
9. Drug stability - Principles and practice by Cartensen & C.J. Rhodes, 3rd Edition, Marcel Dekker Series, Vol 10/.





**Scope:** This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on different systems of body and in addition, emphasis on the basic concepts of bioassay.

**Objectives:** Upon completion of this course the student should be able to

1. Understand the mechanism of drug action and its relevance in the treatment of different diseases
2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
3. Demonstrate the various receptor actions using isolated tissue preparation
4. Appreciate correlation of pharmacology with related medical sciences

**Course Content:**

**UNIT-I**

**10hours**

**1. Pharmacology of drugs acting on cardio vascular system**

- a. Introduction to hemodynamic and electrophysiology of heart.
- b. Drugs used in congestive heart failure
- c. Anti-hypertensive drugs.
- d. Anti-anginal drugs.
- e. Anti-arrhythmic drugs.
- f. Anti-hyperlipidemic drugs.

**UNIT-II**

**10hours**

**1. Pharmacology of drugs acting on cardio vascular system**

- a. Drug used in the therapy of shock.
- b. Hematinics, coagulants and anticoagulants.
- c. Fibrinolytics and anti-platelet drugs
- d. Plasma volume expanders

**2. Pharmacology of drugs acting on urinary system**

- a. Diuretics
- b. Anti-diuretics.

**UNIT-III**

**10hours**

**3. Autocoids and related drugs**

- a. Introduction to autocoids and classification
- b. Histamine, 5-HT and their antagonists.
- c. Prostaglandins, Thromboxanes and Leukotrienes.
- d. Angiotensin, Bradykinin and Substance P.
- e. Non-steroidal anti-inflammatory agents
- f. Anti-gout drugs
- g. Antirheumatic drugs



  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



#### UNIT-IV

08hours

##### 5. Pharmacology of drugs acting on endocrine system

- a. Basic concepts in endocrine pharmacology.
- b. Anterior Pituitary hormones- analogues and their inhibitors.
- c. Thyroid hormones- analogues and their inhibitors.
- d. Hormones regulating plasma calcium level- Parathormone, Calcitonin and Vitamin-D.
- d. Insulin, Oral Hypoglycemic agents and glucagon.
- e. ACTH and corticosteroids.

#### UNIT-V

07hours

##### 5. Pharmacology of drugs acting on endocrine system

- a. Androgens and Anabolic steroids.
- b. Estrogens, progesterone and oral contraceptives.
- c. Drugs acting on the uterus.

##### 6. Bioassay

- a. Principles and applications of bioassay.
- b. Types of bioassay
- c. Bioassay of insulin, oxytocin, vasopressin, ACTH, d-tubocurarine, digitalis, histamine and 5-HT



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP 507 P. PHARMACOLOGY-II (Practical)

4Hrs/Week

1. Introduction to *in-vitro* pharmacology and physiological salt solutions.
2. Effect of drugs on isolated frog heart.
3. Effect of drugs on blood pressure and heart rate of dog.
4. Study of diuretic activity of drugs using rats/mice.
5. DRC of acetylcholine using frog rectus abdominis muscle.
6. Effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively.
7. Bioassay of histamine using guinea pig ileum by matching method.
8. Bioassay of oxytocin using rat uterine horn by interpolation method.
9. Bioassay of serotonin using rat fundus strip by three point bioassay.
10. Bioassay of acetylcholine using rat ileum/colon by four point bioassay.
11. Determination of  $PA_2$  value of prazosin using rat anococcygeus muscle (by Schild's plot method).
12. Determination of  $PD_2$  value using guinea pig ileum.
13. Effect of spasmogens and spasmolytics using rabbit jejunum.
14. Anti-inflammatory activity of drugs using carrageenan induced paw-edema model.
15. Analgesic activity of drug using central and peripheral methods

*Note: All laboratory techniques and animal experiments are demonstrated by simulated experiments by softwares and videos*

### Recommended Books (Latest Editions)

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill.
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs, The Point Lippincott Williams & Wilkins.
5. Mycek M.J., Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology.
6. K D. Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) Ltd, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher
8. Modern Pharmacology with clinical Applications, by Charles R.Craig & Robert.
9. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata.
10. Kulkarni SK. Handbook of experimental pharmacology. Vallabh Prakashan.





## BP504 T. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Theory)

45Hours

**Scope:** The main purpose of subject is to impart the students the knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially. Also this subject involves the study of producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine

**Objectives:** Upon completion of the course, the student shall be able

1. to know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
2. to understand the preparation and development of herbal formulation.
3. to understand the herbal drug interactions
4. to carryout isolation and identification of phytoconstituents

### Course Content:

#### UNIT-I

7 Hours

##### Metabolic pathways in higher plants and their determination

- a) Brief study of basic metabolic pathways and formation of different secondary metabolites through these pathways- Shikimic acid pathway, Acetate pathways and Amino acid pathway.
- b) Study of utilization of radioactive isotopes in the investigation of Biogenetic studies.

#### UNIT-II

14 Hours

General introduction, composition, chemistry & chemical classes, biosources, therapeutic uses and commercial applications of following secondary metabolites:

**Alkaloids:** Vinca, Rauwolfia, Belladonna, Opium,

**Phenylpropanoids and Flavonoids:** Lignans, Tea, Ruta

**Steroids, Cardiac Glycosides & Triterpenoids:** Liquorice, Dioscorea, Digitalis

**Volatile oils:** Mentha, Clove, Cinnamon, Fennel, Coriander,

**Tannins:** Catechu, Pterocarpus

**Resins:** Benzoin, Guggul, Ginger, Asafoetida, Myrrh, Colophony

**Glycosides:** Senna, Aloes, Bitter Almond

**Iridoids, Other terpenoids & Naphthaquinones:** Gentian, Artemisia, taxus, carotenoids

#### UNIT-III

06 Hours

Isolation, Identification and Analysis of Phytoconstituents

- a) Terpenoids: Menthol, Citral, Artemisin
- b) Glycosides: Glycyrrhetic acid & Rutin
- c) Alkaloids: Atropine, Quinine, Reserpine, Caffeine
- d) Resins: Podophyllotoxin, Curcumin

#### UNIT-IV

10 Hours

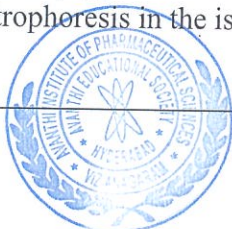
Industrial production, estimation and utilization of the following phytoconstituents: Forskolin, Sennoside, Artemisinin, Diosgenin, Digoxin, Atropine, Podophyllotoxin, Caffeine, Taxol, Vincristine and Vinblastine

#### UNIT V

8 Hours

##### Basics of Phytochemistry

Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.





1. Morphology, histology and powder characteristics & extraction & detection of: Cinchona, Cinnamon, Senna, Clove, Ephedra, Fennel and Coriander
2. Exercise involving isolation & detection of active principles
  - a. Caffeine - from tea dust.
  - b. Diosgenin from Dioscorea
  - c. Atropine from Belladonna
  - d. Sennosides from Senna
3. Separation of sugars by Paper chromatography
4. TLC of herbal extract
5. Distillation of volatile oils and detection of phytoconstituents by TLC
6. Analysis of crude drugs by chemical tests: (i) Asafoetida (ii) Benzoin (iii) Colophony (iv) Aloes (v) Myrrh

**Recommended Books: (Latest Editions)**

1. W.C.Evans, Trease and Evans Pharmacognosy, 16<sup>th</sup> edition, W.B. Saunders & Co., London, 2009.
2. Mohammad Ali. Pharmacognosy and Phytochemistry, CBS Publishers & Distribution, New Delhi.
3. Text book of Pharmacognosy by C.K. Kokate, Purohit, Gokhale (2007), 37<sup>th</sup> Edition, Nirali Prakashan, New Delhi.
4. Herbal drug industry by R.D. Choudhary (1996), 1<sup>st</sup> Edn, Eastern Publisher, New Delhi.
5. Essentials of Pharmacognosy, Dr.SH.Ansari, 1<sup>st</sup> edition, Birla publications, New Delhi, 2007
6. Herbal Cosmetics by H.Pande, Asia Pacific Business press, Inc, New Delhi.
7. A.N. Kalia, Textbook of Industrial Pharmacognosy, CBS Publishers, New Delhi, 2005.
8. R Endress, Plant cell Biotechnology, Springer-Verlag, Berlin, 1994.
9. Pharmacognosy & Pharmacobiotechnology. James Bobbers, Marilyn KS, VE Tylor.
10. The formulation and preparation of cosmetic, fragrances and flavours.
11. Remington's Pharmaceutical sciences.
12. Text Book of Biotechnology by Vyas and Dixit.
13. Text Book of Biotechnology by R.C. Dubey.



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP 505 T. PHARMACEUTICAL JURISPRUDENCE (Theory)

45 Hours

**Scope:** This course is designed to impart basic knowledge on important legislations related to the profession of pharmacy in India.

**Objectives:** Upon completion of the course, the student shall be able to understand:

1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
2. Various Indian pharmaceutical Acts and Laws
3. The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
4. The code of ethics during the pharmaceutical practice

### Course Content:

#### UNIT-I

10 Hours

##### Drugs and Cosmetics Act, 1940 and its rules 1945:

Objectives, Definitions, Legal definitions of schedules to the Act and Rules

Import of drugs – Classes of drugs and cosmetics prohibited from import, Import under license or permit. Offences and penalties.

Manufacture of drugs – Prohibition of manufacture and sale of certain drugs,

Conditions for grant of license and conditions of license for manufacture of drugs, Manufacture of drugs for test, examination and analysis, manufacture of new drug, loan license and repacking license.

#### UNIT-II

10 Hours

##### Drugs and Cosmetics Act, 1940 and its rules 1945.

Detailed study of Schedule G, H, M, N, P, T, U, V, X, Y, Part XII B, Sch F & DMR (OA)

Sale of Drugs – Wholesale, Retail sale and Restricted license. Offences and penalties

Labeling & Packing of drugs- General labeling requirements and specimen labels for drugs and cosmetics, List of permitted colors. Offences and penalties.

Administration of the Act and Rules – Drugs Technical Advisory Board, Central drugs Laboratory, Drugs Consultative Committee, Government drug analysts, Licensing authorities, controlling authorities, Drugs Inspectors

#### UNIT-III

10 Hours

- **Pharmacy Act –1948:** Objectives, Definitions, Pharmacy Council of India; its constitution and functions, Education Regulations, State and Joint state pharmacy councils; constitution and functions, Registration of Pharmacists, Offences and





## Penalties

- **Medicinal and Toilet Preparation Act –1955:** Objectives, Definitions, Licensing, Manufacture In bond and Outside bond, Export of alcoholic preparations, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations. Offences and Penalties.
- **Narcotic Drugs and Psychotropic substances Act-1985 and Rules:** Objectives, Definitions, Authorities and Officers, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and Regulation, opium poppy cultivation and production of poppy straw, manufacture, sale and export of opium, Offences and Penalties

## UNIT-IV

08 Hours

- **Study of Salient Features of Drugs and Magic Remedies Act and its rules:** Objectives, Definitions, Prohibition of certain advertisements, Classes of Exempted advertisements, Offences and Penalties
- **Prevention of Cruelty to animals Act-1960:** Objectives, Definitions, Institutional Animal Ethics Committee, CPCSEA guidelines for Breeding and Stocking of Animals, Performance of Experiments, Transfer and acquisition of animals for experiment, Records, Power to suspend or revoke registration, Offences and Penalties
- **National Pharmaceutical Pricing Authority:** Drugs Price Control Order (DPCO)-2013. Objectives, Definitions, Sale prices of bulk drugs, Retail price of formulations, Retail price and ceiling price of scheduled formulations, National List of Essential Medicines (NLEM)

## UNIT-V

07 Hours

- **Pharmaceutical Legislations** – A brief review, Introduction, Study of drugs enquiry committee, Health survey and development committee, Hathi committee and Mudaliar committee
- **Code of Pharmaceutical ethics** Definition, Pharmacist in relation to his job, trade, medical profession and his profession, Pharmacist's oath
- **Medical Termination of Pregnancy Act**
- **Right to Information Act**
- **Introduction to Intellectual Property Rights (IPR)**

## Recommended books: (Latest Edition)


1. Forensic Pharmacy by B. Suresh





2. Text book of Forensic Pharmacy by B.M. Mithal
3. Hand book of drug law-by M.L. Mehra
4. A text book of Forensic Pharmacy by N.K. Jain
5. Drugs and Cosmetics Act/Rules by Govt. of India publications.
6. Medicinal and Toilet preparations act 1955 by Govt. of India publications.
7. Narcotic drugs and psychotropic substances act by Govt. of India publications
8. Drugs and Magic Remedies act by Govt. of India publication
9. Bare Acts of the said laws published by Government. Reference books (Theory)



  
PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## SEMESTER VI



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP601T. MEDICINAL CHEMISTRY – III (Theory)

45 Hours

**Scope:** This subject is designed to impart fundamental knowledge on the structure, chemistry and therapeutic value of drugs. The subject emphasis on modern techniques of rational drug design like quantitative structure activity relationship (QSAR), Prodrug concept, combinatorial chemistry and Computer aided drug design (CADD). The subject also emphasizes on the chemistry, mechanism of action, metabolism, adverse effects, Structure Activity Relationships (SAR), therapeutic uses and synthesis of important drugs.

**Objectives:** Upon completion of the course student shall be able to

1. Understand the importance of drug design and different techniques of drug design.
2. Understand the chemistry of drugs with respect to their biological activity.
3. Know the metabolism, adverse effects and therapeutic value of drugs.
4. Know the importance of SAR of drugs.

### Course Content:

Study of the development of the following classes of drugs, Classification, mechanism of action, uses of drugs mentioned in the course, Structure activity relationship of selective class of drugs as specified in the course and synthesis of drugs superscripted by (\*)

### UNIT – I

10 Hours

#### Antibiotics

Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes.

**$\beta$ -Lactam antibiotics:** Penicillin, Cephalosporins,  $\beta$ - Lactamase inhibitors, Monobactams

**Aminoglycosides:** Streptomycin, Neomycin, Kanamycin

**Tetracyclines:** Tetracycline, Oxytetracycline, Chlortetracycline, Minocycline, Doxycycline

### UNIT II

10 Hours

#### Antibiotics

Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the following classes.





**Macrolide:** Erythromycin Clarithromycin, Azithromycin.

**Miscellaneous:** Chloramphenicol\*, Clindamycin.

**Prodrugs:** Basic concepts and application of prodrugs design.

**Antimalarials:** Etiology of malaria.

**Quinolines:** SAR, Quinine sulphate, Chloroquine\*, Amodiaquine, Primaquine phosphate, Pamaquine\*, Quinacrine hydrochloride, Mefloquine.

**Biguanides and dihydro triazines:** Cycloguanil pamoate, Proguanil.

**Miscellaneous:** Pyrimethamine, Artesunate, Artemether, Atovaquone.

### UNIT – III

10 Hours

#### Anti-tubercular Agents

**Synthetic anti tubercular agents:** Isoniazid\*, Ethionamide, Ethambutol, Pyrazinamide, Para amino salicylic acid.\*

**Anti tubercular antibiotics:** Rifampicin, Rifabutin, Cycloserine Streptomycin, Capreomycin sulphate.

#### Urinary tract anti-infective agents

**Quinolones:** SAR of quinolones, Nalidixic Acid, Norfloxacin, Enoxacin, Ciprofloxacin\*, Ofloxacin, Lomefloxacin, Sparfloxacin, Gatifloxacin, Moxifloxacin

**Miscellaneous:** Furazolidine, Nitrofurantoin\*, Methanamine.

#### Antiviral agents:

Amantadine hydrochloride, Rimantadine hydrochloride, Idoxuridine trifluoride, Acyclovir\*, Gancyclovir, Zidovudine, Didanosine, Zalcitabine, Lamivudine, Ioviride, Delavirding, Ribavirin, Saquinavir, Indinavir, Ritonavir.

### UNIT – IV

08 Hours

#### Antifungal agents:

**Antifungal antibiotics:** Amphotericin-B, Nystatin, Natamycin, Griseofulvin.

**Synthetic Antifungal agents:** Clotrimazole, Econazole, Butoconazole, Oxiconazole Tioconazole, Miconazole\*, Ketoconazole, Terconazole, Itraconazole, Fluconazole, Naftifine hydrochloride, Tolnaftate\*.

**Anti-protozoal Agents:** Metronidazole\*, Tinidazole, Ornidazole, Diloxanide, Iodoquinol, Pentamidine Isethionate, Atovaquone, Eflornithine.

**Anthelmintics:** Diethylcarbamazine citrate\*, Thiabendazole, Mebendazole\*, Albendazole, Niclosamide, Oxfamiquine, Praziquantal, Ivermectin.



### Sulphonamides and Sulfones

Historical development, chemistry, classification and SAR of Sulfonamides: Sulphamethizole, Sulfisoxazole, Sulphamethizine, Sulfacetamide\*, Sulphapyridine, Sulfamethoxazole\*, Sulphadiazine, Mefenide acetate, Sulfasalazine.

**Folate reductase inhibitors:** Trimethoprim\*, Cotrimoxazole.

**Sulfones:** Dapsone\*.

## UNIT – V

07 Hours

### Introduction to Drug Design

Various approaches used in drug design.

Physicochemical parameters used in quantitative structure activity relationship (QSAR) such as partition coefficient, Hammett's electronic parameter, Taft's steric parameter and Hansch analysis.

Pharmacophore modeling and docking techniques.

**Combinatorial Chemistry:** Concept and applications of combinatorial chemistry: solid phase and solution phase synthesis.




*[Signature]*

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

7. Organic Chemistry by I.L. Finar, Vol. II.
8. The Organic Chemistry of Drug Synthesis by Lednicer, Vol. 1-5.
9. Indian Pharmacopoeia.
10. Text book of practical organic chemistry- A.I.Vogel.



  
**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP602 T. PHARMACOLOGY-III (Theory)

45 Hours

**Scope:** This subject is intended to impart the fundamental knowledge on various aspects (classification, mechanism of action, therapeutic effects, clinical uses, side effects and contraindications) of drugs acting on respiratory and gastrointestinal system, infectious diseases, immuno-pharmacology and in addition, emphasis on the principles of toxicology and chronopharmacology.

**Objectives:** Upon completion of this course the student should be able to:

1. understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
2. comprehend the principles of toxicology and treatment of various poisonings and
3. appreciate correlation of pharmacology with related medical sciences.

### Course Content:

#### UNIT-I

10hours

##### 1. Pharmacology of drugs acting on Respiratory system

- a. Anti -asthmatic drugs
- b. Drugs used in the management of COPD
- c. Expectorants and antitussives
- d. Nasal decongestants
- e. Respiratory stimulants

##### 2. Pharmacology of drugs acting on the Gastrointestinal Tract

- a. Antiulcer agents.
- b. Drugs for constipation and diarrhoea.
- c. Appetite stimulants and suppressants.
- d. Digestants and carminatives.
- e. Emetics and anti-emetics.

#### UNIT-II

10hours

##### 3. Chemotherapy

- a. General principles of chemotherapy.
- b. Sulfonamides and cotrimoxazole.
- c. Antibiotics- Penicillins, cephalosporins, chloramphenicol, macrolides, quinolones and fluoroquinolones, tetracycline and aminoglycosides

#### UNIT-III

10hours

##### 3. Chemotherapy

- a. Antitubercular agents
- b. Antileprotic agents



**I Preparation of drugs and intermediates**

- 1 Sulphanilamide
- 2 7-Hydroxy, 4-methyl coumarin
- 3 Chlorobutanol
- 4 Triphenyl imidazole
- 5 Tolbutamide
- 6 Hexamine

**II Assay of drugs**

- 1 Isonicotinic acid hydrazide
- 2 Chloroquine
- 3 Metronidazole
- 4 Dapsone
- 5 Chlorpheniramine maleate
- 6 Benzyl penicillin

**III Preparation of medicinally important compounds or intermediates by Microwave irradiation technique**

**IV Drawing structures and reactions using chem draw®**

**V Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5)**

**Recommended Books (Latest Editions)**

1. Wilson and Giswold's Organic medicinal and Pharmaceutical Chemistry.
2. Foye's Principles of Medicinal Chemistry.
3. Burger's Medicinal Chemistry, Vol I to IV.
4. Introduction to principles of drug design- Smith and Williams.
5. Remington's Pharmaceutical Sciences.
6. Martindale's extra pharmacopoeia.



*Handwritten signature*

**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

- c. Antifungal agents
- d. Antiviral drugs
- e. Anthelmintics
- f. Antimalarial drugs
- g. Antiamoebic agents

#### UNIT-IV

08hours

#### 3. Chemotherapy

- l. Urinary tract infections and sexually transmitted diseases.
- m. Chemotherapy of malignancy.

#### 4. Immunopharmacology

- a. Immunostimulants
- b. Immunosuppressant

Protein drugs, monoclonal antibodies, target drugs to antigen, biosimilars

#### UNIT-V

07hours

#### 5. Principles of toxicology

- a. Definition and basic knowledge of acute, subacute and chronic toxicity.
- b. Definition and basic knowledge of genotoxicity, carcinogenicity, teratogenicity and mutagenicity
- c. General principles of treatment of poisoning
- d. Clinical symptoms and management of barbiturates, morphine, organophosphorus compound and lead, mercury and arsenic poisoning.

#### 6. Chronopharmacology

- a. Definition of rhythm and cycles.
- b. Biological clock and their significance leading to chronotherapy.



*th*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



1. Dose calculation in pharmacological experiments
2. Antiallergic activity by mast cell stabilization assay
3. Study of anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.
4. Study of effect of drugs on gastrointestinal motility
5. Effect of agonist and antagonists on guinea pig ileum
6. Estimation of serum biochemical parameters by using semi- autoanalyser
7. Effect of saline purgative on frog intestine
8. Insulin hypoglycemic effect in rabbit
9. Test for pyrogens ( rabbit method)
10. Determination of acute oral toxicity (LD50) of a drug from a given data
11. Determination of acute skin irritation / corrosion of a test substance
12. Determination of acute eye irritation / corrosion of a test substance
13. Calculation of pharmacokinetic parameters from a given data
14. Biostatistics methods in experimental pharmacology( student's t test, ANOVA)
15. Biostatistics methods in experimental pharmacology (Chi square test, Wilcoxon Signed Rank test)

*\*Experiments are demonstrated by simulated experiments/videos*

**Recommended Books (Latest Editions)**

1. Rang H. P., Dale M. M., Ritter J. M., Flower R. J., Rang and Dale's Pharmacology, Churchill Livingstone Elsevier
2. Katzung B. G., Masters S. B., Trevor A. J., Basic and clinical pharmacology, Tata Mc Graw-Hill
3. Goodman and Gilman's, The Pharmacological Basis of Therapeutics
4. Marry Anne K. K., Lloyd Yee Y., Brian K. A., Robbin L.C., Joseph G. B., Wayne A. K., Bradley R.W., Applied Therapeutics, The Clinical use of Drugs. The Point Lippincott Williams & Wilkins
5. Mycek M.J, Gelnet S.B and Perper M.M. Lippincott's Illustrated Reviews- Pharmacology
6. K.D.Tripathi. Essentials of Medical Pharmacology, , JAYPEE Brothers Medical Publishers (P) I td, New Delhi.
7. Sharma H. L., Sharma K. K., Principles of Pharmacology, Paras medical publisher Modern Pharmacology with clinical Applications, by Charles R.Craig& Robert,
8. Ghosh MN. Fundamentals of Experimental Pharmacology. Hilton & Company, Kolkata,
9. Kulkarni SK. Handbook of experimental pharmacology. VallabhPrakashan,
10. N.Udupa and P.D. Gupta, Concepts in Chronopharmacology.



## BP 603 T. HERBAL DRUG TECHNOLOGY (Theory)

45 hours

**Scope:** This subject gives the student the knowledge of basic understanding of herbal drug industry, the quality of raw material, guidelines for quality of herbal drugs, herbal cosmetics, natural sweeteners, nutraceutical etc. The subject also emphasizes on Good Manufacturing Practices (GMP), patenting and regulatory issues of herbal drugs

**Objectives:** Upon completion of this course the student should be able to:

1. understand raw material as source of herbal drugs from cultivation to herbal drug product
2. know the WHO and ICH guidelines for evaluation of herbal drugs
3. know the herbal cosmetics, natural sweeteners, nutraceuticals
4. appreciate patenting of herbal drugs, GMP .

### Course content:

#### UNIT-I

11 Hours

##### Herbs as raw materials

Definition of herb, herbal medicine, herbal medicinal product, herbal drug preparation  
Source of Herbs  
Selection, identification and authentication of herbal materials  
Processing of herbal raw material

##### Biodynamic Agriculture

Good agricultural practices in cultivation of medicinal plants including Organic farming.  
Pest and Pest management in medicinal plants: Biopesticides/Bioinsecticides.

##### Indian Systems of Medicine

- a) Basic principles involved in Ayurveda, Siddha, Unani and Homeopathy
- b) Preparation and standardization of Ayurvedic formulations viz Aristas and Asawas, Ghutika, Churna, Lehya and Bhasma.

#### UNIT-II

7 Hours

##### Nutraceuticals

General aspects, Market, growth, scope and types of products available in the market. Health benefits and role of Nutraceuticals in ailments like Diabetes, CVS diseases, Cancer, Irritable bowel syndrome and various Gastro intestinal diseases.  
Study of following herbs as health food: Alfaalfa, Chicory, Ginger, Fenugreek, Garlic, Honey, Amla, Ginseng, Ashwagandha, Spirulina

**Herbal-Drug and Herb-Food Interactions:** General introduction to interaction and classification. Study of following drugs and their possible side effects and interactions: Hypercium, kava-kava, Ginkobiloba, Ginseng, Garlic, Pepper & Ephedra.

#### UNIT-III

10 Hours

##### Herbal Cosmetics



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Sources and description of raw materials of herbal origin used via, fixed oils, waxes, gums colours, perfumes, protective agents, bleaching agents, antioxidants in products such as skin care, hair care and oral hygiene products.

**Herbal excipients:**

Herbal Excipients – Significance of substances of natural origin as excipients – colorants, sweeteners, binders, diluents, viscosity builders, disintegrants, flavors & perfumes.

**Herbal formulations :**

Conventional herbal formulations like syrups, mixtures and tablets and Novel dosage forms like phytosomes

**UNIT- IV**

**10 Hours**

**Evaluation of Drugs** WHO & ICH guidelines for the assessment of herbal drugs  
Stability testing of herbal drugs.

**Patenting and Regulatory requirements of natural products:**

- a) Definition of the terms: Patent, IPR, Farmers right, Breeder's right, Bioprospecting and Biopiracy
- b) Patenting aspects of Traditional Knowledge and Natural Products. Case study of Curcuma & Neem.

**Regulatory Issues** - Regulations in India (ASU DTAB, ASU DCC), Regulation of manufacture of ASU drugs - Schedule Z of Drugs & Cosmetics Act for ASU drugs.

**UNIT-V**

**07 Hours**

**General Introduction to Herbal Industry**

Herbal drugs industry: Present scope and future prospects.

A brief account of plant based industries and institutions involved in work on medicinal and aromatic plants in India.

**Schedule T – Good Manufacturing Practice of Indian systems of medicine**

Components of GMP (Schedule – T) and its objectives

Infrastructural requirements, working space, storage area, machinery and equipments, standard operating procedures, health and hygiene, documentation and records.



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP 609 P. HERBAL DRUG TECHNOLOGY (Practical)

4 hours/ week

1. To perform preliminary phytochemical screening of crude drugs.
2. Determination of the alcohol content of Asava and Arista
3. Evaluation of excipients of natural origin
4. Incorporation of prepared and standardized extract in cosmetic formulations like creams, lotions and shampoos and their evaluation.
5. Incorporation of prepared and standardized extract in formulations like syrups, mixtures and tablets and their evaluation as per Pharmacopoeial requirements.
6. Monograph analysis of herbal drugs from recent Pharmacopoeias
7. Determination of Aldehyde content
8. Determination of Phenol content
9. Determination of total alkaloids

### Recommended Books: (Latest Editions)

1. Textbook of Pharmacognosy by Trease & Evans.
2. Textbook of Pharmacognosy by Tyler, Brady & Robber.
3. Pharmacognosy by Kokate, Purohit and Gokhale
4. Essential of Pharmacognosy by Dr.S.H.Ansari
5. Pharmacognosy & Phytochemistry by V.D.Rangari
6. Pharmacopoeal standards for Ayurvedic Formulation (Council of Research in Indian Medicine & Homeopathy)
7. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.



**UNIT- IV****08 Hours**

**Multicompartment models:** Two compartment open model. IV bolus  
Kinetics of multiple dosing, steady state drug levels, calculation of loading and maintenance doses and their significance in clinical settings.

**UNIT- V****07 Hours**

**Nonlinear Pharmacokinetics:** a. Introduction, b. Factors causing Non-linearity.  
c. Michaelis-menton method of estimating parameters, Explanation with example of drugs.

**Recommended Books: (Latest Editions)**

1. Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi.
2. Biopharmaceutics and Pharmacokinetics; By Robert F Notari
3. Applied biopharmaceutics and pharmacokinetics, Leon Shargel and Andrew B.C.YU 4th edition, Prentice-Hall International edition. USA
4. Bio pharmaceutics and Pharmacokinetics-A Treatise, By D. M. Brahmanekar and Sunil B. Jaiswal, Vallabh Prakashan Pitampura, Delhi
5. Pharmacokinetics: By Milo Gibaldi Donald, R. Marcel Dekker Inc.
6. Hand Book of Clinical Pharmacokinetics, By Milo Gibaldi and Laurie Prescott by ADIS Health Science Press.
7. Biopharmaceutics; By Swarbrick
8. Clinical Pharmacokinetics, Concepts and Applications: By Malcolm Rowland and Thomas, N. Tozen, Lea and Febrger, Philadelphia, 1995.
10. Dissolution, Bioavailability and Bioequivalence, By Abdou H.M, Mack, Publishing Company, Pennsylvania 1989.
11. Biopharmaceutics and Clinical Pharmacokinetics-An introduction 4th edition Revised and expanded by Robert F Notari Marcel Dekker Inc, New York and Basel, 1987.
12. Remington's Pharmaceutical Sciences, By Mack Publishing Company, Pennsylvania



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP 605 T. PHARMACEUTICAL BIOTECHNOLOGY (Theory)

45 Hours

### Scope:

- Biotechnology has a long promise to revolutionize the biological sciences and technology.
- Scientific application of biotechnology in the field of genetic engineering, medicine and fermentation technology makes the subject interesting.
- Biotechnology is leading to new biological revolutions in diagnosis, prevention and cure of diseases, new and cheaper pharmaceutical drugs.
- Biotechnology has already produced transgenic crops and animals and the future promises lot more.
- It is basically a research-based subject.

**Objectives:** Upon completion of the subject student shall be able to;

1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries
2. Genetic engineering applications in relation to production of pharmaceuticals
3. Importance of Monoclonal antibodies in Industries
4. Appreciate the use of microorganisms in fermentation technology

### Unit I

10 Hours

- a) Brief introduction to Biotechnology with reference to Pharmaceutical Sciences.
- b) Enzyme Biotechnology- Methods of enzyme immobilization and applications.
- c) Biosensors- Working and applications of biosensors in Pharmaceutical Industries.
- d) Brief introduction to Protein Engineering.
- e) Use of microbes in industry. Production of Enzymes- General consideration - Amylase, Catalase, Peroxidase, Lipase, Protease, Penicillinase.
- f) Basic principles of genetic engineering.

### Unit II

10 Hours

- a) Study of cloning vectors, restriction endonucleases and DNA ligase.
- b) Recombinant DNA technology. Application of genetic engineering in medicine.
- c) Application of r DNA technology and genetic engineering in the production of:  
i) Interferon ii) Vaccines- hepatitis- B iii) Hormones-Insulin.
- d) Brief introduction to PCR



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



### Unit III

10 Hours

Types of immunity- humoral immunity, cellular immunity

- a) Structure of Immunoglobulins
- b) Structure and Function of MHC
- c) Hypersensitivity reactions, Immune stimulation and Immune suppressions.
- d) General method of the preparation of bacterial vaccines, toxoids, viral vaccine, antitoxins, serum-immune blood derivatives and other products relative to immunity.
- e) Storage conditions and stability of official vaccines
- f) Hybridoma technology- Production, Purification and Applications
- g) Blood products and Plasma Substitutes.

### Unit IV

08Hours

- a) Immuno blotting techniques- ELISA, Western blotting, Southern blotting.
- b) Genetic organization of Eukaryotes and Prokaryotes
- c) Microbial genetics including transformation, transduction, conjugation, plasmids and transposons.
- d) Introduction to Microbial biotransformation and applications.
- e) Mutation: Types of mutation/mutants.

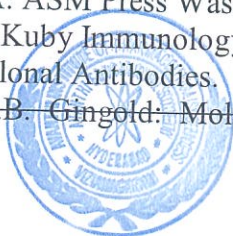
### Unit V

07 Hours

- a) Fermentation methods and general requirements, study of media, equipments, sterilization methods, aeration process, stirring.
- b) Large scale production fermenter design and its various controls.
- c) Study of the production of - penicillins, citric acid, Vitamin B12, Glutamic acid, Griseofulvin,
- d) Blood Products: Collection, Processing and Storage of whole human blood, dried human plasma, plasma Substitutes.

### Recommended Books (Latest edition):

1. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of Recombinant DNA: ASM Press Washington D.C.
2. RA Goldsby et. al., : Kuby Immunology.
3. J.W. Goding: Monoclonal Antibodies.
4. J.M. Walker and E.B. Gingold: Molecular Biology and Biotechnology



Principal

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Society of Chemistry.

5. Zaborsky: Immobilized Enzymes, CRC Press, Degraland, Ohio.
6. S.B. Primrose: Molecular Biotechnology (Second Edition) Blackwell Scientific Publication.
7. Stanbury F., P., Whitakar A., and Hall J., S., Principles of fermentation technology, 2nd edition, Aditya books Ltd., New Delhi



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## **BP606TPHARMACEUTICAL QUALITY ASSURANCE (Theory)**

**45 Hours**

**Scope:** This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It deals with the important aspects like cGMP, QC tests, documentation, quality certifications and regulatory affairs.

**Objectives:** Upon completion of the course student shall be able to:

- understand the cGMP aspects in a pharmaceutical industry
- appreciate the importance of documentation
- understand the scope of quality certifications applicable to pharmaceutical industries
- understand the responsibilities of QA & QC departments

### **Course content:**

#### **UNIT – I**

**10 Hours**

**Quality Assurance and Quality Management concepts:** Definition and concept of Quality control, Quality assurance and GMP

**Total Quality Management (TQM):** Definition, elements, philosophies

**ICH Guidelines:** purpose, participants, process of harmonization, Brief overview of QSFM, with special emphasis on Q-series guidelines, ICH stability testing guidelines

**Quality by design (QbD):** Definition, overview, elements of QbD program, tools

**ISO 9000 & ISO14000:** Overview, Benefits, Elements, steps for registration

**NABL accreditation :** Principles and procedures

#### **UNIT - II**

**10 Hours**

**Organization and personnel:** Personnel responsibilities, training, hygiene and personal records.

**Premises:** Design, construction and plant layout, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination.

**Equipments and raw materials:** Equipment selection, purchase specifications, maintenance, purchase specifications and maintenance of stores for raw materials.

#### **UNIT – III**

**10 Hours**

**Quality Control:** Quality control test for containers, rubber closures and secondary packing



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



materials.

**Good Laboratory Practices:** General Provisions, Organization and Personnel, Facilities, Equipment, Testing Facilities Operation, Test and Control Articles, Protocol for Conduct of a Nonclinical Laboratory Study, Records and Reports, Disqualification of Testing Facilities

#### UNIT – IV

**08 Hours**

**Complaints:** Complaints and evaluation of complaints, Handling of return good, recalling and waste disposal.

**Document maintenance in pharmaceutical industry:** Batch Formula Record, Master Formula Record, SOP, Quality audit, Quality Review and Quality documentation, Reports and documents, distribution records.

#### UNIT – V

**07 Hours**

**Calibration and Validation:** Introduction, definition and general principles of calibration, qualification and validation, importance and scope of validation, types of validation, validation master plan. Calibration of pH meter, Qualification of UV-Visible spectrophotometer, General principles of Analytical method Validation.

**Warehousing:** Good warehousing practice, materials management

#### Recommended Books: (Latest Edition)

1. Quality Assurance Guide by organization of Pharmaceutical Products of India.
2. Good Laboratory Practice Regulations, 2<sup>nd</sup> Edition, Sandy Weinberg Vol. 69.
3. Quality Assurance of Pharmaceuticals- A compendium of Guide lines and Related materials Vol I WHO Publications.
4. A guide to Total Quality Management- Kushik Maitra and Sedhan K Ghosh
5. How to Practice GMP's – P P Sharma.
6. ISO 9000 and Total Quality Management – Sadhank G Ghosh
7. The International Pharmacopoeia – Vol I, II, III, IV- General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excipients and Dosage forms
8. Good laboratory Practices – Marcel Dekker Series
9. ICH guidelines, ISO 9000 and 14000 guidelines



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## SEMESTER VII



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP701T. INSTRUMENTAL METHODS OF ANALYSIS (Theory)

45 Hours

**Scope:** This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart a fundamental knowledge on the principles and instrumentation of spectroscopic and chromatographic technique. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing.

**Objectives:** Upon completion of the course the student shall be able to

1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
2. Understand the chromatographic separation and analysis of drugs.
3. Perform quantitative & qualitative analysis of drugs using various analytical instruments.

### Course Content:

#### UNIT –I

10 Hours

##### UV Visible spectroscopy

Electronic transitions, chromophores, auxochromes, spectral shifts, solvent effect on absorption spectra, Beer and Lambert's law, Derivation and deviations.

Instrumentation - Sources of radiation, wavelength selectors, sample cells, detectors- Photo tube, Photomultiplier tube, Photo voltaic cell, Silicon Photodiode.

Applications - Spectrophotometric titrations, Single component and multi component analysis

##### Fluorimetry

Theory, Concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications

#### UNIT –II

10 Hours

##### IR spectroscopy

Introduction, fundamental modes of vibrations in poly atomic molecules, sample handling, factors affecting vibrations

Instrumentation - Sources of radiation, wavelength selectors, detectors - Golay cell, Bolometer, Thermocouple, Thermister, Pyroelectric detector and applications

**Flame Photometry**-Principle, interferences, instrumentation and applications





**Atomic absorption spectroscopy-** Principle, interferences, instrumentation and applications

**Nepheloturbidometry-** Principle, instrumentation and applications

### UNIT –III

10 Hours

**Introduction to chromatography**

**Adsorption and partition column chromatography-**Methodology, advantages, disadvantages and applications.

**Thin layer chromatography-** Introduction, Principle, Methodology, Rf values, advantages, disadvantages and applications.

**Paper chromatography-**Introduction, methodology, development techniques, advantages, disadvantages and applications

**Electrophoresis–** Introduction, factors affecting electrophoretic mobility, Techniques of paper, gel, capillary electrophoresis, applications

### UNIT –IV

08 Hours

**Gas chromatography -** Introduction, theory, instrumentation, derivatization, temperature programming, advantages, disadvantages and applications

**High performance liquid chromatography (HPLC)-**Introduction, theory, instrumentation, advantages and applications.

### UNIT –V

07 Hours

**Ion exchange chromatography-** Introduction, classification, ion exchange resins, properties, mechanism of ion exchange process, factors affecting ion exchange, methodology and applications

**Gel chromatography-** Introduction, theory, instrumentation and applications

**Affinity chromatography-** Introduction, theory, instrumentation and applications



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP705P. INSTRUMENTAL METHODS OF ANALYSIS (Practical)

4 Hours/Week

- 1 Determination of absorption maxima and effect of solvents on absorption maxima of organic compounds
- 2 Estimation of dextrose by colorimetry
- 3 Estimation of sulfanilamide by colorimetry
- 4 Simultaneous estimation of ibuprofen and paracetamol by UV spectroscopy
- 5 Assay of paracetamol by UV- Spectrophotometry
- 6 Estimation of quinine sulfate by fluorimetry
- 7 Study of quenching of fluorescence
- 8 Determination of sodium by flame photometry
- 9 Determination of potassium by flame photometry
- 10 Determination of chlorides and sulphates by nephelo turbidometry
- 11 Separation of amino acids by paper chromatography
- 12 Separation of sugars by thin layer chromatography
- 13 Separation of plant pigments by column chromatography
- 14 Demonstration experiment on HPLC
- 15 Demonstration experiment on Gas Chromatography

### Recommended Books (Latest Editions)

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J.B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Organic spectroscopy by William Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP 702 T. INDUSTRIAL PHARMACYII (Theory)

45 Hours

**Scope:** This course is designed to impart fundamental knowledge on pharmaceutical product development and translation from laboratory to market

**Objectives:** Upon completion of the course, the student shall be able to:

1. Know the process of pilot plant and scale up of pharmaceutical dosage forms
2. Understand the process of technology transfer from lab scale to commercial batch
3. Know different Laws and Acts that regulate pharmaceutical industry
4. Understand the approval process and regulatory requirements for drug products

### Course Content:

#### UNIT-I

10 Hours

**Pilot plant scale up techniques:** General considerations - including significance of personnel requirements, space requirements, raw materials, Pilot plant scale up considerations for solids, liquid orals, semi solids and relevant documentation, SUPAC guidelines, Introduction to platform technology

#### UNIT-II

10 Hours

**Technology development and transfer:** WHO guidelines for Technology Transfer(TT): Terminology, Technology transfer protocol, Quality risk management, Transfer from R & D to production (Process, packaging and cleaning), Granularity of TT Process (API, excipients, finished products, packaging materials) Documentation, Premises and equipments, qualification and validation, quality control, analytical method transfer, Approved regulatory bodies and agencies, Commercialization - practical aspects and problems (case studies), TT agencies in India - APCTD, NRDC, TIFAC, BCIL, TBSE / SIDBI; TT related documentation - confidentiality agreement, licensing, MoUs, legal issues

#### UNIT-III

10 Hours

**Regulatory affairs:** Introduction, Historical overview of Regulatory Affairs, Regulatory authorities, Role of Regulatory affairs department, Responsibility of Regulatory Affairs Professionals

**Regulatory requirements for drug approval:** Drug Development Teams, Non-Clinical Drug Development, Pharmacology, Drug Metabolism and Toxicology, General considerations of Investigational New Drug (IND) Application, Investigator's Brochure (IB) and New Drug Application (NDA), Clinical research / BE studies, Clinical Research Protocols, Biostatistics in Pharmaceutical Product Development, Data Presentation for FDA Submissions, Management of Clinical Studies.



147

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



#### UNIT-IV

08 Hours

**Quality management systems:** Quality management & Certifications: Concept of Quality, Total Quality Management, Quality by Design (QbD), Six Sigma concept, Out of Specifications (OOS), Change control, Introduction to ISO 9000 series of quality systems standards, ISO 14000, NABL, GLP

#### UNIT-V

07 Hours

**Indian Regulatory Requirements:** Central Drug Standard Control Organization (CDSCO) and State Licensing Authority: Organization, Responsibilities, Certificate of Pharmaceutical Product (COPP), Regulatory requirements and approval procedures for New Drugs.

#### Recommended Books: (Latest Editions)

1. Regulatory Affairs from Wikipedia, the free encyclopedia modified on 7<sup>th</sup> April available at [http://en.wikipedia.org/wiki/Regulatory\\_Affairs](http://en.wikipedia.org/wiki/Regulatory_Affairs).
2. International Regulatory Affairs Updates, 2005. available at <http://www.iraup.com/about.php>
3. Douglas J Pisano and David S. Mantus. Text book of FDA Regulatory Affairs A Guide for Prescription Drugs, Medical Devices, and Biologics' Second Edition.
4. Regulatory Affairs brought by learning plus, inc. available at <http://www.cgmp.com/ra.htm>.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP 703I. PHARMACY PRACTICE (Theory)

45 Hours

**Scope:** In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug information, and therapeutic drug monitoring for improved patient care. In community pharmacy, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counselling for improved patient care in the community set up.

**Objectives:** Upon completion of the course, the student shall be able to

1. know various drug distribution methods in a hospital
2. appreciate the pharmacy stores management and inventory control
3. monitor drug therapy of patient through medication chart review and clinical review
4. obtain medication history interview and counsel the patients
5. identify drug related problems
6. detect and assess adverse drug reactions
7. interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states
8. know pharmaceutical care services
9. do patient counseling in community pharmacy;
10. appreciate the concept of Rational drug therapy.

### Unit I:

10 Hours

#### a) Hospital and it's organization

Definition, Classification of hospital- Primary, Secondary and Tertiary hospitals, Classification based on clinical and non- clinical basis, Organization Structure of a Hospital, and Medical staffs involved in the hospital and their functions.

#### b) Hospital pharmacy and its organization

Definition, functions of hospital pharmacy, Organization structure, Location, Layout and staff requirements, and Responsibilities and functions of hospital pharmacists.

#### c) Adverse drug reaction

Classifications - Excessive pharmacological effects, secondary pharmacological effects, idiosyncrasy, allergic drug reactions, genetically determined toxicity, toxicity following sudden withdrawal of drugs; Drug interaction- beneficial interactions, adverse interactions, and pharmacokinetic drug interactions, Methods for detecting



149

*Handwritten signature*

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



drug interactions, spontaneous case reports and record linkage studies, and Adverse drug reaction reporting and management.

**d) Community Pharmacy**

Organization and structure of retail and wholesale drug store, types and design, Legal requirements for establishment and maintenance of a drug store, Dispensing of proprietary products, maintenance of records of retail and wholesale drug store.

**Unit II:**

**10 Hours**

**a) Drug distribution system in a hospital**

Dispensing of drugs to inpatients, types of drug distribution systems, charging policy and labelling, Dispensing of drugs to ambulatory patients, and Dispensing of controlled drugs.

**b) Hospital formulary**

Definition, contents of hospital formulary, Differentiation of hospital formulary and Drug list, preparation and revision, and addition and deletion of drug from hospital formulary.

**c) Therapeutic drug monitoring**

Need for Therapeutic Drug Monitoring, Factors to be considered during the Therapeutic Drug Monitoring, and Indian scenario for Therapeutic Drug Monitoring.

**d) Medication adherence**

Causes of medication non-adherence, pharmacist role in the medication adherence, and monitoring of patient medication adherence.

**e) Patient medication history interview**

Need for the patient medication history interview, medication interview forms.

**f) Community pharmacy management**

Financial, materials, staff, and infrastructure requirements.

**Unit III:**

**10 Hours**

**a) Pharmacy and therapeutic committee**

Organization, functions, Policies of the pharmacy and therapeutic committee in including drugs into formulary, inpatient and outpatient prescription, automatic stop order, and emergency drug list preparation.

**b)**

**information services**

**Drug**





Drug and Poison information centre, Sources of drug information, Computerised services, and storage and retrieval of information.

c)

**Patient**

**counseling**

Definition of patient counseling; steps involved in patient counseling, and Special cases that require the pharmacist

**d) Education and training program in the hospital**

Role of pharmacist in the education and training program, Internal and external training program, Services to the nursing homes/clinics, Code of ethics for community pharmacy, and Role of pharmacist in the interdepartmental communication and community health education.

**e) Prescribed medication order and communication skills**

Prescribed medication order- interpretation and legal requirements, and Communication skills- communication with prescribers and patients.

**Unit IV**

**8 Hours**

a)

**Budget**

**preparation and implementation**

Budget preparation and implementation

**b) Clinical Pharmacy**

Introduction to Clinical Pharmacy, Concept of clinical pharmacy, functions and responsibilities of clinical pharmacist, Drug therapy monitoring - medication chart review, clinical review, pharmacist intervention, Ward round participation, Medication history and Pharmaceutical care.

Dosing pattern and drug therapy based on Pharmacokinetic & disease pattern.

**c) Over the counter (OTC) sales**

Introduction and sale of over the counter, and Rational use of common over the counter medications.

**Unit V**

**7 Hours**

**a) Drug store management and inventory control**

Organisation of drug store, types of materials stocked and storage conditions, Purchase and inventory control: principles, purchase procedure, purchase order, procurement and stocking, Economic order quantity, Reorder quantity level, and Methods used for the analysis of the drug expenditure

**b) Investigational use of drugs**



151

*tr*

**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Description, principles involved, classification, control, identification, role of hospital pharmacist, advisory committee.

**c) Interpretation of Clinical Laboratory Tests**

Blood chemistry, hematology, and urinalysis

**Recommended Books (Latest Edition):**

1. Merchant S.H. and Dr. J.S. Quadry. *A textbook of hospital pharmacy*, 4th ed. Ahmadabad: B.S. Shah Prakashan, 2001.
2. Parthasarathi G, Karin Nyfort-Hansen, Milap C Nahata. *A textbook of Clinical Pharmacy Practice- essential concepts and skills*, 1<sup>st</sup> ed. Chennai: Orient Longman Private Limited; 2004.
3. William E. Hassan. *Hospital pharmacy*, 5th ed. Philadelphia: Lea & Febiger; 1986.
4. Tipnis Bajaj. *Hospital Pharmacy*, 1<sup>st</sup> ed. Maharashtra: Career Publications; 2008.
5. Scott LT. *Basic skills in interpreting laboratory data*, 4th ed. American Society of Health System Pharmacists Inc; 2009.
6. Parmar N.S. *Health Education and Community Pharmacy*, 18th ed. India: CBS Publishers & Distributors; 2008.

**Journals:**

1. Therapeutic drug monitoring. ISSN: 0163-4356
2. Journal of pharmacy practice. ISSN : 0974-8326
3. American journal of health system pharmacy. ISSN: 1535-2900 (online)
4. Pharmacy times (Monthly magazine)



**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP 704T: NOVEL DRUG DELIVERY SYSTEMS (Theory)

45 Hours

**Scope:** This subject is designed to impart basic knowledge on the area of novel drug delivery systems.

**Objectives:** Upon completion of the course student shall be able

1. To understand various approaches for development of novel drug delivery systems.
2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation

### Course content:

#### Unit-I

10 Hours

**Controlled drug delivery systems:** Introduction, terminology/definitions and rationale, advantages, disadvantages, selection of drug candidates. Approaches to design controlled release formulations based on diffusion, dissolution and ion exchange principles. Physicochemical and biological properties of drugs relevant to controlled release formulations

**Polymers:** Introduction, classification, properties, advantages and application of polymers in formulation of controlled release drug delivery systems.

#### Unit-II

10 Hours

**Microencapsulation:** Definition, advantages and disadvantages, microspheres /microcapsules, microparticles, methods of microencapsulation, applications

**Mucosal Drug Delivery system:** Introduction, Principles of bioadhesion / mucoadhesion, concepts, advantages and disadvantages, transmucosal permeability and formulation considerations of buccal delivery systems

**Implantable Drug Delivery Systems:** Introduction, advantages and disadvantages, concept of implants and osmotic pump

#### Unit-III

10 Hours

**Transdermal Drug Delivery Systems:** Introduction, Permeation through skin, factors affecting permeation, permeation enhancers, basic components of TDDS, formulation approaches

**Gastroretentive drug delivery systems:** Introduction, advantages, disadvantages, approaches for GRDDS – Floating, high density systems, inflatable and gastroadhesive systems and their applications

**Nasopulmonary drug delivery system:** Introduction to Nasal and Pulmonary routes of drug delivery, Formulation of Inhalers (dry powder and metered dose), nasal sprays, nebulizers

#### Unit-IV

08 Hours



153

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**Targeted drug Delivery:** Concepts and approaches advantages and disadvantages, introduction to liposomes, niosomes, nanoparticles, monoclonal antibodies and their applications

#### Unit-V

07 Hours

**Ocular Drug Delivery Systems:** Introduction, intra ocular barriers and methods to overcome –Preliminary study, ocular formulations and ocuserts

**Intrauterine Drug Delivery Systems:** Introduction, advantages and disadvantages, development of intra uterine devices (IUDs) and applications

#### Recommended Books: (Latest Editions)

1. Y W. Chien, Novel Drug Delivery Systems, 2<sup>nd</sup> edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992.
3. Encyclopedia of Controlled Delivery. Edith Mathiowitz, Published by Wiley Interscience Publication, John Wiley and Sons, Inc, New York. Chichester/Weinheim
4. N.K. Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
5. S.P. Vyas and R.K. Khar, Controlled Drug Delivery -concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002.

#### Journals

1. Indian Journal of Pharmaceutical Sciences (IPA)
2. Indian Drugs (IDMA)
3. Journal of Controlled Release (Elsevier Sciences)
4. Drug Development and Industrial Pharmacy (Marcel & Decker)
5. International Journal of Pharmaceutics (Elsevier Sciences)



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## SEMESTER VIII



*Handwritten signature in green ink.*

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP801T. BIOSTATISTICS AND RESEARCH METHODOLOGY (Theory)

45 Hours

**Scope:** To understand the applications of Biostatistics in Pharmacy. This subject deals with descriptive statistics, Graphics, Correlation, Regression, logistic regression Probability theory, Sampling technique, Parametric tests, Non Parametric tests, ANOVA, Introduction to Design of Experiments, Phases of Clinical trials and Observational and Experimental studies, SPSS, R and MINITAB statistical software's, analyzing the statistical data using Excel.

**Objectives:** Upon completion of the course the student shall be able to

- Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment)
- Know the various statistical techniques to solve statistical problems
- Appreciate statistical techniques in solving the problems.

### Course content:

#### Unit-I

10 Hours

**Introduction:** Statistics, Biostatistics, Frequency distribution

**Measures of central tendency:** Mean, Median, Mode- Pharmaceutical examples

**Measures of dispersion:** Dispersion, Range, standard deviation, Pharmaceutical problems

**Correlation:** Definition, Karl Pearson's coefficient of correlation, Multiple correlation - Pharmaceuticals examples

#### Unit-II

10 Hours

**Regression:** Curve fitting by the method of least squares, fitting the lines  $y = a + bx$  and  $x = a + by$ , Multiple regression, standard error of regression- Pharmaceutical Examples

**Probability:** Definition of probability, Binomial distribution, Normal distribution, Poisson's distribution, properties - problems

Sample, Population, large sample, small sample, Null hypothesis, alternative hypothesis, sampling, essence of sampling, types of sampling, Error-I type, Error-II type, Standard error of mean (SEM) - Pharmaceutical examples

**Parametric test:** t-test (Sample, Pooled or Unpaired and Paired), ANOVA, (One way and Two way), Least Significance difference

#### Unit-III

10 Hours

**Non Parametric tests:** Wilcoxon Rank Sum Test, Mann-Whitney U test, Kruskal-Wallis test, Friedman Test



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**Introduction to Research:** Need for research, Need for design of Experiments, Experiential Design Technique, plagiarism

**Graphs:** Histogram, Pie Chart, Cubic Graph, response surface plot, Counter Plot graph

**Designing the methodology:** Sample size determination and Power of a study, Report writing and presentation of data, Protocol, Cohorts studies, Observational studies, Experimental studies, Designing clinical trial, various phases.

#### Unit-IV

8 Hours

Blocking and confounding system for Two-level factorials

**Regression modeling:** Hypothesis testing in Simple and Multiple regression models

**Introduction to Practical components of Industrial and Clinical Trials Problems:**

Statistical Analysis Using Excel, SPSS, MINITAB®, DESIGN OF EXPERIMENTS, R - Online Statistical Software's to Industrial and Clinical trial approach

#### Unit-V

7Hours

**Design and Analysis of experiments:**

**Factorial Design:** Definition,  $2^2$ ,  $2^3$  design. Advantage of factorial design

**Response Surface methodology:** Central composite design, Historical design, Optimization Techniques

#### Recommended Books (Latest edition):

1. Pharmaceutical statistics- Practical and clinical applications, Sanford Bolton, publisher Marcel Dekker Inc. NewYork.
2. Fundamental of Statistics – Himalaya Publishing House- S.C.Guptha
3. Design and Analysis of Experiments –PHI Learning Private Limited, R. Pannerselvam,
4. Design and Analysis of Experiments – Wiley Students Edition, Douglas and C. Montgomery



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP 802T SOCIAL AND PREVENTIVE PHARMACY

Hours: 45

### Scope:

The purpose of this course is to introduce to students a number of health issues and their challenges. This course also introduced a number of national health programmes. The roles of the pharmacist in these contexts are also discussed.

### Objectives:

After the successful completion of this course, the student shall be able to:

- Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.
- Have a critical way of thinking based on current healthcare development.
- Evaluate alternative ways of solving problems related to health and pharmaceutical issues

### Course content:

#### Unit I:

10 Hours

**Concept of health and disease:** Definition, concepts and evaluation of public health. Understanding the concept of prevention and control of disease, social causes of diseases and social problems of the sick.

**Social and health education:** Food in relation to nutrition and health, Balanced diet, Nutritional deficiencies, Vitamin deficiencies, Malnutrition and its prevention.

**Sociology and health:** Socio cultural factors related to health and disease, Impact of urbanization on health and disease, Poverty and health

**Hygiene and health:** personal hygiene and health care; avoidable habits

#### Unit II:

10 Hours

**Preventive medicine:** General principles of prevention and control of diseases such as cholera, SARS, Ebola virus, influenza, acute respiratory infections, malaria, chicken guinea, dengue, lymphatic filariasis, pneumonia, hypertension, diabetes mellitus, cancer, drug addiction-drug substance abuse

#### Unit III:

10 Hours

**National health programs, its objectives, functioning and outcome of the following:** HIV AND AIDS control programme, TB, Integrated disease surveillance program (IDSP), National leprosy control programme, National mental health program, National



158

  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



programme for prevention and control of deafness, Universal immunization programme, National programme for control of blindness, Pulse polio programme.

**Unit IV:**

**08 Hours**

National health intervention programme for mother and child, National family welfare programme, National tobacco control programme, National Malaria Prevention Program, National programme for the health care for the elderly, Social health programme; role of WHO in Indian national program

**Unit V:**

**07 Hours**

Community services in rural, urban and school health: Functions of PHC, Improvement in rural sanitation, national urban health mission, Health promotion and education in school.

**Recommended Books (Latest edition):**

1. Short Textbook of Preventive and Social Medicine, Prabhakara GN, 2<sup>nd</sup> Edition, 2010, ISBN: 9789380704104, JAYPEE Publications
2. Textbook of Preventive and Social Medicine (Mahajan and Gupta), Edited by Roy Rabindra Nath, Saha Indranil, 4<sup>th</sup> Edition, 2013, ISBN: 9789350901878, JAYPEE Publications
3. Review of Preventive and Social Medicine (Including Biostatistics), Jain Vivek, 6<sup>th</sup> Edition, 2014, ISBN: 9789351522331, JAYPEE Publications
4. Essentials of Community Medicine—A Practical Approach, Hiremath Lalita D, Hiremath Dhananjaya A, 2<sup>nd</sup> Edition, 2012, ISBN: 9789350250440, JAYPEE Publications
5. Park Textbook of Preventive and Social Medicine, K Park, 21<sup>st</sup> Edition, 2011, ISBN-14: 9788190128285, BANARSIDAS BHANOT PUBLISHERS.
6. Community Pharmacy Practice, Ramesh Adepu, BSP publishers, Hyderabad

**Recommended Journals:**

1. Research in Social and Administrative Pharmacy, Elsevier, Ireland



**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP803ET. PHARMA MARKETING MANAGEMENT (Theory)

45 Hours

### Scope:

The pharmaceutical industry not only needs highly qualified researchers, chemists and, technical people, but also requires skilled managers who can take the industry forward by managing and taking the complex decisions which are imperative for the growth of the industry. The Knowledge and Know-how of marketing management groom the people for taking a challenging role in Sales and Product management.

**Course Objective:** The course aims to provide an understanding of marketing concepts and techniques and their applications in the pharmaceutical industry.

### Unit I

10 Hours

#### Marketing:

Definition, general concepts and scope of marketing; Distinction between marketing & selling; Marketing environment; Industry and competitive analysis; Analyzing consumer buying behavior; industrial buying behavior.

#### Pharmaceutical market:

Quantitative and qualitative aspects; size and composition of the market; demographic descriptions and socio-psychological characteristics of the consumer; market segmentation & targeting. Consumer profile; Motivation and prescribing habits of the physician; patients' choice of physician and retail pharmacist. Analyzing the Market; Role of market research.

### Unit II

10 Hours

#### Product decision:

Classification, product line and product mix decisions, product life cycle, product portfolio analysis, product positioning; New product decisions; Product branding, packaging and labeling decisions, Product management in pharmaceutical industry.

### Unit III

10 Hours

#### Promotion:

Methods, determinants of promotional mix, promotional budget; An overview of personal selling, advertising, direct mail, journals, sampling, retailing, medical exhibition, public relations, online promotional techniques for OTC Products.



160

*TVB*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

#### Unit IV

10 Hours

##### **Pharmaceutical marketing channels:**

Designing channel, channel members, selecting the appropriate channel, conflict in channels, physical distribution management: Strategic importance, tasks in physical distribution management.

##### **Professional sales representative (PSR):**

Duties of PSR, purpose of detailing, selection and training, supervising, norms for customer calls, motivating, evaluating, compensation and future prospects of the PSR.

#### Unit V

10 Hours

##### **Pricing:**

Meaning, importance, objectives, determinants of price; pricing methods and strategies, issues in price management in pharmaceutical industry. An overview of DPCO (Drug Price Control Order) and NPPA (National Pharmaceutical Pricing Authority).

##### **Emerging concepts in marketing:**

Vertical & Horizontal Marketing; Rural Marketing; Consumerism; Industrial Marketing; Global Marketing.

##### **Recommended Books: (Latest Editions)**

1. Philip Kotler and Kevin Lane Keller: Marketing Management, Prentice Hall of India, New Delhi
2. Walker, Boyd and Larreche : Marketing Strategy- Planning and Implementation, Tata MC GrawHill, New Delhi.
3. Dhruv Grewal and Michael Levy: Marketing, Tata MC Graw Hill
4. Arun Kumar and N Menakshi: Marketing Management, Vikas Publishing, India
5. Rajan Saxena. Marketing Management; Tata MC Graw-Hill (India Edition)
6. Ramaswamy, U.S & Nanakamari, S: Marketing Managemnt:Global Perspective, IndianContext,Macmilan India, New Delhi.
7. Shanker, Ravi: Service Marketing, Excell Books, New Delhi
8. Subba Rao Changanti, Pharmaceutical Marketing in India (GIFT – Excel series) Excel Publications.



*4/2*  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## **BP804 ET: PHARMACEUTICAL REGULATORY SCIENCE (Theory)**

**45Hours**

**Scope:** This course is designed to impart the fundamental knowledge on the regulatory requirements for approval of new drugs, and drug products in regulated markets of India & other countries like US, EU, Japan, Australia, UK etc. It prepares the students to learn in detail on the regulatory requirements, documentation requirements, and registration procedures for marketing the drug products.

**Objectives:** Upon completion of the subject student shall be able to;

1. Know about the process of drug discovery and development
2. Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
3. Know the regulatory approval process and their registration in Indian and international markets

### **Course content:**

#### **Unit I**

**10Hours**

##### **New Drug Discovery and development**

Stages of drug discovery, Drug development process, pre-clinical studies, non-clinical activities, clinical studies, Innovator and generics, Concept of generics, Generic drug product development.

#### **Unit II**

**10Hours**

##### **Regulatory Approval Process**

Approval processes and timelines involved in Investigational New Drug (IND), New Drug Application (NDA), Abbreviated New Drug Application (ANDA). Changes to an approved NDA / ANDA.

##### **Regulatory authorities and agencies**

Overview of regulatory authorities of India, United States, European Union, Australia, Japan, Canada (Organization structure and types of applications)

#### **Unit III**

**10Hours**

##### **Registration of Indian drug product in overseas market**

Procedure for export of pharmaceutical products, Technical documentation, Drug Master Files (DMF), Common Technical Document (CTD), electronic Common Technical



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Document (eCTD), ASEAN Common Technical Document (ACTD) research.

#### Unit IV

08Hours

##### Clinical trials

Developing clinical trial protocols, Institutional Review Board / Independent Ethics committee - formation and working procedures, Informed consent process and procedures, GCP obligations of Investigators, sponsors & Monitors, Managing and Monitoring clinical trials, Pharmacovigilance - safety monitoring in clinical trials

#### Unit V

07Hours

##### Regulatory Concepts

Basic terminology, guidance, guidelines, regulations, Laws and Acts, Orange book, Federal Register, Code of Federal Regulatory, Purple book

##### Recommended books (Latest edition):

1. Drug Regulatory Affairs by Sachin Itkar, Dr. N.S. Vyawahare, Nirali Prakashan.
2. The Pharmaceutical Regulatory Process, Second Edition Edited by Ira R. Berry and Robert P. Martin, Drugs and the Pharmaceutical Sciences, Vol.185. Informa Health care Publishers.
3. New Drug Approval Process: Accelerating Global Registrations By Richard A Guarino, MD, 5<sup>th</sup> edition, Drugs and the Pharmaceutical Sciences, Vol.190.
4. Guidebook for drug regulatory submissions / Sandy Weinberg. By John Wiley & Sons. Inc.
5. FDA Regulatory Affairs: a guide for prescription drugs, medical devices, and biologics /edited by Douglas J. Pisano, David Mantus.
6. Generic Drug Product Development, Solid Oral Dosage forms, Leon Shargel and Isader Kaufer, Marcel Dekker series, Vol.143
7. Clinical Trials and Human Research: A Practical Guide to Regulatory Compliance By Fay A. Rozovsky and Rodney K. Adams
8. Principles and Practices of Clinical Research, Second Edition Edited by John I. Gallin and Frederick P. Ognibene
9. Drugs: From Discovery to Approval, Second Edition By Rick Ng



## BP 805T: PHARMACOVIGILANCE (Theory)

45 hours

**Scope:** This paper will provide an opportunity for the student to learn about development of pharmacovigilance as a science, basic terminologies used in pharmacovigilance, global scenario of Pharmacovigilance, train students on establishing pharmacovigilance programme in an organization, various methods that can be used to generate safety data and signal detection. This paper also develops the skills of classifying drugs, diseases and adverse drug reactions.

### Objectives:

*At completion of this paper it is expected that students will be able to (know, do, and appreciate):*

1. Why drug safety monitoring is important?
2. History and development of pharmacovigilance
3. National and international scenario of pharmacovigilance
4. Dictionaries, coding and terminologies used in pharmacovigilance
5. Detection of new adverse drug reactions and their assessment
6. International standards for classification of diseases and drugs
7. Adverse drug reaction reporting systems and communication in pharmacovigilance
8. Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle
9. Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation
10. Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India
11. ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning
12. CIOMS requirements for ADR reporting
13. Writing case narratives of adverse events and their quality.

## Course Content

### Unit I

10 Hours

#### Introduction to Pharmacovigilance

- History and development of Pharmacovigilance
- Importance of safety monitoring of Medicine
- WHO international drug monitoring programme
- Pharmacovigilance Program of India(PvPI).

#### Introduction to adverse drug reactions

- Definitions and classification of ADRs
- Detection and reporting
- Methods in Causality assessment
- Severity and seriousness assessment
- Predictability and preventability assessment
- Management of adverse drug reactions

#### Basic terminologies used in pharmacovigilance



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## Unit IV

8 Hours

### Safety data generation

- Pre clinical phase
- Clinical phase
- Post approval phase (PMS)

### ICH Guidelines for Pharmacovigilance

- Organization and objectives of ICH
- Expedited reporting
- Individual case safety reports
- Periodic safety update reports
- Post approval expedited reporting
- Pharmacovigilance planning
- Good clinical practice in pharmacovigilance studies

## Unit V

7 hours

### Pharmacogenomics of adverse drug reactions

- Genetics related ADR with example focusing PK parameters.

### Drug safety evaluation in special population

- Paediatrics
- Pregnancy and lactation
- Geriatrics

### CIOMS

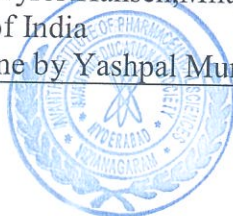
- CIOMS Working Groups
- CIOMS Form

### CDSCO (India) and Pharmacovigilance

- D&C Act and Schedule Y
- Differences in Indian and global pharmacovigilance requirements

### Recommended Books (Latest edition):

1. Textbook of Pharmacovigilance: S K Gupta, Jaypee Brothers, Medical Publishers.
2. Practical Drug Safety from A to Z By Barton Cobert, Pierre Biron, Jones and Bartlett Publishers.
3. Mann's Pharmacovigilance: Elizabeth B. Andrews, Nicholas, Wiley Publishers.
4. Stephens' Detection of New Adverse Drug Reactions: John Talbot, Patrick Walle, Wiley Publishers.
5. An Introduction to Pharmacovigilance: Patrick Waller, Wiley Publishers.
6. Cobert's Manual of Drug Safety and Pharmacovigilance: Barton Cobert, Jones & Bartlett Publishers.
7. Textbook of Pharmacoepidemiology edited by Brian L. Strom, Stephen E Kimmel, Sean Hennessy, Wiley Publishers.
8. A Textbook of Clinical Pharmacy Practice -Essential Concepts and Skills: G. Parthasarathi, Karin Nyfort Hansen, Milap C. Nahata
9. National Formulary of India
10. Text Book of Medicine by Yashpal Munjal



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



12. <http://www.who.unc.org/DynPage.aspx?id=105825&mn1=7347&mn2=7259&mn3=7297>
13. <http://www.ich.org/>
14. <http://www.cioms.ch/>
15. <http://cdsco.nic.in/>
16. [http://www.who.int/vaccine\\_safety/en/](http://www.who.int/vaccine_safety/en/)
17. [http://www.ipc.gov.in/PvPI/pv\\_home.html](http://www.ipc.gov.in/PvPI/pv_home.html)



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## **BP 806 ET. QUALITY CONTROL AND STANDARDIZATION OF HERBALS (Theory)**

**Scope:** In this subject the student learns about the various methods and guidelines for evaluation and standardization of herbs and herbal drugs. The subject also provides an opportunity for the student to learn cGMP, GAP and GLP in traditional system of medicines.

**Objectives:** Upon completion of the subject student shall be able to;

1. know WHO guidelines for quality control of herbal drugs
2. know Quality assurance in herbal drug industry
3. know the regulatory approval process and their registration in Indian and international markets
4. appreciate EU and ICH guidelines for quality control of herbal drugs

### **Unit I**

**10 hours**

Basic tests for drugs – Pharmaceutical substances, Medicinal plants materials and dosage forms

WHO guidelines for quality control of herbal drugs.

Evaluation of commercial crude drugs intended for use

### **Unit II**

**10 hours**

**Quality assurance in herbal drug industry** of cGMP, GAP, GMP and GLP in traditional system of medicine.

WHO Guidelines on current good manufacturing Practices (cGMP) for Herbal Medicines  
WHO Guidelines on GACP for Medicinal Plants.

### **Unit III**

**10 hours**

EU and ICH guidelines for quality control of herbal drugs.

Research Guidelines for Evaluating the Safety and Efficacy of Herbal Medicines

### **Unit IV**

**08 hours**

Stability testing of herbal medicines. Application of various chromatographic techniques in standardization of herbal products.

Preparation of documents for new drug application and export registration

GMP requirements and Drugs & Cosmetics Act provisions.



*Handwritten signature*  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## Unit V

07 hours

Regulatory requirements for herbal medicines.  
WHO guidelines on safety monitoring of herbal medicines in pharmacovigilance systems  
Comparison of various Herbal Pharmacopoeias.  
Role of chemical and biological markers in standardization of herbal products

### Recommended Books: (Latest Editions)

1. Pharmacognosy by Trease and Evans
2. Pharmacognosy by Kokate, Purohit and Gokhale
3. Rangari, V.D., Text book of Pharmacognosy and Phytochemistry Vol. I, Carrier Pub., 2006.
4. Aggrawal, S.S., Herbal Drug Technology. Universities Press, 2002.
5. EMEA. Guidelines on Quality of Herbal Medicinal Products/Traditional Medicinal Products,
6. Mukherjee, P.W. Quality Control of Herbal Drugs: An Approach to Evaluation of Botanicals. Business Horizons Publishers, New Delhi, India, 2002.
7. Shinde M.V., Dhalwal K., Potdar K., Mahadik K. Application of quality control principles to herbal drugs. International Journal of Phytomedicine 1(2009); p. 4-8.
8. WHO. Quality Control Methods for Medicinal Plant Materials, World Health Organization, Geneva, 1998. WHO. Guidelines for the Appropriate Use of Herbal Medicines. WHO Regional Publications, Western Pacific Series No 3, WHO Regional office for the Western Pacific, Manila, 1998.
9. WHO. The International Pharmacopeia, Vol. 2: Quality Specifications, 3rd edn. World Health Organization, Geneva, 1981.
10. WHO. Quality Control Methods for Medicinal Plant Materials. World Health Organization, Geneva, 1999.
11. WHO. WHO Global Atlas of Traditional, Complementary and Alternative Medicine. 2 vol. set. Vol. 1 contains text and Vol. 2, maps. World Health Organization, Geneva, 2005.
12. WHO. Guidelines on Good Agricultural and Collection Practices (GACP) for Medicinal Plants. World Health Organization, Geneva, 2004.



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP 807 ET. COMPUTER AIDED DRUG DESIGN (Theory)

45 Hours

**Scope:** This subject is designed to provide detailed knowledge of rational drug design process and various techniques used in rational drug design process.

**Objectives:** Upon completion of the course, the student shall be able to understand

- Design and discovery of lead molecules
- The role of drug design in drug discovery process
- The concept of QSAR and docking
- Various strategies to develop new drug like molecules.
- The design of new drug molecules using molecular modeling software

### Course Content:

#### UNIT-I

10 Hours

##### Introduction to Drug Discovery and Development

Stages of drug discovery and development

##### Lead discovery and Analog Based Drug Design

Rational approaches to lead discovery based on traditional medicine, Random screening, Non-random screening, serendipitous drug discovery, lead discovery based on drug metabolism, lead discovery based on clinical observation.

**Analog Based Drug Design:** Bioisosterism, Classification, Bioisosteric replacement. Any three case studies

#### UNIT-II

10 Hours

##### Quantitative Structure Activity Relationship (QSAR)

SAR versus QSAR, History and development of QSAR, Types of physicochemical parameters, experimental and theoretical approaches for the determination of physicochemical parameters such as Partition coefficient, Hammett's substituent constant and Taft's steric constant. Hansch analysis, Free Wilson analysis, 3D-QSAR approaches like COMFA and COMSIA.

#### UNIT-III

10 Hours

##### Molecular Modeling and virtual screening techniques

**Virtual Screening techniques:** Drug likeness screening, Concept of pharmacophore mapping and pharmacophore based Screening,

**Molecular docking:** Rigid docking, flexible docking, manual docking, Docking based screening. *De novo* drug design.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

#### UNIT-IV

08 Hours

##### **Informatics & Methods in drug design**

Introduction to Bioinformatics, chemoinformatics. ADME databases, chemical, biochemical and pharmaceutical databases.

#### UNIT-V

07 Hours

**Molecular Modeling:** Introduction to molecular mechanics and quantum mechanics. Energy Minimization methods and Conformational Analysis, global conformational minima determination.

#### **Recommended Books (Latest Editions)**

1. Robert GCK, ed., "Drug Action at the Molecular Level" University Prak Press Baltimore.
2. Martin YC. "Quantitative Drug Design" Dekker, New York.
3. Delgado JN, Remers WA eds "Wilson & Gisvolds's Text Book of Organic Medicinal & Pharmaceutical Chemistry" Lippincott, New York.
4. Foye WO "Principles of Medicinal chemistry" Lea & Febiger.
5. Koro lkovas A, Burckhalter JH. "Essentials of Medicinal Chemistry" Wiley Interscience.
6. Wolf ME, ed "The Basis of Medicinal Chemistry, Burger's Medicinal Chemistry" John Wiley & Sons, New York.
7. Patrick Graham, L., An Introduction to Medicinal Chemistry, Oxford University Press.
8. Smith HJ, Williams H, eds, "Introduction to the principles of Drug Design" Wright Boston.
9. Silverman R.B. "The organic Chemistry of Drug Design and Drug Action" Academic Press New York.



HB

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**BP808ET: CELL AND MOLECULAR BIOLOGY (Elective subject)**

**45 Hours**

**Scope:**

- Cell biology is a branch of biology that studies cells – their physiological properties, their structure, the organelles they contain, interactions with their environment, their life cycle, division, death and cell function.
- This is done both on a microscopic and molecular level.
- Cell biology research encompasses both the great diversity of single-celled organisms like bacteria and protozoa, as well as the many specialized cells in multi-cellular organisms such as humans, plants, and sponges.

**Objectives:** Upon completion of the subject student shall be able to;

- Summarize cell and molecular biology history.
- Summarize cellular functioning and composition.
- Describe the chemical foundations of cell biology.
- Summarize the DNA properties of cell biology.
- Describe protein structure and function.
- Describe cellular membrane structure and function.
- Describe basic molecular genetic mechanisms.
- Summarize the Cell Cycle

**Course content:**

**Unit I**

**10Hours**

- a) Cell and Molecular Biology: Definitions theory and basics and Applications.
- b) Cell and Molecular Biology: History and Summation.
- c) Properties of cells and cell membrane.
- d) Prokaryotic versus Eukaryotic
- e) Cellular Reproduction
- f) Chemical Foundations – an Introduction and Reactions (Types)

**Unit II**

**10 Hours**

- a) DNA and the Flow of Molecular Information
- b) DNA Functioning
- c) DNA and RNA
- d) Types of RNA
- e) Transcription and Translation

**Unit III**

**10 Hours**

- a) Proteins: Defined and Amino Acids
- b) Protein Structure



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



- c) Regularities in Protein Pathways
- d) Cellular Processes
- e) Positive Control and significance of Protein Synthesis

#### Unit IV

08 Hours

- a) Science of Genetics
- b) Transgenics and Genomic Analysis
- c) Cell Cycle analysis
- d) Mitosis and Meiosis
- e) Cellular Activities and Checkpoints

#### Unit V

07 Hours

- a) Cell Signals: Introduction
- b) Receptors for Cell Signals
- c) Signaling Pathways: Overview
- d) Misregulation of Signaling Pathways
- e) Protein-Kinases: Functioning

#### Recommended Books (latest edition):

1. W.B. Hugo and A.D. Russel: Pharmaceutical Microbiology, Blackwell Scientific publications, Oxford London.
2. Prescott and Dunn., Industrial Microbiology, 4<sup>th</sup> edition, CBS Publishers & Distributors, Delhi.
3. Pelczar, Chan Kreig, Microbiology, Tata McGraw Hill edn.
4. Malcolm Harris, Balliere Tindall and Cox: Pharmaceutical Microbiology.
5. Rose: Industrial Microbiology.
6. Probisher, Hinsdill et al: Fundamentals of Microbiology, 9th ed. Japan
7. Cooper and Gunn's: Tutorial Pharmacy, CBS Publisher and Distribution.
8. Peppler: Microbial Technology.
9. Edward: Fundamentals of Microbiology.
10. N.K.Jain: Pharmaceutical Microbiology, Vallabh Prakashan, Delhi
11. Bergeys manual of systematic bacteriology, Williams and Wilkins- A Waverly company
12. B.R. Glick and J.J. Pasternak: Molecular Biotechnology: Principles and Applications of Recombinant DNA: ASM Press Washington D.C.
13. RA Goldshy et. al., : Kuby Immunology.



*Handwritten signature*

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## BP809ET. COSMETIC SCIENCE(Theory)

45Hours

### UNIT I

10Hours

Classification of cosmetic and cosmeceutical products

Definition of cosmetics as per Indian and EU regulations, Evolution of cosmeceuticals from cosmetics, cosmetics as quasi and OTC drugs

**Cosmetic excipients:** Surfactants, rheology modifiers, humectants, emollients, preservatives. Classification and application

**Skin:** Basic structure and function of skin.

**Hair:** Basic structure of hair. Hair growth cycle.

**Oral Cavity:** Common problem associated with teeth and gums.

### UNIT II

10 Hours

**Principles of formulation and building blocks of skin care products:**

Face wash,

Moisturizing cream, Cold Cream, Vanishing cream and their advantages and disadvantages. Application of these products in formulation of cosmeceuticals.

**Antiperspirants & deodorants-** Actives & mechanism of action.

**Principles of formulation and building blocks of Hair care products:**

Conditioning shampoo, Hair conditioner, anti-dandruff shampoo.

Hair oils.

Chemistry and formulation of Para-phenylene diamine based hair dye.

Principles of formulation and building blocks of oral care products:

Toothpaste for bleeding gums, sensitive teeth. Teeth whitening, Mouthwash.

### UNIT III

10 Hours

Sun protection, Classification of Sunscreens and SPF.

**Role of herbs in cosmetics:**

Skin Care: Aloe and turmeric

Hair care: Henna and amla.

Oral care: Neem and clove

**Analytical cosmetics:** BIS specification and analytical methods for shampoo, skin-cream and toothpaste.

### UNIT IV

08 Hours.

Principles of Cosmetic Evaluation: Principles of sebumeter, corneometer. Measurement of TEWL, Skin Color, Hair tensile strength, Hair combing properties

Soaps, and syndet bars. Evolution and skin benefits.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## UNIT V

07 Hours

Oily and dry skin, causes leading to dry skin, skin moisturisation. Basic understanding of the terms Comedogenic, dermatitis.

Cosmetic problems associated with Hair and scalp: Dandruff, Hair fall causes

Cosmetic problems associated with skin: blemishes, wrinkles, acne, prickly heat and body odor.

Antiperspirants and Deodorants- Actives and mechanism of action

### References

- 1) Harry's Cosmeticology, Wilkinson, Moore, Seventh Edition, George Godwin..
- 2) Cosmetics – Formulations, Manufacturing and Quality Control, P.P. Sharma, 4<sup>th</sup> Edition, Vandana Publications Pvt. Ltd., Delhi.
- 3) Text book of cosmeticology by Sanju Nanda & Roop K. Khar, Tata Publishers.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP810 ET. PHARMACOLOGICAL SCREENING METHODS

45 Hours

**Scope:** This subject is designed to impart the basic knowledge of preclinical studies in experimental animals including design, conduct and interpretations of results.

### Objectives

Upon completion of the course the student shall be able to,

- Appreciate the applications of various commonly used laboratory animals.
- Appreciate and demonstrate the various screening methods used in preclinical research
- Appreciate and demonstrate the importance of biostatistics and research methodology
- Design and execute a research hypothesis independently

<b>Unit –I</b>	<b>08 Hours</b>
<b>Laboratory Animals:</b> Study of CPCSEA and OECD guidelines for maintenance, breeding and conduct of experiments on laboratory animals, Common lab animals: Description and applications of different species and strains of animals. Popular transgenic and mutant animals. Techniques for collection of blood and common routes of drug administration in laboratory animals, Techniques of blood collection and euthanasia.	
<b>Unit –II</b>	<b>10 Hours</b>
<b>Preclinical screening models</b> a. Introduction: Dose selection, calculation and conversions, preparation of drug solution/suspensions, grouping of animals and importance of sham negative and positive control groups. Rationale for selection of animal species and sex for the study. b. <b>Study of screening animal models for</b> Diuretics, nootropics, anti-Parkinson's, antiasthmatics, <b>Preclinical screening models:</b> for CNS activity- analgesic, antipyretic, anti-inflammatory, general anaesthetics, sedative and hypnotics, antipsychotic, antidepressant, antiepileptic, antiparkinsonism, alzheimer's disease	



177

  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

<b>Unit –III</b>  <b>Preclinical screening models:</b> for ANS activity, sympathomimetics, sympatholytics, parasympathomimetics, parasympatholytics, skeletal muscle relaxants, drugs acting on eye, local anaesthetics	
<b>Unit –IV</b>  <b>Preclinical screening models:</b> for CVS activity- antihypertensives, diuretics, antiarrhythmic, antidyslipidemic, anti aggregatory, coagulants, and anticoagulants Preclinical screening models for other important drugs like antiulcer, antidiabetic, anticancer and antiasthmatics.	
<b>Research methodology and Bio-statistics</b> Selection of research topic, review of literature, research hypothesis and study design Pre-clinical data analysis and interpretation using Students 't' test and One-way ANOVA. Graphical representation of data	<b>05 Hours</b>

**Recommended Books (latest edition):**

1. Fundamentals of experimental Pharmacology-by M.N.Ghosh
2. Hand book of Experimental Pharmacology-S.K.Kulakarni
3. CPCSEA guidelines for laboratory animal facility.
4. Drug discovery and Evaluation by Vogel H.G.
5. Drug Screening Methods by Suresh Kumar Gupta and S. K. Gupta
6. Introduction to biostatistics and research methods by PSS Sundar Rao and J Richard



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP 811 ET. ADVANCED INSTRUMENTATION TECHNIQUES

45 Hours

**Scope:** This subject deals with the application of instrumental methods in qualitative and quantitative analysis of drugs. This subject is designed to impart advanced knowledge on the principles and instrumentation of spectroscopic and chromatographic hyphenated techniques. This also emphasizes on theoretical and practical knowledge on modern analytical instruments that are used for drug testing.

**Objectives:** Upon completion of the course the student shall be able to

- understand the advanced instruments used and its applications in drug analysis
- understand the chromatographic separation and analysis of drugs.
- understand the calibration of various analytical instruments
- know analysis of drugs using various analytical instruments.

### Course Content:

#### UNIT-I

10 Hours

##### **Nuclear Magnetic Resonance spectroscopy**

Principles of H-NMR and C-NMR, chemical shift, factors affecting chemical shift, coupling constant, Spin - spin coupling, relaxation, instrumentation and applications

**Mass Spectrometry-** Principles, Fragmentation, Ionization techniques – Electron impact, chemical ionization, MALDI, FAB, Analyzers-Time of flight and Quadrupole, instrumentation, applications

#### UNIT-II

10 Hours

**Thermal Methods of Analysis:** Principles, instrumentation and applications of Thermogravimetric Analysis (TGA), Differential Thermal Analysis (DTA), Differential Scanning Calorimetry (DSC)

**X-Ray Diffraction Methods:** Origin of X-rays, basic aspects of crystals, X-ray

Crystallography, rotating crystal technique, single crystal diffraction, powder diffraction, structural elucidation and applications.

#### UNIT-III


10 Hours

**Calibration and validation-**as per ICH and USFDA guidelines

**Calibration of following Instruments**

Electronic balance, UV-Visible spectrophotometer, IR spectrophotometer,



  
PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Fluorimeter, Flame Photometer, HPLC and GC

**UNIT-IV**

**08 Hours**

**Radio immune assay:** Importance, various components, Principle, different methods, Limitation and Applications of Radio immuno assay

**Extraction techniques:** General principle and procedure involved in the solid phase extraction and liquid-liquid extraction

**UNIT-V**

**07 Hours**

**Hyphenated techniques-** LC-MS/MS, GC-MS/MS, HPTLC-MS.

**Recommended Books (Latest Editions)**

1. Instrumental Methods of Chemical Analysis by B.K Sharma
2. Organic spectroscopy by Y.R Sharma
3. Text book of Pharmaceutical Analysis by Kenneth A. Connors
4. Vogel's Text book of Quantitative Chemical Analysis by A.I. Vogel
5. Practical Pharmaceutical Chemistry by A.H. Beckett and J B. Stenlake
6. Organic Chemistry by I. L. Finar
7. Organic spectroscopy by William Kemp
8. Quantitative Analysis of Drugs by D. C. Garrett
9. Quantitative Analysis of Drugs in Pharmaceutical Formulations by P. D. Sethi
10. Spectrophotometric identification of Organic Compounds by Silverstein



*Handwritten signature*  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**Semester VIII – Elective course on Pharmaceutical Product Development**

**No of Hours: 3**

**Tutorial:1**

**Credit points:4**

**Unit-I**

**10 Hours**

Introduction to pharmaceutical product development, objectives, regulations related to preformulation, formulation development, stability assessment, manufacturing and quality control testing of different types of dosage forms

**Unit-II**

**10 Hours**

An advanced study of Pharmaceutical Excipients in pharmaceutical product development with a special reference to the following categories

- i. Solvents and solubilizers
- ii. Cyclodextrins and their applications
- iii. Non - ionic surfactants and their applications
- iv. Polyethylene glycols and sorbitols
- v. Suspending and emulsifying agents
- vi. Semi solid excipients

**Unit-III**

**10 Hours**

An advanced study of Pharmaceutical Excipients in pharmaceutical product development with a special reference to the following categories

- i. Tablet and capsule excipients
- ii. Directly compressible vehicles
- iii. Coat materials
- iv. Excipients in parenteral and aerosols products
- v. Excipients for formulation of NDDS

Selection and application of excipients in pharmaceutical formulations with specific industrial applications

**Unit-IV**

**08 Hours**

Optimization techniques in pharmaceutical product development. A study of various optimization techniques for pharmaceutical product development with specific examples. Optimization by factorial designs and their applications. A study of QbD and its application in pharmaceutical product development.

**Unit-V**

**07 Hours**

Selection and quality control testing of packaging materials for pharmaceutical product development- regulatory considerations.



*Handwritten signature*

**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



- b) Dietary fibres and complex carbohydrates as functional food ingredients..

#### UNIT IV

10 hours

- a) Free radicals in Diabetes mellitus, Inflammation, Ischemic reperfusion injury, Cancer, Atherosclerosis, Free radicals in brain metabolism and pathology, kidney damage, muscle damage. Free radicals involvement in other disorders. Free radicals theory of ageing.
- b) Antioxidants: Endogenous antioxidants – enzymatic and nonenzymatic antioxidant defence, Superoxide dismutase, catalase, Glutathione peroxidase, Glutathione Vitamin C, Vitamin E,  $\alpha$ - Lipoic acid, melatonin  
Synthetic antioxidants: Butylated hydroxy Toluene, Butylated hydroxy Anisole.
- c) Functional foods for chronic disease prevention

#### UNIT V

06 hours

- a) Effect of processing, storage and interactions of various environmental factors on the potential of nutraceuticals.
- b) Regulatory Aspects; FSSAI, FDA, FPO, MPO, AGMARK. HACCP and GMPs on Food Safety. Adulteration of foods.
- c) Pharmacopoeial Specifications for dietary supplements and nutraceuticals.

#### References:

1. Dietetics by Sri Lakshmi
2. Role of dietary fibres and nutraceuticals in preventing diseases by K.T Agusti and P.Faizal: BSPublication.
3. Advanced Nutritional Therapies by Cooper. K.A., (1996).
4. The Food Pharmacy by Jean Carper, Simon & Schuster, UK Ltd., (1988).
5. Prescription for Nutritional Healing by James F.Balch and Phyllis A.Balch 2<sup>nd</sup> Edn., Avery Publishing Group, NY (1997).
6. G. Gibson and C.williams Editors 2000 *Functional foods* Woodhead Publ.Co.London.
7. Goldberg, I. *Functional Foods*. 1994. Chapman and Hall, New York.
8. Labuza, T.P. 2000 Functional Foods and Dietary Supplements: Safety, Good Manufacturing Practice (GMPs) and Shelf Life Testing in *Essentials of Functional Foods* M.K. Sachmidl and T.P. Labuza eds. Aspen Press.
9. Handbook of Nutraceuticals and Functional Foods, Third Edition (Modern Nutrition)
10. Shils, ME, Olson, JA, Shike, M. 1994 *Modern Nutrition in Health and Disease*. Eighth edition. Lea and Febiger





PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BP 812 ET. DIETARY SUPPLEMENTS AND NUTRACEUTICALS

No. of hours :3

Tutorial:1

Credit point:4

### Scope :

This subject covers foundational topic that are important for understanding the need and requirements of dietary supplements among different groups in the population.

### Objective:

This module aims to provide an understanding of the concepts behind the theoretical applications of dietary supplements. By the end of the course, students should be able to :

1. Understand the need of supplements by the different group of people to maintain healthy life.
2. Understand the outcome of deficiencies in dietary supplements.
3. Appreciate the components in dietary supplements and the application.
4. Appreciate the regulatory and commercial aspects of dietary supplements including health claims.

### UNIT I

07 hours

- a. Definitions of Functional foods, Nutraceuticals and Dietary supplements. Classification of Nutraceuticals, Health problems and diseases that can be prevented or cured by Nutraceuticals i.e. weight control, diabetes, cancer, heart disease, stress, osteoarthritis, hypertension etc.
- b. Public health nutrition, maternal and child nutrition, nutrition and ageing, nutrition education in community.
- c. Source, Name of marker compounds and their chemical nature, Medicinal uses and health benefits of following used as nutraceuticals/functional foods: Spirulina, Soyabean, Ginseng, Garlic, Broccoli, Gingko, Flaxseeds

### UNIT II

15 hours

Phytochemicals as nutraceuticals: Occurrence and characteristic features(chemical nature medicinal benefits) of following

- a) Carotenoids-  $\alpha$  and  $\beta$ -Carotene, Lycopene, Xanthophylls, leutin
- b) Sulfides: Diallyl sulfides, Allyl trisulfide.
- c) Polyphenolics: Resveratrol
- d) Flavonoids- Rutin, Naringin, Quercetin, Anthocyanidins, catechins, Flavones
- e) Prebiotics / Probiotics.: Fructo oligosaccharides, Lacto bacillum
- f) Phyto estrogens : Isoflavones, daidzein, Geobustan, lignans
- g) Tocopherols
- h) Proteins, vitamins, minerals, cereal, vegetables and beverages as functional foods: oats, wheat bran, rice bran, sea foods, coffee, tea and the like.

### UNIT III

07 hours

- a) Introduction to free radicals: Free radicals, reactive oxygen species, production of free radicals in cells, damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids.



Principal  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**BP 604 T. BIOPHARMACEUTICS AND PHARMACOKINETICS**  
(Theory)

45 Hours

**Scope:** This subject is designed to impart knowledge and skills of Biopharmaceutics and pharmacokinetics and their applications in pharmaceutical development, design of dose and dosage regimen and in solving the problems arising therein.

**Objectives:** Upon completion of the course student shall be able to:

1. Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.
2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
3. To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
4. Understand various pharmacokinetic parameters, their significance & applications.

**Course  
Content:**

**UNIT-I**  
**Hours**

10

**Introduction**  
**Biopharmaceutics**

to

**Absorption;** Mechanisms of drug absorption through GIT, factors influencing drug absorption through GIT, absorption of drug from Non per oral extra-vascular routes, **Distribution** Tissue permeability of drugs, binding of drugs, apparent, volume of drug distribution, plasma and tissue protein binding of drugs, factors affecting protein-drug binding. Kinetics of protein binding, Clinical significance of protein binding of drugs

**UNIT- II**  
**Hours**

10

**Elimination:** Drug metabolism and basic understanding metabolic pathways renal excretion of drugs, factors affecting renal excretion of drugs, renal clearance, Non renal routes of drug excretion of drugs

**Bioavailability and Bioequivalence:** Definition and Objectives of bioavailability, absolute and relative bioavailability, measurement of bioavailability, *in vitro* drug dissolution models, *in-vitro-in-vivo* correlations, bioequivalence studies, methods to enhance the dissolution rates and bioavailability of poorly soluble drugs.

**UNIT- III**

**10 Hours**

**Pharmacokinetics:** Definition and introduction to Pharmacokinetics, Compartment models, Non compartment models, physiological models, One compartment open model. (a). Intravenous Injection (Bolos) (b). Intravenous infusion and (c) Extra vascular administrations. Pharmacokinetics parameters -  $K_E$ ,  $t_{1/2}$ ,  $V_d$ ,  $AUC$ ,  $K_a$ ,  $Cl_t$  and  $CL_R$ - definitions methods of eliminations, understanding of their significance and application



**PRINCIPAL**


Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



### Recommended Books (Latest editions)

1. Pharmaceutical Statistics Practical and Clinical Applications by Stanford Bolton, Charles Bon; Marcel Dekker Inc.
2. Encyclopedia of Pharmaceutical Technology, edited by James Swarbrick, Third Edition, Informa Healthcare publishers.
3. Pharmaceutical Dosage Forms, Tablets, Volume II, edited by Herbert A. Lieberman and Leon Lachman; Marcel Dekker, Inc.
4. The Theory and Practice of Industrial Pharmacy, Fourth Edition, edited by R. K. Khar, S. P. Vyas, Farhan J. Ahmad, Gaurav K. Jain; CBS Publishers and Distributors Pvt. Ltd. 2013.
5. Martin's Physical Pharmacy and Pharmaceutical Sciences, Fifth Edition, edited by Patrick J. Sinko, BI Publications Pvt. Ltd.
6. Targeted and Controlled Drug Delivery, Novel Carrier Systems by S. P. Vyas and R. K. Khar, CBS Publishers and Distributors Pvt. Ltd, First Edition 2012.
7. Pharmaceutical Dosage Forms and Drug Delivery Systems, Loyd V. Allen Jr., Nicholas B. Popovich, Howard C. Ansel, 9th Ed. 40
8. Aulton's Pharmaceutics – The Design and Manufacture of Medicines, Michael E. Aulton, 3rd Ed.
9. Remington – The Science and Practice of Pharmacy, 20th Ed.
10. Pharmaceutical Dosage Forms – Tablets Vol 1 to 3, A. Liberman, Leon Lachman and Joseph B. Schwartz
11. Pharmaceutical Dosage Forms – Disperse Systems Vol 1 to 3, H.A. Liberman, Martin, M.R. and Gilbert S. Banker.
12. Pharmaceutical Dosage Forms – Parenteral Medication Vol 1 & 2, Kenneth E. Avis and H.A. Libermann.
13. Advanced Review Articles related to the topics.



  
**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### SYLLABUS REGULATION (PCI)

Avanthi Institute Of Pharmaceutical Sciences (AIPS) follows PCI Syllabus for all the programs such as B.Pharm, M.Pharm, Pharm.D. PCI Syllabus covered the vast and categorically includes Pharmacy subjects which later the needs of students both in professional and scientific requirements.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## PHARMACEUTICS (MPH)

### SEMESTER - I

#### MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (MPH 101T)

##### Scope

This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.

##### Objectives

After completion of course student is able to know,

- 1 Chemicals and Excipients
- 1 The analysis of various drugs in single and combination dosage forms
- 1 Theoretical and practical skills of the instruments

##### THEORY

60 HOURS

1. a. UV-Visible spectroscopy: Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV-Visible spectroscopy. 11 Hrs  
b. IR spectroscopy: Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier - Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy  
c. Spectrofluorimetry: Theory of Fluorescence, Factors affecting fluorescence, Quenchers, Instrumentation and Applications of fluorescence spectrophotometer.  
d. Flame emission spectroscopy and Atomic absorption spectroscopy: Principle, Instrumentation, Interferences and Applications.
- 2 NMR spectroscopy: Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and <sup>13</sup>C NMR. Applications of NMR spectroscopy. 11 Hrs





- |   |  |           |
|---|--|-----------|
| 3 | Mass Spectroscopy: Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Metastable ions, Isotopic peaks and Applications of Mass spectroscopy  | 11<br>Hrs |
| 4 | Chromatography: Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution and applications of the following:<br>a) Paper chromatography<br>b) Thin Layer chromatography<br>c) Ion exchange chromatography<br>d) Column chromatography<br>e) Gas chromatography<br>f) High Performance Liquid chromatography<br>g) Affinity chromatography  | 11<br>Hrs |
| 5 | a. Electrophoresis: Principle, Instrumentation, Working conditions, factors affecting separation and applications of the following:<br>a) Paper electrophoresis                      b) Gel electrophoresis<br>c) Capillary electrophoresis                d) Zone electrophoresis<br>e) Moving boundary electrophoresis      f) Iso electric focusing<br>b. X ray Crystallography: Production of X rays, Different X ray diffraction methods, Bragg's law, Rotating crystal technique, X ray powder technique, Types of crystals and applications of X-ray diffraction. | 11<br>Hrs |
| 6 | Immunological assays : RIA (Radio immuno assay), ELISA, Bioluminescence assays.  | 5 Hrs     |

## REFERENCES

1. Spectrometric Identification of Organic compounds –Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004.
2. Principles of Instrumental Analysis - Douglas A Skoog, F. James Holler, Timothy A. Nieman, 5<sup>th</sup> edition, Eastern press, Bangalore, 1998.
3. Instrumental methods of analysis – Willards, 7<sup>th</sup> edition, CBS publishers.
4. Practical Pharmaceutical Chemistry – Beckett and Stenlake, Vol II, 4th edition, CBS Publishers, New Delhi, 1997.
5. Organic Spectroscopy - William Kemp, 3rd edition, ELBS, 1991.
6. Quantitative Analysis of Drugs in Pharmaceutical formulation – PD Sethi, 3<sup>rd</sup> Edition, CBS Publishers, New Delhi, 1997.
7. Pharmaceutical Analysis –Modern methods –Part B- JW Munson, Volume 11, Marcel Dekker Series





## DRUG DELIVERY SYSTEMS (MPH 102T)

### SCOPE

This course is designed to impart knowledge on the area of advances in novel drug delivery systems.

### OBJECTIVES

Upon completion of the course, student shall be able to understand

- || The various approaches for development of novel drug delivery systems.
- || The criteria for selection of drugs and polymers for the development of delivering system.
- | The formulation and evaluation of Novel drug delivery systems.

### THEORY

60 Hrs

1. Sustained Release (SR) and Controlled Release (CR) formulations: Introduction & basic concepts, advantages/ disadvantages, factors influencing, Physicochemical & biological approaches for SR/CR formulation, Mechanism of Drug Delivery from SR/CR formulation. Polymers: introduction, definition, classification, properties and application Dosage Forms for Personalized Medicine: Introduction, Definition, Pharmacogenetics, Categories of Patients for Personalized Medicines: Customized drug delivery systems, Bioelectronic Medicines, 3D printing of pharmaceuticals, Telepharmacy. 10 Hrs
2. Rate Controlled Drug Delivery Systems: Principles & Fundamentals, Types, Activation; Modulated Drug Delivery Systems; Mechanically activated, pH activated, Enzyme activated and Osmotic activated Drug Delivery Systems Feedback regulated Drug Delivery Systems; Principles & Fundamentals. 10 Hrs
3. Gastro-Retentive Drug Delivery Systems: Principle, concepts advantages and disadvantages, Modulation of GI transit time approaches to extend GI transit. Buccal Drug Delivery Systems: Principle of mucoadhesion, advantages and disadvantages, Mechanism of drug permeation, Methods of formulation and its evaluations. 10 Hrs
4. Ocular Drug Delivery Systems: Barriers of drug permeation, Methods to overcome barriers. 06 Hrs



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

- |   |  |        |
|---|--|--------|
| 5 | Transdermal Drug Delivery Systems: Structure of skin and barriers, Penetration enhancers, Transdermal Drug Delivery Systems, Formulation and evaluation. | 10 Hrs |
| 6 | Protein and Peptide Delivery: Barriers for protein delivery. Formulation and Evaluation of delivery systems of proteins and other macromolecules.        | 08 Hrs |
| 7 | Vaccine delivery systems: Vaccines, uptake of antigens, single shot vaccines, mucosal and transdermal delivery of vaccines.                              | 06 Hrs |

## REFERENCES

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., New York, 1992.
2. Robinson, J. R., Lee V. H. L, Controlled Drug Delivery Systems, Marcel Dekker, Inc., New York, 1992.
3. Encyclopedia of controlled delivery, Editor -Edith Mathiowitz, Published by Wiley Inter science Publication, John Wiley and Sons, Inc, New York! Chichester/Weinheim
4. N.K.Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, New Delhi, First edition 1997 (reprint in 2001).
5. S.P.Vyas and R.K.Khar, Controlled Drug Delivery-concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002

## JOURNALS

1. Indian Journal of Pharmaceutical Sciences
2. Indian drugs (IDMA)
3. Journal of controlled release (Elsevier Sciences) desirable
4. Drug Development and Industrial Pharmacy (Marcel & Decker) desirable



*Handwritten signature*

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## MODERN PHARMACEUTICS (MPH 103T)

### Scope

Course designed to impart advanced knowledge and skills required to learn various aspects and concepts at pharmaceutical industries

### Objectives

Upon completion of the course, student shall be able to understand

- 1 The elements of preformulation studies.
- 1 The Active Pharmaceutical Ingredients and Generic drug Product development
- 1 Industrial Management and GMP Considerations.
- 1 Optimization Techniques & Pilot Plant Scale Up Techniques
- 1 Stability Testing, sterilization process & packaging of dosage forms.

### THEORY

60HRS

1. a. Preformation Concepts – Drug Excipient interactions - different methods, kinetics of stability, Stability testing. Theories of dispersion and pharmaceutical Dispersion (Emulsion and Suspension, SMEDDS) preparation and stability Large and small volume parental – physiological and formulation consideration, Manufacturing and evaluation. 10 Hrs
- b. Optimization techniques in Pharmaceutical Formulation: Concept and parameters of optimization, Optimization techniques in pharmaceutical formulation and processing. Statistical design, Response surface method, Contour designs, Factorial designs and application in formulation 10 Hrs
- 2 Validation: Introduction to Pharmaceutical Validation, Scope & merits of Validation, Validation and calibration of Master plan, ICH & WHO guidelines for calibration and validation of equipments, Validation of specific dosage form, Types of validation. Government regulation, Manufacturing Process Model, URS, DQ, IQ, OQ& P.Q of facilities 10 Hrs
- 3 cGMP & Industrial Management: Objectives and policies of current good manufacturing practices, layout of buildings, services, equipments and their maintenance Production management: Production organization, materials management, handling and transportation, inventory management and control, production and planning control, Sales forecasting, budget and cost control, industrial and personal relationship. Concept of Total Quality Management. 10 Hrs



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



- 4      Compression and compaction: Physics of tablet compression, 10 Hrs  
compression, consolidation, effect of friction, distribution of forces,  
compaction profiles. Solubility.
  
- 5      Study of consolidation parameters; Diffusion parameters, Dissolution 10 Hrs  
parameters and Pharmacokinetic parameters, Heckel plots, Similarity factors  
– f<sub>2</sub> and f<sub>1</sub>, Higuchi and Peppas plot, Linearity Concept of significance,  
Standard deviation, Chi square test, students T-test, ANOVA test.

## REFERENCES

1. Theory and Practice of Industrial Pharmacy By Lachmann and Libermann
2. Pharmaceutical dosage forms: Tablets Vol.1-3 by Leon Lachmann.
3. Pharmaceutical Dosage forms: Disperse systems, Vol, 1-2; By Leon Lachmann.
4. Pharmaceutical Dosage forms: Parenteral medications Vol. 1-2; By Leon Lachmann.
5. Modern Pharmaceutics; By Gillbert and S.Banker.
6. Remington's Pharmaceutical Sciences.
7. Advances in Pharmaceutical Sciences Vol. 1-5; By H.S. Bean & A.H. Beckett.
8. Physical Pharmacy; By Alfred Martin
9. Bentley's Textbook of Pharmaceutics – by Rawlins.
10. Good manufacturing practices for Pharmaceuticals: A plan for total quality control, Second edition; By Sidney H. Willig.
11. Quality Assurance Guide; By Organization of Pharmaceutical producers of India.
12. Drug formulation manual; By D.P.S. Kohli and D.H. Shah. Eastern publishers, New Delhi.
13. How to practice GMPs; By P.P. Sharma. Vandhana Publications, Agra.
14. Pharmaceutical Process Validation; By Fra. R. Berry and Robert A. Nash.
15. Pharmaceutical Preformulations; By J.J. Wells.
16. Applied production and operations management; By Evans, Anderson, Sweeney and Williams.
17. Encyclopaedia of Pharmaceutical technology, Vol I–III.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## REGULATORY AFFAIRS (MPH 104T)

### Scope

Course designed to impart advanced knowledge and skills required to learn the concept of generic drug and their development, various regulatory filings in different countries, different phases of clinical trials and submitting regulatory documents: filing process of IND, NDA and ANDA

- 1 To know the approval process of
- 1 To know the chemistry, manufacturing controls and the irregularity importance.
- 1 To learn the documentation requirements

### Objectives:

Upon completion of the course, it is expected that the students will be able to understand

- 1 The Concepts of innovator and generic drugs, drug development process
- 1 The Regulatory guidance's and guidelines for filing and approval process
- 1 Preparation of Dossiers and their submission to regulatory agencies in different countries
- 1 Postapproval regulatory requirements for actives and drug products Submission of global documents in CTD/eCTD formats
- 1 Clinical trials requirements for approvals for conducting clinical trials
- 1 Pharmacovigilance and process of monitoring in clinical trials.

### THEORY

60Hrs

1. a. Documentation in Pharmaceutical industry: Master formula record, DMF 12  
(Drug Master File), distribution records. Generic drugs product Hrs  
development Introduction, Hatch- Waxman act and amendments, CFR  
(CODE OF FEDERAL REGULATION) ,drug product performance, in-  
vitro, ANDA regulatory approval process, NDA approval process, BE and  
drug product assessment, in -vivo, scale up process approval changes,  
postmarketing surveillance, outsourcing BA and BE to CRO. 12
- b. Regulatory requirement for product approval: API, biologics, 12  
novel, therapies obtaining NDA, ANDA for generic drugs ways and Hrs  
means of US registration for foreign drugs



*Handwritten signature*  
**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162




- 2 CMC, post approval regulatory affairs. Regulation for combination products and medical devices. CTD and ECTD format, industry and FDA liaison. ICH - Guidelines of ICH-Q, S E, M. Regulatory requirements of EU, MHRA, TGA and ROW countries. 12 Hrs
- 3 Non clinical drug development: Global submission of IND, NDA, ANDA. Investigation of medicinal products dossier, dossier (IMPD) and investigator brochure (IB). 12 Hrs
- 4 Clinical trials: Developing clinical trial protocols. Institutional review board/ independent ethics committee Formulation and working procedures informed Consent process and procedures. HIPAA- new, requirement to clinical study process, pharmacovigilance safety monitoring in clinical trials. 12 Hrs

#### REFERENCES

1. Generic Drug Product Development, Solid Oral Dosage forms, Leon Shargel and Isader Kaufer, Marcel Dekker series, Vol.143
2. The Pharmaceutical Regulatory Process, Second Edition Edited by IraR. Berryand Robert P.Martin, Drugs and the Pharmaceutical Sciences, Vol. 185, Informa Health care Publishers.
3. New Drug Approval Process: Accelerating Global Registrations By Richard A Guarino, MD, 5<sup>th</sup> edition, Drugs and the Pharmaceutical Sciences, Vol.190.
4. Guide book for drug regulatory submissions /Sandy Weinberg. By John Wiley & Sons. Inc.
5. FDA regulatory affairs: a guide for prescription drugs, medical devices, and biologics/ edited By Douglas J.Pisano, David Mantus.
6. Clinical Trials and Human Research: A Practical Guide to Regulatory Compliance By Fay A. Rozovsky and Rodney K. Adams
7. [www.ich.org/](http://www.ich.org/)
8. [www.fda.gov/](http://www.fda.gov/)
9. [europa.eu/index\\_en.htm](http://europa.eu/index_en.htm)
10. <https://www.tga.gov.au/tga-basics>



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



## PHARMACEUTICS PRACTICAL - I

### (MPH 105PA)

1. Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3. Experiments based on HPLC
4. Experiments based on Gas Chromatography
5. Estimation of riboflavin/quinine sulphate by fluorimetry
6. Estimation of sodium/potassium by flame photometry
7. To carry out preformulation studies of tablets.
8. To study the effect of compressional force on tablets disintegration time.
9. To study Micromeritic properties of powders and granulation.

## PHARMACEUTICS PRACTICAL - II

### (MPH 105PB)

1. To study the effect of particle size on dissolution of a tablet.
2. To study the effect of binders on dissolution of a tablet.
3. To plot Heckal plot, Higuchi and peppas plot and determine similarity factors.
4. To perform In-vitro dissolution profile of CR/ SR marketed formulation
5. Formulation and evaluation of sustained release matrix tablets
6. Formulation and evaluation osmotically controlled DDS
7. Preparation and evaluation of Floating DDS- hydro dynamically balanced DDS
8. Formulation and evaluation of Muco adhesive tablets.
9. Formulation and evaluation of trans dermal patches.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

SEMESTER - II  
MOLECULAR PHARMACEUTICS (NANO TECHNOLOGY &  
TARGETED DDS) (NTDS)  
(MPH 201T)

**Scope**

This course is designed to impart knowledge on the area of advances in novel drug delivery systems.

**Objectives**

Upon completion of the course student shall be able to understand

- 1 The various approaches for development of novel drug delivery systems.
- 1 The criteria for selection of drugs and polymers for the development of NTDS
- 1 The formulation and evaluation of novel drug delivery systems.

**THEORY**

60 Hrs

1. Targeted Drug Delivery Systems: Concepts, Events and biological process involved in drug targeting. Tumor targeting and Brain specific delivery. 12 Hrs
- 2 Targeting Methods: introduction preparation and evaluation. NanoParticles & Liposomes: Types, preparation and evaluation. 12 Hrs
- 3 Micro Capsules / Micro Spheres: Types, preparation and evaluation, Monoclonal Antibodies; preparation and application, preparation and application of Niosomes, Aquasomes, Phytosomes, Electrosomes. 12 Hrs
- 4 Pulmonary Drug Delivery Systems: Aerosols, propellents, Containers Types, preparation and evaluation, Intra Nasal Route Delivery systems; Types, preparation and evaluation. 12 Hrs
- 5 Nucleic acid based therapeutic delivery system: Gene therapy, introduction (ex-vivo & in-vivo gene therapy). Potential target diseases for gene therapy (inherited disorder and cancer). Gene expression systems (viral and nonviral genetransfer). Liposomal gene delivery systems. Bio distribution and Pharmacokinetics. Knowledge of therapeutic antisense molecules and aptamers as drugs of future. 12 Hrs

**REFERENCES**

1. Y W. Chien, Novel Drug Delivery Systems, 2nd edition, revised and expanded, Marcel Dekker, Inc., NewYork, 1992.
2. S.P.Vyas and R.K.Khar, Controlled Drug Delivery - concepts and advances, Vallabh Prakashan, New Delhi, First edition 2002.
3. N.K.Jain, Controlled and Novel Drug Delivery, CBS Publishers & Distributors, NewDelhi, First edition 1997 (reprint in 2001).





## ADVANCED BIOPHARMACEUTICS & PHARMACOKINETICS (MPH 202T)

### Scope

This course is designed to impart knowledge and skills necessary for dose calculations, dose adjustments and to apply biopharmaceutics theories in practical problem solving. Basic theoretical discussions of the principles of biopharmaceutics and pharmacokinetics are provided to help the students to clarify the concepts.

### Objectives

Upon completion of this course it is expected that students will be able understand,

- 1 The basic concepts in Biopharmaceutics and pharmacokinetics.
- 1 The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination.
- 1 The critical evaluation of biopharmaceutic studies involving drug product equivalency.
- 1 The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.
- 1 The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic

### THEORY

60Hrs

1. Drug Absorption from the Gastrointestinal Tract: Gastrointestinal tract, Mechanism of drug absorption, Factors affecting drug absorption, pH-partition theory of drug absorption. Formulation and physicochemical factors: Dissolution rate, Dissolution process, Noyes-Whitney equation and drug dissolution, Factors affecting the dissolution rate. Gastrointestinal absorption: role of the dosage form: Solution (elixir, syrup and solution) as a dosage form, Suspension as a dosage form, Capsule as a dosage form, Tablet as a dosage form, Dissolution methods, Formulation and processing factors, Correlation of in vivo data with in vitro dissolution data. Transport model: Permeability - Solubility - Charge State and the pH Partition Hypothesis, Properties of the Gastrointestinal Tract (GIT), pH Microclimate Intracellular pH Environment, Tight-Junction Complex. 12 Hrs
2. Biopharmaceutic considerations in drug product design and In Vitro Drug Product Performance: Introduction, biopharmaceutic factors affecting drug bioavailability, rate-limiting steps in drug absorption, physicochemical nature of the drug formulation factors affecting drug product performance, in vitro: dissolution and drug release testing, compendial methods of dissolution, alternative methods of dissolution testing, meeting dissolution requirements, problems of variable control in dissolution testing performance of drug products. In vitro-in vivo correlation, dissolution profile comparisons, drug product stability, considerations in the design of a drug product. 12 Hrs



*trv*

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



3. Pharmacokinetics: Basic considerations, pharmacokinetic models, compartment modeling: one compartment model –IV bolus, IV infusion, extra- vascular. Multicompartment model: two compartment- model in brief, non-linear pharmacokinetics: cause of non-linearity, Michaelis–Menten equation, estimation of  $k_{max}$  and  $v_{max}$ . Drug interactions: introduction, the effect of protein-binding interactions, the effect of tissue-binding interactions, cytochrome p450-based drug interactions, drug interactions linked to transporters. 12 Hrs
4. Drug Product Performance, In Vivo: Bioavailability and Bioequivalence: drug product performance, purpose of bioavailability studies, relative and absolute availability, methods for assessing bioavailability, bioequivalence studies, design and evaluation of bioequivalence studies, study designs, crossover study designs, evaluation of the data, bioequivalence example, study submission and drug review process. Biopharmaceutical classification system, methods. Permeability: In- vitro, in-situ and In-vivo methods. generic biologics (biosimilar drug products), clinical significance of bioequivalence studies, special concerns in bioavailability and bioequivalence studies, generic substitution. 12 Hrs
5. Application of Pharmacokinetics: Modified-Release Drug Products, Targeted Drug Delivery Systems and Biotechnological Products. Introduction to Pharmacokinetics and pharmacodynamic, drug interactions. Pharmacokinetics and pharmacodynamics of biotechnology drugs. Introduction, Proteins and peptides, Monoclonal antibodies, Oligonucleotides, Vaccines (immunotherapy), Genetherapies. 12 Hrs



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## REFERENCES

1. Biopharmaceutics and Clinical Pharmacokinetics by Milo Gibaldi, 4th edition, Philadelphia, Lea and Febiger, 1991
2. Biopharmaceutics and Pharmacokinetics, A. Treatise, D .M. Brahmanekar and Sunil B. Jaiswal, Vallab Prakashan, Pitampura, Delhi
3. Applied Biopharmaceutics and Pharmacokinetics by Shargel. Land Yu ABC, 2<sup>nd</sup> edition, Connecticut Appleton Century Crofts, 1985
4. Textbook of Biopharmaceutics and Pharmacokinetics, Dr. Shobha Rani R. Hiremath, Prism Book
5. Pharmacokinetics by Milo Gibaldi and D. Perrier, 2nd edition, Marcel Dekker Inc., New York, 1982
6. Current Concepts in Pharmaceutical Sciences: Biopharmaceutics, Swarbrick. J, Lea and Febiger, Philadelphia, 1970
7. Clinical Pharmacokinetics, Concepts and Applications 3rd edition by Malcolm Rowland and Thomas N. Tozer, Lea and Febiger, Philadelphia, 1995
8. Dissolution, Bioavailability and Bioequivalence, Abdou. H.M, Mack Publishing Company, Pennsylvania 1989
9. Biopharmaceutics and Clinical Pharmacokinetics, An Introduction, 4th edition, revised and expanded by Robert E. Notari, Marcel Dekker Inc, New York and Basel, 1987.
10. Biopharmaceutics and Relevant Pharmacokinetics by John G Wagner and M. Pamarowski, 1st edition, Drug Intelligence Publications, Hamilton, Illinois, 1971.
11. Encyclopedia of Pharmaceutical Technology, Vol 13, James Swarbrick, James G. Boylan, Marcel Dekker Inc, New York, 1996.
12. Basic Pharmacokinetics, 1<sup>st</sup> edition, Sunil S Jambhekar and Philip J Breen, pharmaceutical press, RPS Publishing, 2009.
13. Absorption and Drug Development- Solubility, Permeability and Charge State, Alex Avdeef, John Wiley & Sons, Inc, 2003.



*tu*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# COMPUTER AIDED DRUG DEVELOPMENT (MPH 203T)

## Scope

This course is designed to impart knowledge and skills necessary for computer Applications in pharmaceutical research and development who want to understand the application of computers across the entire drug research and development process. Basic theoretical discussions of the principles of more integrated and coherent use of computerized information (informatics) in the drug development process are provided to help the students to clarify the concepts.

## Objectives

Upon completion of this course it is expected that students will be able to understand,

- 1 History of Computers in Pharmaceutical Research and Development
- 1 Computational Modeling of Drug Disposition
- 1 Computers in Preclinical Development.
- 1 Optimization Techniques in Pharmaceutical Formulation
- 1 Computers in Market Analysis
- 1 Computers in Clinical Development
- 1 Artificial Intelligence (AI) and Robotics
- 1 Computational fluid dynamics (CFD)

## THEORY

60 Hrs

1. a. Computers in Pharmaceutical Research and Development: 12 Hrs  
A General Overview: History of Computers in Pharmaceutical Research and Development. Statistical modeling in Pharmaceutical research and development: Descriptive versus Mechanistic Modeling, Statistical Parameters, Estimation, Confidence Regions, Nonlinearity at the Optimum, Sensitivity Analysis, Optimal Design, Population Modeling
- b. Quality-by-Design In Pharmaceutical Development: Introduction, ICH Q8 guideline, Regulatory and industry views on QbD, Scientifically based QbD - examples of application.
- 2 Computational Modeling Of Drug Disposition: Introduction, Modeling 12 Hrs  
Techniques: Drug Absorption, Solubility, Intestinal Permeation, Drug Distribution, Drug Excretion, Active Transport; P-gp, BCRP, Nucleoside Transporters, hPEPT1, ASBT, OCT, OATP, BBB-Choline Transporter.



48

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

- 3 Computer-aided formulation development: Concept of optimization, Optimization parameters, Factorial design, Optimization technology & Screening design. Computers in Pharmaceutical Formulation: Development of pharmaceutical emulsions, microemulsion drug carriers Legal Protection of Innovative Uses of Computers in R&D, The Ethics of Computing in Pharmaceutical Research, Computers in Market analysis 12 Hrs
- 4
  - a. Computer-aided biopharmaceutical characterization: Gastrointestinal absorption simulation. Introduction, Theoretical background, Model construction, Parameter sensitivity analysis, Virtual trial, Fedvs.fasted state, In vitro dissolution and in vitro in vivo correlation, Biowaiver considerations 12 Hrs
  - b. Computer Simulations in Pharmacokinetics and Pharmacodynamics: Introduction, Computer Simulation: Whole Organism, Isolated Tissues, Organs, Cell, Proteins and Genes.
  - c. Computers in Clinical Development: Clinical Data Collection and Management, Regulation of Computer Systems
- 5 Artificial Intelligence (AI), Robotics and Computational fluid dynamics: General overview, Pharmaceutical Automation, Pharmaceutical applications, Advantages and Disadvantages. Current Challenges and Future Directions. 12 Hrs

#### REFERENCES

1. Computer Applications in Pharmaceutical Research and Development, Sean Ekins, 2006, John Wiley & Sons.
2. Computer-Aided Applications in Pharmaceutical Technology, 1<sup>st</sup> Edition, Jelena Djuris, Woodhead Publishing
3. Encyclopedia of Pharmaceutical Technology, Vol 13, James Swarbrick, James. G.Boylan, Marcel Dekker Inc, New York, 1996.



*Handwritten signature*  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# FORMULATION DEVELOPMENT OF PHARMACEUTICAL AND COSMETIC PRODUCTS (MPH204T)

## Scope

This course is designed to impart knowledge and skills necessary to train the students on par with the routine of Industrial activities in R&D and F&D.

## Objectives

On completion of this course it is expected that students will be able to understand-  
The scheduled activities in a Pharmaceutical firm.

The pre formulation studies of pilot batches of pharmaceutical industry. The significance of dissolution and product stability

## THEORY

60 Hrs

1. Preformulation Studies: 12 Hrs  
Molecular optimization of APIs (drug substances), crystal morphology and variations, powder flow, structure modification, drug-excipient compatibility studies, methods of determination.
2. Formulation Additives: 12 Hrs  
Study of different formulation additives, factors influencing their incorporation, role of formulation development and processing, new developments in excipient science. Design of experiments – factorial design for product and process development.
3. Solubility & Dissolution: 12 Hrs  
Importance, experimental determination, phase- solubility analysis, pH-solubility profile, solubility techniques to improve solubility and utilization of analytical methods – cosolvency, salt formation, complexation, solid dispersion, micellar solubilization and hydrotrophy. Theories and mechanisms of dissolution, in-vitro dissolution testing models – sink and non-sink. Factor influencing dissolution and intrinsic dissolution studies. Dissolution test apparatus – designs, dissolution testing for conventional and controlled release products. Data handling and correction factor. Biorelevant media, in-vitro and in- vivo correlations, levels of correlations.
4. Product Stability: 12 Hrs  
Degradation kinetics, mechanisms, stability testing of drugs and pharmaceuticals, factors influencing-media effects and pH effects, accelerated stability studies, interpretation of kinetic data (API & tablets). Solid state stability and shelf life assignment. Stability protocols, reports and ICH guidelines.
5. Cosmetics: 12 Hrs  
Formulation, Evaluation and packaging of the following cosmetic products: Dentrifices like tooth powders, pastes and gels. Manicure preparations like nail polish, lipsticks, eye lashes, Baby care products, Moisturizing cream, vanishing cream, cold cream, shampoo, Soaps and syndetbars



**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## REFERENCES

1. Lachman L, Lieberman HA, Kanig JL. The Theory and Practice of Industrial Pharmacy, 3<sup>rd</sup> ed., Varghese Publishers, Mumbai 1991.
2. Sinko PJ. Martin's physical pharmacy and pharmaceutical sciences, 5 ed., B.I. Publications Pvt. Ltd, Noida, 2006.
3. Lieberman HA, Lachman L, Schwartz JB. Pharmaceutical dosage forms: tablets Vol. I-III, 2<sup>nd</sup> ed., CBS Publishers & distributors, New Delhi, 2005.
4. Connors KA. A Text book of pharmaceutical analysis Wells JI. Pharmaceutical preformulation: The physicochemical properties of drug substances. Ellis Horwood Ltd., England, 1998.
5. Yalkowsky SH. Techniques of solubilization of drugs. Vol-12. Marcel Dekker Inc., New York, 1981
6. Dressman J, Kramer J. Pharmaceutical dissolution testing. Saurah printer pvt. Ltd., New Delhi, 2005.
7. Sethi PD. Quantitative analysis of drugs in pharmaceutical formulations, 3<sup>rd</sup>ed., CBS publications, New Delhi, 2008.
8. Carstensen JT, Rhodes CT. Drug stability principles and practices, 3<sup>rd</sup>ed., CBS Publishers & distributors, New Delhi, 2005.
9. Yoshioka S, Stella VJ. Stability of drugs and dosage forms, Springer (India) Pvt. Ltd., New Delhi, 2006.
10. Banker GS, Rhodes CT. Modern Pharmaceutics, 4<sup>th</sup> ed., Marcel Dekker Inc, New York, 2005.
11. W. Grimm - Stability testing of drug products.
12. Mazzo DJ. International stability testing. Eastern Press Pvt. Ltd., Bangalore, 1999.
13. Beckett AH, Stenlake JB. Practical pharmaceutical chemistry, Part I & II, 4<sup>th</sup>ed., CBS Publishers & distributors, New Delhi, 2004.
14. Indian Pharmacopoeia. Controller of Publication. Delhi, 1996.
15. British Pharmacopoeia. British Pharmacopoeia Commission Office, London, 2008.
16. United States Pharmacopoeia. United States Pharmacopoeial Convention, Inc, USA, 2003.
17. Encyclopaedia of Pharm. Technology, Vol I – III.
18. Wells J. I. Pharmaceutical Preformulation: The physicochemical properties of drug substances, Ellis Horwood Ltd. England, 1988.
19. Harry's Cosmeticology. 8<sup>th</sup> edition.
20. Poucher's perfume cosmetics and Soaps, 10<sup>th</sup> edition.
21. Cosmetics - Formulation, Manufacture and quality control, PP.Sharma, 4<sup>th</sup> edition
22. Handbook of cosmetic science and Technology A.O.Barel, M.Paye and H I Maibach 3<sup>rd</sup> edition.



*Handwritten signature*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162




### PHARMACEUTICS PRACTICAL - III (MPH 205PA)

1. To study the effect of temperature change, non solvent addition, incompatible polymer addition in microcapsules preparation
2. Preparation and evaluation of Alginate beads
3. Formulation and evaluation of gelatin /albumin microspheres
4. Formulation and evaluation of liposomes/niosomes
5. Formulation and evaluation of spherules
6. Improvement of dissolution characteristics of slightly soluble drug by Solid dispersion technique
7. Comparison of dissolution of two different marketed products /brands
8. Protein binding studies of a highly protein bound drug & poorly protein bound drug
9. Bioavailability studies of Paracetamol in animals.
10. Pharmacokinetic and IVIVC data analysis by Winnoline<sup>R</sup> software
11. In vitro cell studies for permeability and metabolism

### PHARMACEUTICS PRACTICAL - IV (MPH 205PB)

1. DoE Using Design Expert<sup>®</sup> Software
2. Formulation data analysis Using Design Expert<sup>®</sup> Software
3. Quality-by-Design in Pharmaceutical Development
4. Computer Simulations in Pharmacokinetics and Pharmacodynamics
5. Computational Modeling Of Drug Disposition
6. To develop Clinical Data Collection manual
7. To carry out Sensitivity Analysis, and Population Modeling.
8. Development and evaluation of Creams
9. Development and evaluation of Shampoo and Toothpaste base
10. Formulation Development of Multi Vitamin Syrup
11. Use of Optimization techniques in Formulation Development of Tablets



  
PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

# PHARMACEUTICAL ANALYSIS (MPA)

## SEMESTER - I

### MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (MPA 101T)

#### Scope

This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.


#### Objectives

- After completion of course student is able to know about chemicals and excipients
- 1 The analysis of various drugs in single and combination dosage forms
  - 1 Theoretical and practical skills of the instruments

#### THEORY

- |    |  |                  |
|----|--|------------------|
| 1. | a. UV-Visible spectroscopy: Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV-Visible spectroscopy, Difference/ Derivative spectroscopy.   | 60 Hrs<br>10 Hrs |
|    | b. IR spectroscopy: Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier - Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy, Data Interpretation.   |                  |
|    | c. Spectrofluorimetry: Theory of Fluorescence, Factors affecting fluorescence (Characteristics of drugs that can be analysed by fluorimetry), Quenchers, Instrumentation and Applications of fluorescence spectrophotometer.   |                  |
|    | d. Flame emission spectroscopy and Atomic absorption spectroscopy: Principle, Instrumentation, Interferences and Applications.   |                  |
| 2  | NMR spectroscopy: Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors, Influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and <sup>13</sup> C NMR. Applications of NMR spectroscopy. | 10 Hrs           |
| 3  | Mass Spectroscopy: Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization like electron impact, chemical field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Metastable ions, Isotopic peaks and Applications of Mass spectroscopy.  | 10 Hrs           |



  
**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



- 4 Chromatography: Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution, isolation of drug from excipients, data interpretation and applications of the following: 10 Hrs
- Thin Layer chromatography
  - High Performance Thin Layer Chromatography
  - Ion exchange chromatography
  - Column chromatography
  - Gas chromatography
  - High Performance Liquid chromatography
  - Ultra High Performance Liquid chromatography
  - Affinity chromatography
  - Gel Chromatography
5. a. Electrophoresis: Principle, Instrumentation, Working conditions, factors affecting separation and applications of the following: 10 Hrs
- a) Paper electrophoresis b) Gel electrophoresis c) Capillary electrophoresis d) Zone electrophoresis e) Moving boundary electrophoresis f) Isoelectric focusing
  - b. X ray Crystallography: Production of X rays, Different X ray methods, Bragg's law, Rotating crystal technique, X ray powder technique, Types of crystals and applications of X-ray diffraction
6. a. Potentiometry: Principle, working, Ion selective Electrodes and Application of potentiometry. 10 Hrs
- b. Thermal Techniques: Principle, thermal transitions and Instrumentation (Heat flux and power-compensation and designs), Modulated DSC, Hyper DSC, experimental parameters (sample preparation, experimental conditions, calibration, heating and cooling rates, resolution, source of errors) and their influence, advantage and disadvantages, pharmaceutical applications. Differential Thermal Analysis (DTA): Principle, instrumentation and advantage and disadvantages, pharmaceutical applications, derivative differential thermal analysis (DDTA). TGA: Principle, instrumentation, factors affecting results, advantage and disadvantages, pharmaceutical applications.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## REFERENCES

1. Spectrometric Identification of Organic compounds- Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004.
2. Principles of Instrumental Analysis - Douglas A Skoog, F. James Holler, Timothy A. Nieman, 5<sup>th</sup> edition, Eastern press, Bangalore, 1998.
3. Instrumental methods of analysis- Willards, 7<sup>th</sup> edition, CBS publishers.
4. Practical Pharmaceutical Chemistry- Beckett and Stenlake, Vol II, 4<sup>th</sup> edition, CBS Publishers, New Delhi, 1997.
5. Organic Spectroscopy - William Kemp, 3<sup>rd</sup> edition, ELBS, 1991.
6. Quantitative Analysis of Drugs in Pharmaceutical formulation PD Sethi, 3<sup>rd</sup> Edition, CBS Publishers, New Delhi, 1997.
7. Pharmaceutical Analysis- Modern Methods- Part B- JW Munson, Vol 11, Marcel. Dekker Series
8. Spectroscopy of Organic Compounds, 2<sup>nd</sup> edn., P.S /Kalsi, Wileyestern Ltd., Delhi.
9. Textbook of Pharmaceutical Analysis, KA. Connors, 3<sup>rd</sup> Edition, John Wiley & Sons, 1982.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# ADVANCED PHARMACEUTICAL ANALYSIS (MPA 102T)

## Scope

This subject deals with the various aspects of Impurity, Impurities in new drug products, in residual solvents, Elemental impurities, Impurity profiling and characterization of degradants, Stability testing of phytopharmaceuticals and their protocol preparation. It also covers the biological testing of various vaccines and their principle and procedure.

## Objective

After completion of the course students shall able to know,

1. Appropriate analytical skills required for the analytical method development.
1. Principles of various reagents used in functional group analysis that renders necessary support in research methodology and demonstrates its application in the practical related problems.
1. Analysis of impurities in drugs, residual solvents and stability studies of drugs and biological products

## THEORY

60 Hrs

### 1. Impurity and stability studies:

10 Hrs

Definition, classification of impurities in drug Substance or Active Pharmaceutical Ingredients and quantification of impurities as per ICH guidelines

Impurities in new drug products:

Rationale for the reporting and control of degradation products, reporting degradation products content of batches, listing of degradation products in specifications, qualification of degradation products

Impurities in residual solvents:

General principles, classification of residual solvents, Analytical procedures, limits of residual solvents, reporting levels of residual solvents.

### 2 Elemental impurities:

10 Hrs

Element classification, control of elemental impurities, Potential Sources of elemental Impurities, Identification of Potential Elemental Impurities, analytical procedures, instrumentation & C, H, N and S analysis

Stability testing protocols:

Selection of batches, container orientation, test parameters, sampling frequency, specification, storage conditions, recording of results, concept of stability, commitment etc. Important mechanistic and stability related information provided by results of study of factors like temperature, pH, buffering species ionic strength and dielectric constant etc. on the reaction rates. With practical considerations.

### 3 Impurity profiling and degradant characterization: Method development, Stability studies and concepts of validation accelerated stability testing & shelf life calculation, WHO and ICH stability testing guidelines, Stability zones, steps in development, practical considerations. Basics of Impurity

10 Hrs



**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

profiling and degradant characterization with special emphasis. Photostability testing guidelines, ICH stability guidelines for biological products

- 4 **Stability testing of phytopharmaceuticals:**  
Regulatory requirements, protocols, HPTLC /HPLC finger printing, interactions and complexity. 10 Hrs
- 5 **Biological tests and assays of the following:**
- |  |                                |        |
|--|--------------------------------|--------|
| a. Adsorbed Tetanus vaccine .  | b. Adsorbed Diphtheria vaccine | 10 Hrs |
| c. Human anti haemophilic vaccine  | d. Rabies vaccine              |        |
| e. Tetanus Anti toxin  | f. Tetanus Anti serum          |        |
| g. Oxytocin  | h. Heparin sodium IP           |        |
| i. Antivenom. PCR, PCR studies for gene regulation, instrumentation (Principle and Procedures) |                                |        |
- 6 **Immunoassays (IA)**  
Basic principles, Production of antibodies, Separation of bound and unbound drug, Radio immunoassay, Optical IA, Enzyme IA, Fluoro IA, Luminiscence IA, Quantification and applications of IA. 10 Hrs



*th*

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## REFERENCES

1. Vogel's textbook of quantitative chemical analysis- Jeffery J Bassett, J. Mendham, R. C. Denney, 5<sup>th</sup> edition, ELBS, 1991.
2. Practical Pharmaceutical Chemistry- Beckett, and Stenlake, Vol II, 4<sup>th</sup> Edition, CBS publishers, NewDelhi, 1997.
3. Textbook of Pharmaceutical Analysis- KA Connors, 3<sup>rd</sup> Edition, John Wiley & Sons, 1982.
4. Pharmaceutical Analysis-Higuchi, Brochmman and Hassen, 2<sup>nd</sup> Edition, Wiley – Inter science Publication, 1961.
5. Quantitative Analysis of Drugs in Pharmaceutical formulation– PD Sethi, 3<sup>rd</sup> Edition, CBS Publishers, New Delhi, 1997.
6. Pharmaceutical Analysis- Modern methods- JW Munson– Part B, Volume 11, Marcel Dekker Series.
7. The Quantitative analysis of Drugs - D C Carratt, 3rd edition, CBS Publishers, NewDelhi, 1964.
8. Indian Pharmacopoeia, Vol I, II & III 2007, 2010, 2014.
9. Methods of sampling and microbiological examination of water, first revision, BIS
10. Practical HPLC method development – Snyder, Kirkland, Glajch, 2nd edition, John Wiley & Sons.
11. Analytical Profiles of drug substances – Klaus Florey, Volume 1 – 20, Elsevier, 2005
12. Analytical Profiles of drug substances and Excipients– Harry G Brittan, Volume 21 – 30, Elsevier, 2005.
13. The analysis of drugs in biological fluids - Joseph Chamberlain, 2<sup>nd</sup> edition, CRC press, London.
14. ICH Guidelines for impurity profiles and stability studies.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

# PHARMACEUTICAL VALIDATION

## (MPA 103T)

### Scope

The main purpose of the subject is to understand about validation and how it can be applied to industry and thus to improve the quality of the products. The subject covers the complete information about validation, types, methodology and application.

### Objectives

Upon completion of the subject student shall be able to

- 1 Explain the aspect of validation
- 1 Carry out validation of manufacturing processes
- 1 Apply the knowledge of validation to instruments and equipments
- 1 Validate the manufacturing facilities

### THEORY

1. Introduction: Definition of Qualification and Validation, Advantage of Validation, Streamlining of Qualification & Validation process and Validation Master Plan. 60 Hrs  
Qualification: User Requirement Specification, Design Qualification, Factory Acceptance Test (FAT)/Site Acceptance Test (SAT), Installation Qualification, Operational Qualification, Performance Qualification, Re-qualification (Maintaining status- Calibration Preventive Maintenance, Change management), Qualification of Manufacturing Equipments, Qualification of Analytical Instruments and Laboratory equipments. 12 Hrs
- 2 Qualification of analytical instruments: Electronic balance, pH meter, UV-Visible spectrophotometer, FTIR, GC, HPLC, HPTLC Qualification of Glassware: Volumetric flask, pipette, Measuring cylinder, beakers and burette. 12 Hrs
- 3 Validation of Utility systems: Pharmaceutical Water System & pure steam, HVAC system, Compressed air and nitrogen. Cleaning Validation: Cleaning Validation- Cleaning Method development, Validation and validation of analytical method used in cleaning. Cleaning of Equipment, Cleaning of Facilities. Cleaning in place (CIP). 12 Hrs
- 4 Analytical method validation: General principles, Validation of analytical method as per ICH guidelines and USP. Computerized system validation: Electronic records and digital significance-21 CFR part 11 and GAMP5. 12 Hrs



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



- 5 General Principles of Intellectual Property: Concepts of Intellectual Property (IP), Intellectual Property Protection (IPP), Intellectual Property Rights (IPR); Economic importance, mechanism for protection of Intellectual Property –patents, Copyright, Trademark; Factors affecting choice of IP protection; Penalties for violation; Role of IP in pharmaceutical industry; Global ramification and financial implications. Filing a patent applications; patent application forms and guidelines. Types patent applications-provisional and non-provisional, PCT and convention patent applications; International patenting requirement procedures and costs; Rights and responsibilities of a patentee; Practical aspects regarding maintaining of a Patent file; Patent infringement meaning and scope. Significance of transfer technology (TOT), IP and ethics-positive and negative aspects of IPP; Societal responsibility, avoiding unethical practices. 12 Hrs

#### REFERENCES

1. B.T.Loftus & R.A.Nash, "Pharmaceutical Process Validation", Drugs and Pharm Sci. Series, Vol.129, 3<sup>rd</sup> Ed., Marcel Dekker Inc., N.Y.
2. The Theory & Practice of Industrial Pharmacy, 3<sup>rd</sup> edition, Leon Lachman, Herbert A. Lieberman, Joseph. L. Karig, Varghese Publishing House, Bombay.
3. Validation Master plan by TerveeksorDeeks, Davis Harwood International publishing.
4. Validation of Aseptic Pharmaceutical Processes, 2<sup>nd</sup> Edition, by Carleton & Agalloco, (MarcelDekker).
5. Michael Levin, Pharmaceutical Process Scale-Up, Drugs and Pharm.Sci. Series, Vol. 157, 2<sup>nd</sup> Ed., Marcel Dekker Inc., N.Y.
6. Validation Standard Operating Procedures: A Step by Step Guide for Achieving Compliance in the Pharmaceutical, Medical Device, and Biotech Industries, Syed ImtiazHaider
7. Pharmaceutical Equipment Validation: The Ultimate Qualification Handbook, PhillipA.Cloud, Interpharm Press
8. Validation of Pharmaceutical Processes: Sterile Products, Frederick J. Carlton (Ed.) and JamesAgalloco(Ed.), Marcel Dekker, 2<sup>nd</sup> Ed.
9. Analytical Method validation and Instrument Performance Verification by ChurgChan, HeimanLam, Y.C.Lee, Yue. Zhang, WileyInter Science.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## FOOD ANALYSIS (MPA 104T)

### Scope

This course is designed to impart knowledge on analysis of food constituents and finished food products. The course includes application of instrumental analysis in the determination of pesticides in variety of food products.

### Objectives


At completion of this course student shall be able to understand various analytical techniques in the determination of

- 1 Food constituents
- 1 Food additives
- 1 Finished food products
- 1 Pesticides in food
- 1 And also student shall have the knowledge on food regulations and legislations

### THEORY

1. Carbohydrates: classification and properties of food carbohydrates, General methods of analysis of food carbohydrates, Changes in food carbohydrates during processing, Digestion, absorption and metabolism of carbohydrates, Dietary fibre, Crude fibre and application of food carbohydrates  
Proteins: Chemistry and classification of amino acids and proteins, Physico-Chemical properties of protein and their structure, general methods of analysis of proteins and amino acids, Digestion, absorption and metabolism of proteins. 60 Hrs
- 2 Lipids: Classification, general methods of analysis, refining of fats and oils; hydrogenation of vegetable oils, Determination of adulteration in fats and oils, Various methods used for measurement of spoilage of fats and fatty foods.  
Vitamins: classification of vitamins, methods of analysis of vitamins, Principles of microbial assay of vitamins of B-series. 12 Hrs
- 3 Food additives: Introduction, analysis of Preservatives, antioxidants, artificial sweeteners, flavors, flavor enhancers, stabilizers, thickening and jelling agents.  
Pigments and synthetic dyes: Natural pigments, their occurrence and characteristic properties, permitted synthetic dyes, Non-permitted synthetic dyes used by industries, Method of detection of natural, permitted and non-permitted dyes. 12 Hrs



  
**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



- 4 General Analytical methods for milk, milk constituents and milk products like ice cream, milk powder, butter, margarine, cheese including adulterants and contaminants of milk. Analysis of fermentation products like wine, spirits, beer and vinegar. 12 Hrs
- 5 Pesticide analysis: Effects of pest and insects on various food, use of pesticides in agriculture, pesticide cycle, organophosphorus and organochlorine pesticides analysis, determination of pesticide residues in grain, fruits, vegetables, milk and milk products. Legislation regulations of food products with special emphasis on BIS, Agmark, FDA and US-FDA. 12 Hrs

#### REFERENCES

1. The chemical analysis of foods – David Pearson, Seventh edition, Churchill Livingstone, Edinburgh London, 1976
2. Introduction to the Chemical analysis of foods – S. Nielsen, Jones & Bartlett publishers, Boston London, 1994.
3. Official methods of analysis of AOAC International, sixth edition, Volume I & II, 1997.
4. Analysis of Food constituents– Multon, Wiley VCH.
5. Dr. William Horwitz, Official methods of analysis of AOAC International, 18<sup>th</sup> edition, 2005.



*[Signature]*  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162


## PHARMACEUTICAL ANALYSIS PRACTICAL - I (MPA 105PA)

- 1 Calibration of glass wares
- 2 Calibration of pH meter
- 3 Calibration of UV-Visible spectrophotometer
- 4 Calibration of FTIR spectrophotometer
- 5 Calibration of GC instrument
- 6 Calibration of HPLC instrument
- 7 Cleaning validation of any one equipment
- 8 Impurity profiling of drugs
- 9 Assay of official compounds by different titrations
- 10 Assay of official compounds by instrumental techniques.
- 11 Estimation of riboflavin/quinine sulphate by fluorimetry
- 12 Estimation of sodium/potassium by flame photometry
- 13 Quantitative determination of hydroxyl group.
- 14 Quantitative determination of aminogroup
- 15 Colorimetric determination of drugs by using different reagents

## PHARMACEUTICAL ANALYSIS PRACTICAL - II (MPA 105PB)

- 1 Analysis of Pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
- 2 Simultaneous estimation of multi component containing formulations by UV spectrophotometry
- 3 Experiments based on HPLC
- 4 Experiments based on Gas Chromatography
- 5 Determination of total reducing sugar
- 6 Determination of proteins
- 7 Determination of saponification value, Iodine value, Peroxide value, Acid value in food products
- 8 Determination of fat content and rancidity in food products
- 9 Analysis of natural and synthetic colors in food
- 10 Determination of preservatives in food
- 11 Determination of pesticide residue in food products
- 12 Analysis of vitamin content in food products
- 13 Determination of density and specific gravity of foods
- 14 Determination of food additives



  
PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



SEMESTER - II  
ADVANCED INSTRUMENTAL ANALYSIS  
(MPA 201T)

**Scope**

This subject deals with various hyphenated analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are LC-MS, GC-MS, and hyphenated techniques.

**Objectives**

After completion of course student is able to know,

- 1 interpretation of the NMR, Mass and IR spectra of various organic compounds
- 1 theoretical and practical skills of the hyphenated instruments
- 1 identification of organic compounds

**THEORY**

- |  |                  |
|--|------------------|
| 1. HPLC: Principle, instrumentation, pharmaceutical applications, peak shapes, capacity factor, selectivity, plate number, plate height, resolution, band broadening, pumps, injector, detectors, columns, column problems, gradient HPLC, HPLC solvents, trouble shooting, sample preparation, method development, New developments in HPLC. role and principles of ultra, nano liquid chromatography in pharmaceutical analysis. Immobilized polysaccharide CSP's: Advancement in enantiomeric separations, revised phase Chiral method development and HILIC approaches. HPLC in Chiral analysis of pharmaceuticals. Preparative HPLC, practical aspects of preparative HPLC. | 60 Hrs<br>12 Hrs |
| 2 Biochromatography: Size exclusion chromatography, ion exchange chromatography, ion pair chromatography, affinity chromatography general principles, stationary phases and mobile phases.<br>Gas chromatography: Principles, instrumentation, derivatization, head space sampling, columns for GC, detectors, quantification. High performance Thin Layer chromatography: Principles, instrumentation, pharmaceutical applications.   | 12 Hrs           |
| 3 Supercritical fluid chromatography: Principles, instrumentation, pharmaceutical applications.<br>Capillary electrophoresis: Overview of CE in pharmaceutical analysis, basic configuration, CE characteristics, principles of CE, methods and modes of CE. General considerations and method development in CE, Crown ethers as buffer additives in capillary electrophoresis. CE-MS hyphenation   | 12 Hrs           |



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

- 4 Mass spectrometry: Principle, theory, instrumentation of mass spectrometry, different types of ionization like electron impact, chemical, field, FAB and MALD, APCI, ESI, APPI mass fragmentation and its rules, metastable ions, isotopic peaks and applications of mass spectrometry. LC-MS hyphenation and DART MS analysis. Mass analysers (Quadrupole, Time of flight, FT-ICR, iontrap and Orbitrap) instruments. MS/MS systems (Tandem: QqQ, TOF-TOF; Q-IT, Q-TOF, LTQ-FT, LTQ-Orbitrap). 12 Hrs
- 5 NMR spectroscopy: Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR with reference to <sup>13</sup>CNMR: Spin spin and spin lattice relaxation phenomenon. <sup>13</sup>CNMR, 1-D and 2-D NMR, NOESY and COSY techniques, Interpretation and Applications of NMR spectroscopy. LC-NMR hyphenations. 12 Hrs

#### REFERENCES

1. Spectrometric Identification of Organic compounds- Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004.
2. Principles of Instrumental Analysis- Douglas A Skoog, F. James Holler, Timothy A. Nieman, 5<sup>th</sup> edition, Eastern press, Bangalore, 1998.
3. Instrumental methods of analysis- Willards, 7<sup>th</sup> edition, CBS publishers.
4. Organic Spectroscopy- William Kemp, 3<sup>rd</sup> edition, ELBS, 1991.
5. Quantitative analysis of Pharmaceutical formulations by HPTLC-PD Sethi, CBS Publishers, New Delhi.
6. Quantitative Analysis of Drugs in Pharmaceutical formulation- PD Sethi, 3<sup>rd</sup> Edition, CBS Publishers, New Delhi, 1997.
7. Pharmaceutical Analysis- Modern methods -Part B- JW Munson, Volume 11, Marcel Dekker Series.
8. Organic Spectroscopy by Donald L. Pavia, 5<sup>th</sup> Edition.



*Handwritten signature*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# MODERN BIO-ANALYTICAL TECHNIQUES (MPA 202T)

## Scope

This subject is designed to provide detailed knowledge about the importance of analysis of drugs in biological matrices.

## Objectives

Upon completion of the course, the student shall be able to understand

- 1 Extraction of drugs from biological samples
- 1 Separation of drugs from biological samples using different techniques
- 1 Guidelines for BA/BE studies.

## THEORY

1. Extraction of drugs and metabolites from biological matrices: General need, principle and procedure involved in the Bioanalytical methods such as Protein precipitation, Liquid-Liquid extraction and Solid phase extraction and other novel sample preparation approach. Bioanalytical method validation: USFDA and EMEA guidelines. 60 Hrs
2. Biopharmaceutical Consideration: Introduction, Biopharmaceutical Factors Affecting Drug Bioavailability, In Vitro: Dissolution and Drug Release Testing, Alternative Methods of Dissolution Testing Transport models, Biopharmaceutics Classification System. Solubility: Experimental methods. Permeability: In-vitro, in-situ and In-vivo methods. 12 Hrs
3. Pharmacokinetics and Toxicokinetics: Basic consideration, Drug interaction (PK-PD interactions), The effect of protein-binding interactions, The effect of tissue-binding interactions, Cytochrome P450-based drug interactions, Drug interactions linked to transporters. Microsomal assays Toxicokinetics-Toxicokinetic evaluation in preclinical studies, Importance and applications of toxicokinetic studies. LC- MS in bioactivity screening and proteomics. 12 Hrs
4. Cell culture techniques Basic equipments used in cell culture lab. Cell culture media, various types of cell culture, general procedure for cell cultures; isolation of cells, subculture, cryopreservation, characterization of cells and their applications. Principles and applications of cell viability assays (MTT assays), Principles and applications of flow cytometry. 12 Hrs



*[Signature]*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

- 5 Metabolite identification: 12 Hrs  
In-vitro / in-vivo approaches, protocols and sample preparation. Microsomal approaches (Rat liver microsomes (RLM) and Human liver microsomes (HLM) in Met-ID. Regulatory perspectives.  
In-vitro assay of drug metabolites & drug metabolizing enzymes.

Drug Product Performance, In Vivo: Bioavailability and Bioequivalence: Drug Product Performance, Purpose of Bioavailability Studies, Relative and Absolute Availability. Methods for Assessing Bioavailability, Bioequivalence Studies, Design and Evaluation of Bioequivalence Studies, Study Designs, Crossover Study Designs, Generic Biologics (Biosimilar Drug Products), Clinical Significance of Bioequivalence Studies.

#### REFERENCES

- 1 Analysis of drugs in Biological fluids-. Joseph Chamberlain, 2<sup>nd</sup> Edition. CRC Press, Newyork. 1995.
- 2 Principles of Instrumental Analysis- Douglas A Skoog, F. James Holler, Timothy A. Nieman, 5<sup>th</sup> edition, Eastern press, Bangalore, 1998.
- 3 Pharmaceutical Analysis- Higuchi, Brochman and Hassen, 2<sup>nd</sup> Edition, Wiley – Interscience Publications, 1961.
- 4 Pharmaceutical Analysis- Modern methods– Part B- JW Munson, Volume 11, Marcel Dekker Series
- 5 Practical HPLC method Development – Snyder, Kirkland, Glajch, 2<sup>nd</sup> Edition, John Wiley & Sons, New Jercey. USA.
- 6 Chromatographic Analysis of Pharmaceuticals – John A Adamovics, 2<sup>nd</sup> Edition, Marcel Dekker, New york, USA. 1997.
- 7 Chromatographic methods in clinical chemistry & Toxicology– Roger L Bertholf, Ruth E Winecker, John Wiley & Sons, New Jercey, USA. 2007.
- 8 Good Laboratory Practice Regulations, 2<sup>nd</sup> Edition, Sandy Weinberg, Vol. 69, Marcel Dekker Series, 1995.
- 9 Good laboratory Practice Regulations – Allen F. Hirsch, Volume 38, Marcel Dekker Series, 1989.
- 10 ICH, USFDA & CDSCO Guidelines.
- 11 Palmer



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# QUALITY CONTROL AND QUALITY ASSURANCE (MPA 203T)

## Scope

This course deals with the various aspects of quality control and quality assurance aspects of pharmaceutical industries. It covers the important aspects like cGMP, QC tests, documentation, quality certifications, GLP and regulatory affairs.

## Objectives

At the completion of this subject it is expected that the student shall be able to know

- 1 the cGMP aspects in a pharmaceutical industry
- 1 to appreciate the importance of documentation
- 1 to understand the scope of quality certifications applicable to Pharmaceutical industries
- 1 to understand the responsibilities of QA & QC departments

## THEORY

1. Concept and Evolution of Quality Control and Quality Assurance 60 hrs  
12 Hrs  
Good Laboratory Practice, GMP, Overview of ICH Guidelines-QSEM, with special emphasis on Q-series guidelines.  
Good Laboratory Practices: Scope of GLP, Definitions, Quality assurance unit, protocol for conduct of non clinical testing, control on animal house, report preparation and documentation.
2. cGMP guidelines according to schedule M, USFDA (inclusive of CDER and CBER) Pharmaceutical Inspection Convention (PIC), WHO and EMEA covering: Organization and personnel responsibilities, training, hygiene and personal records, drug industry location, design, construction and plant lay out, maintenance, sanitation, environmental control, utilities and maintenance of sterile areas, control of contamination and Good Warehousing Practice. CPCSEA guidelines. 12 Hrs
3. Analysis of raw materials, finished products, packaging materials, in process quality control (IPQC), Developing specification (ICH Q6 and Q3) 12 Hrs  
Purchase specifications and maintenance of stores for raw materials. In process quality control and finished products quality control for following formulation in Pharma industry according to Indian, US and British pharmacopoeias: tablets, capsules, ointments, suppositories, creams, parenterals, ophthalmic and surgical products (How to refer pharmacopoeias), Quality control test for containers, closures and secondary packing materials.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162




4. Documentation in pharmaceutical industry: Three tier documentation, Policy, Procedures and Work instructions, and records (Formats), Basic principles- How to maintain, retention and retrieval etc. Standard operating procedures (How to write), Master Formula Record, Batch Formula Record, Quality audit plan and reports. Specification and test procedures, Protocols and reports. Distribution records. Electronic data. 12 Hrs
5. Manufacturing operations and controls: Sanitation of manufacturing premises, mix-ups and cross contamination, processing of intermediates and bulk products, packaging operations, IPQC, release of finished product, process deviations, charge-in of components, time limitations on production, drug product inspection, expiry date calculation, calculation of yields, production record review, change control, sterile products, aseptic process control, packaging. 12 Hrs

#### REFERENCES

1. Quality Assurance Guide by organization of Pharmaceutical Procedures of India, 3<sup>rd</sup> revised edition, Volume I & II, Mumbai, 1996.
2. Good Laboratory Practice Regulations, 2<sup>nd</sup> Edition, Sandy Weinberg Vol. 69, Marcel Dekker Series, 1995.
3. Quality Assurance of Pharmaceuticals- A compendium of Guidelines and Related materials, Vol I & II, 2<sup>nd</sup> edition, WHO Publications, 1999.
4. How to Practice GMP's – PP Sharma, Vandana Publications, Agra, 1991.
5. The International Pharmacopoeia – vol I, II, III, IV & V- General Methods of Analysis and Quality specification for Pharmaceutical Substances, Excipients and Dosage forms, 3<sup>rd</sup> edition, WHO, Geneva, 2005.
6. Good laboratory Practice Regulations – Allen F.Hirsch, Volume 38, Marcel Dekker Series, 1989.
7. ICH guidelines
8. ISO 9000 and total quality management
9. The drugs and cosmetics act 1940 – Deshpande, Nilesh Gandhi, 4<sup>th</sup> edition, Susmit Publishers, 2006.
10. QA Manual–D.H.Shah, 1<sup>st</sup> edition, Business Horizons, 2000.
11. Good Manufacturing Practices for Pharmaceuticals a plan for total quality control – Sidney H.Willig, Vol.52, 3<sup>rd</sup> edition, Marcel Dekker Series.
12. Steinborn L. GMP/ISO Quality Audit Manual for Health care Manufacturers and Their Suppliers, Sixth Edition, (Volume I-With Check lists and Software Package). Taylor & Francis; 2003.
13. Sarker DK. Quality Systems and Controls for Pharmaceuticals. John Wiley & Sons; 2008.



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



## HERBAL AND COSMETIC ANALYSIS (MPA 204T)

### Scope

This course is designed to impart knowledge on analysis of herbal products. Regulatory requirements, herbal drug interaction with monographs. Performance evaluation of cosmetic products is included for the better understanding of the equipments used in cosmetic industries for the purpose.

### Objectives

At completion of this course student shall be able to understand

- 1 Determination of herbal remedies and regulations
- 1 Analysis of natural products and monographs
- 1 Determination of Herbal drug-drug interaction
- 1 Principles of performance evaluation of cosmetic products.

### THEORY

1. Herbal remedies- Toxicity and Regulations: Herbals vs Conventional drugs, Efficacy of herbal medicine products, Validation of Herbal Therapies, Pharmacodynamic and Pharmacokinetic issues. Herbal drug standardization: WHO and AYUSH guidelines. 60 Hrs
  2. Adulteration and Deterioration: Introduction, types of adulteration/substitution of herbal drugs, Causes and Measure of adulteration, Sampling Procedures, Determination of Foreign Matter, DNA Finger printing techniques in identification of drugs of natural origin, heavy metals, pesticide residues, phototoxin and microbial contamination in herbal formulations. Regulatory requirements for setting herbal drug industry: Global marketing management, Indian and international patent law as applicable herbal drugs and natural products and its protocol. 12 Hrs
  3. Testing of natural products and drugs: Effect of herbal medicine on clinical laboratory testing, Adulterant screening using modern analytical instruments, Regulation and dispensing of herbal drugs, Stability testing of natural products, protocol. 12 Hrs
- Monographs of Herbal drugs: Study of monographs of herbal drugs and comparative study in IP, USP, Ayurvedic Pharmacopoeia, American herbal Pharmacopoeia, British herbal Pharmacopoeia, Siddha and Unani Pharmacopoeia, WHO guidelines in quality assessment of herbal drugs.



*[Signature]*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

- 4 Herbal drug-drug interaction: WHO and AYUSH guidelines for safety monitoring of natural medicine, Spontaneous reporting schemes for biodrug adverse reactions, biodrug-drug and biodrug-food interactions with suitable examples. Challenges in monitoring the safety of herbal medicines. 12 Hrs
- 5 Evaluation of cosmetic products: Determination of acid value, ester value, saponification value, iodine value, peroxide value, rancidity, moisture, ash, volatile matter, heavy metals, fineness of powder, density, viscosity of cosmetic raw materials and finished products. Study of quality of raw materials and general methods of analysis of raw material used in cosmetic manufacture as per BIS. 12 Hrs  
Indian Standard specification laid down for sampling and testing of various cosmetics in finished forms such as baby care products, skincare products, dental products, personal hygiene preparations, lips sticks. Hair products and skin creams by the Bureau Indian Standards.

#### REFERENCES

- a. Pharmacognosy by Trease and Evans
- b. Pharmacognosy by Kokate, Purohit and Gokhale
- c. Quality Control Methods for Medicinal Plant, WIIO, Geneva
- d. Pharmacognosy & Pharmacobiotechnology by AshutoshKar
- e. Essential of Pharmacognosy by Dr.S.H.Ansari
- f. Cosmetics – Formulation, Manufacturing and Quality Control, P.P. Sharma, 4<sup>th</sup> edition, Vandana Publications Pvt.Ltd., Delhi
- g. Indian Standard specification, for raw materials, BIS, New Delhi.
- h. Indian Standard specification for 28 finished cosmetics BIS, New Delhi
- i. Harry's Cosmeticology, 8<sup>th</sup> edition
- j. Suppliers catalogue on specialized cosmetic excipients
- k. Wilkinson, Moore, seventh edition, George Godwin. Poucher's Perfumes, Cosmetics and Soaps
- l. Hilda Butler, 10<sup>th</sup> Edition, Kluwer Academic Publishers. Handbook of Cosmetic Science and Technology, 3<sup>rd</sup> Edition,



*th*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt , - 531162



## PHARMACEUTICAL ANALYSIS PRACTICAL - III (MPA 205PA)

1. Comparison of absorption spectra by UV and Wood ward – Fiesure rule
2. Interpretation of organic compounds by FT-IR
3. Interpretation of organic compounds by NMR
4. Interpretation of organic compounds by MS
5. Determination of purity by DSC in pharmaceuticals
6. Identification of organic compounds using FT-IR, NMR, CNMR and Mass spectra
7. Bio molecules separation utilizing various sample preparation techniques and Quantitative analysis of components by gel electrophoresis.
8. Bio molecules separation utilizing various sample preparation techniques and Quantitative analysis of components by HPLC techniques.
9. Isolation of analgesics from biological fluids (Blood serum and urine).
10. Protocol preparation and performance of analytical / Bioanalytical method validation.
11. Protocol preparation for the conduct of BA/BE studies according to guidelines.

## PHARMACEUTICAL ANALYSIS PRACTICAL - IV (MPA 205PB)

1. In process and finished product quality control tests for tablets, capsules, parenterals and creams
2. Quality control tests for Primary and secondary packing materials
3. Assay of raw materials as per official monographs
4. Testing of related and foreign substances in drugs and raw materials
5. Preparation of Master Formula Record.
6. Preparation of Batch Manufacturing Record.
7. Quantitative analysis of rancidity in lipsticks and hairoil
8. Determination of aryl amine content and Developer in hair dye
9. Determination of foam height and SLS content of Shampoo.
10. Determination of total fatty matter in creams (Soap, skin and hair creams)
11. Determination of acid value and saponification value.
12. Determination of calcium thioglycolate in depilatories



*Handwritten signature*

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

# PHARMACOLOGY (MPL)

## SEMESTER - I

### MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (MPL 101T)

#### Scope

This subject deals with various advanced analytical instrumental techniques for identification, characterization and quantification of drugs. Instruments dealt are NMR, Mass spectrometer, IR, HPLC, GC etc.

#### Objectives

After completion of course student is able to know about,

- 1 Chemicals and Excipients
- 1 The analysis of various drugs in single and combination dosage forms
- 1 Theoretical and practical skills of the instruments

#### THEORY

- |    |   |                 |
|----|---|-----------------|
| 1. | a) UV-Visible spectroscopy: Introduction, Theory, Laws, Instrumentation associated with UV-Visible spectroscopy, Choice of solvents and solvent effect and Applications of UV-Visible spectroscopy, Difference/ Derivative spectroscopy.  | 60Hrs<br>10 Hrs |
|    | b) IR spectroscopy: Theory, Modes of Molecular vibrations, Sample handling, Instrumentation of Dispersive and Fourier-Transform IR Spectrometer, Factors affecting vibrational frequencies and Applications of IR spectroscopy, Data Interpretation.  |                 |
|    | c) Spectrofluorimetry: Theory of Fluorescence, Factors affecting fluorescence (Characteristics of drugs that can be analysed by fluorimetry), Quenchers, Instrumentation and Applications of fluorescence spectrophotometer.  |                 |
|    | d) Flame emission spectroscopy and Atomic absorption spectroscopy: Principle, Instrumentation, Interferences and Applications.  |                 |
| 2  | NMR spectroscopy: Quantum numbers and their role in NMR, Principle, Instrumentation, Solvent requirement in NMR, Relaxation process, NMR signals in various compounds, Chemical shift, Factors influencing chemical shift, Spin-Spin coupling, Coupling constant, Nuclear magnetic double resonance, Brief outline of principles of FT-NMR and <sup>13</sup> C NMR. Applications of NMR spectroscopy. | 10 Hrs          |
| 3  | Mass Spectroscopy: Principle, Theory, Instrumentation of Mass Spectroscopy, Different types of ionization like electron impact, chemical, field, FAB and MALDI, APCI, ESI, APPI Analyzers of Quadrupole and Time of Flight, Mass fragmentation and its rules, Metastable ions, Isotopic peaks and Applications of Mass spectroscopy.  | 10 Hrs          |
| 4  | Chromatography: Principle, apparatus, instrumentation, chromatographic parameters, factors affecting resolution, isolation of drug from excipients, data interpretation and applications of the following:  | 10 Hrs          |



**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162




- a) Thin Layer chromatography
  - b) High Performance Thin Layer Chromatography
  - c) Ion exchange chromatography
  - d) Column chromatography
  - e) Gas chromatography
  - f) High Performance Liquid chromatography
  - g) Ultra High Performance Liquid chromatography
  - h) Affinity chromatography
  - i) Gel Chromatography
- 5 Electrophoresis: Principle, Instrumentation, Working conditions, factors affecting separation and applications of the following: 10 Hrs
- a) Paper electrophoresis
  - b) Gel electrophoresis
  - c) Capillary electrophoresis
  - d) Zone electrophoresis
  - e) Moving boundary electrophoresis
  - f) Isoelectric focusing
- X ray Crystallography: Production of X rays, Different X ray methods, Bragg's law, Rotating crystal technique, Xray powder technique, Types of crystals and applications of X-ray diffraction.
- 6 Potentiometry: Principle, working, Ion selective Electrodes and Application of potentiometry. 10 Hrs
- Thermal Techniques: Principle, thermal transitions and Instrumentation (Heat flux and power-compensation and designs), Modulated DSC, Hyper DSC, experimental parameters (sample preparation, experimental conditions, calibration, heating and cooling rates, resolution, source of errors) and their influence, advantage and disadvantages, pharmaceutical applications. Differential Thermal Analysis (DTA): Principle, instrumentation and advantage and disadvantages, pharmaceutical applications, derivative differentialthermal analysis (DDTA). TGA: Principle, instrumentation, factors affecting results, advantage and disadvantages, pharmaceutical applications.

## REFERENCES

1. Spectrometric Identification of Organic compounds- Robert M Silverstein, Sixth edition, John Wiley & Sons, 2004.
2. Principles of Instrumental Analysis - Doglas A Skoog, F. James Holler, Timothy A.Nieman, 5<sup>th</sup> edition, Easternpress, Bangalore, 1998.
3. Instrumental methods of analysis- Willards, 7<sup>th</sup> edition, CBS publishers.
4. Practical Pharmaceutical Chemistry- Beckett and Stenlake, Vol II, 4<sup>th</sup> edition, CBS Publishers, New Delhi, 1997.
5. Organic Spectroscopy- William Kemp, 3<sup>rd</sup> edition, ELBS, 1991.
6. Quantitative Analysis of Drugs in Pharmaceutical formulation-PDSethi, 3<sup>rd</sup> Ed, CBS Publishers, New Delhi, 1997.
7. Pharmaceutical Analysis - Modern Methods – Part B - J W Munson, Vol 11, Marcel. Dekker Series
8. Spectroscopy of Organic Compounds, 2<sup>nd</sup> edn., P.S /Kalsi, Wileyestern Ltd., Delhi.
9. Textbook of Pharmaceutical Analysis, KA.Connors, 3<sup>rd</sup> Edition, John Wiley & Sons, 1982.



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

## ADVANCED PHARMACOLOGY - I (MPL 102T)

### Scope

The subject is designed to strengthen the basic knowledge in the field of pharmacology and to impart recent advances in the drugs used for the treatment of various diseases. In addition, this subject helps the students to understand the concepts of drug action and mechanisms involved

### Objectives

Upon completion of the course the student shall be able to:

1. Discuss the pathophysiology and pharmacotherapy of certain diseases.
1. Explain the mechanism of drug actions at cellular and molecular level
1. Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases

### THEORY

#### 1. General Pharmacology

60 Hrs

12 Hrs

a. Pharmacokinetics: The dynamics of drug absorption, distribution, biotransformation and elimination. Concepts of linear and non-linear compartment models. Significance of Protein binding.

b. Pharmacodynamics: Mechanism of drug action and the relationship between drug concentration and effect. Receptors, structural and functional families of receptors, quantitation of drug receptors interaction and elicited effects.

#### 2. Neurotransmission

12 Hrs

- a. General aspects and steps involved in neurotransmission.
- b. Neurohumoral transmission in autonomic nervous system (Detailed study about neurotransmitters- Adrenaline and Acetylcholine).
- c. Neurohumoral transmission in central nervous system (Detailed study about neurotransmitters- histamine, serotonin, dopamine, GABA, glutamate and glycine).
- d. Non adrenergic non cholinergic transmission (NANC). Co-transmission

#### Systemic Pharmacology

A detailed study on pathophysiology of diseases, mechanism of action, pharmacology and toxicology of existing as well as novel drugs used in the following systems

#### Autonomic Pharmacology

Para sympathomimetics and lytics, sympathomimetics and lytics, agents affecting neuromuscular junction.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162




- |   |  |        |
|---|--|--------|
| 3 | <b>Central nervous system Pharmacology</b><br>General and local anesthetics<br>Sedatives and hypnotics, drugs used to treat anxiety.<br>Depression, psychosis, mania, epilepsy, neurodegenerative diseases.<br>Narcotic and non-narcotic analgesics. | 12 Hrs |
| 4 | <b>Cardiovascular Pharmacology</b><br>Diuretics, antihypertensives, antiischemics, anti-arrhythmics, drugs for heart failure and hyperlipidemia.<br>Hematinics, coagulants, anticoagulants, fibrinolytics and anti-platelet drugs                    | 12 Hrs |
| 5 | <b>Autocoid Pharmacology</b><br>The physiological and pathological role of Histamine, Serotonin, Kinins<br>Prostaglandins Opioid autocoids.<br>Pharmacology of antihistamines, 5 HT antagonists.   | 12 Hrs |

#### REFEERENCES

1. The Pharmacological Basis of Therapeutics, Goodman and Gillman's
2. Principles of Pharmacology. The Pathophysiologic basis of drug Therapy by David E Golan, Armen H, Tashjian Jr, Ehrin J, Armstrong, April W, Armstrong, Wolters, Kluwer-Lippincott Williams & Wilkins Publishers.
3. Basic and Clinical Pharmacology by B.G Katzung
4. Handbook of Clinical Pharmacokinetics by Gibaldi and Prescott.
5. Applied Biopharmaceutics and Pharmacokinetics by Leon Shargel and Andrew B.C.Yu.
6. Graham Smith. Oxford textbook of Clinical Pharmacology.
7. Avery Drug Treatment
8. Dipiro Pharmacology, Pathophysiological approach.
9. Green Pathophysiology for Pharmacists.
10. Robbins & Cortan Pathologic Basis of Disease, 9<sup>th</sup>Ed. (Robbins Pathology)
11. A Complete Textbook of Medical Pharmacology by Dr. S.K Srivastava published by APC Avichal Publishing Company
12. KD.Tripathi. Essentials of Medical Pharmacology.
13. Modern Pharmacology with Clinical Applications, Craig Charles R. & Stitzel Robert E., Lippincott Publishers.
14. Clinical Pharmacokinetics & Pharmacodynamics: Concepts and Applications – Malcolm Rowland and Thomas N.Tozer, Wolters Kluwer, Lippincott Williams & Wilkins Publishers.
15. Applied Biopharmaceutics and Pharmacokinetics, Pharmacodynamics and Drug metabolism for industrial scientists.
16. Modern Pharmacology, Craig CR. & Stitzel RE, Little Brown & Company.



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

# PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS - I

## (MPL 103T)

### Scope

This subject is designed to impart the knowledge on preclinical evaluation of drugs and recent experimental techniques in the drug discovery and development. The subject content helps the student to understand the maintenance of laboratory animals as per the guidelines, basic knowledge of various in-vitro and in-vivo preclinical evaluation processes

### Objectives


Upon completion of the course the student shall be able to,

- 1 Appraise the regulations and ethical requirement for the usage of experimental animals.
- 1 Describe the various animals used in the drug discovery process and good laboratory practices in maintenance and handling of experimental animals
- 1 Describe the various newer screening methods involved in the drug discovery process
- 1 Appreciate and correlate the preclinical data to humans

### THEORY

- |   |        |
|---|--------|
| 1. Laboratory Animals   | 60 Hrs |
| Common laboratory animals: Description, handling and applications of different species and strains of animals.  | 12 Hrs |
| Transgenic animals: Production, maintenance and applications Anaesthesia and euthanasia of experimental animals.  |        |
| Maintenance and breeding of laboratory animals. CPCSEA guidelines to conduct experiments on animals   |        |
| Good laboratory practice.   |        |
| Bioassay- Principle, scope and limitations and methods  |        |
| 2. Preclinical screening of new substances for the pharmacological activity using in vivo, invitro and other possible animal alternative models.  | 12 Hrs |
| General principles of preclinical screening. CNS Pharmacology: behavioral and muscle co ordination, CNS stimulants and depressants, anxiolytics, anti-psychotics, antiepileptics and nootropics. Drugs for neurodegenerative diseases like Parkinsonism, Alzheimers and multiple sclerosis. Drugs acting on Autonomic Nervous System. |        |
| 3. Preclinical screening of new substances for the pharmacological activity using in vivo, invitro and other possible animal alternative models.  | 12 Hrs |
| Respiratory Pharmacology: anti-asthmatics, drugs for COPD and antiallergics. Reproductive Pharmacology: Aphrodisiacs and antifertility agents Analgesics, anti-inflammatory and antipyreticagents. Gastrointestinal drugs: antiulcer, anti- emetic, anti- diarrheal and laxatives.  |        |



  
**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162




4. Preclinical screening of new substances for the pharmacological activity using 12 Hrs  
in vivo, invitro, and other possible animal alternative models.  
Cardiovascular Pharmacology: antihypertensives, antiarrhythmics, antianginal, antiatherosclerotic agents and diuretics. Drugs for metabolic disorders like anti-diabetic, antidyslipidemic agents. Anti cancer agents. Hepatoprotective screening methods.
5. Preclinical screening of new substances for the pharmacological activity 12 Hrs  
using in vivo, in vitro, and other possible animal alternative models.  
Immunomodulators, Immunosuppressants and immunostimulants  
General principles of immunoassay: theoretical basis and optimization of immunoassay, heterogeneous and homogenous immunoassay systems. Immuno assay methods evaluation; protocol outline, objectives and preparation. Immunoassay for digoxin and insulin.  
Limitations of animal experimentation and alternate animal experiments. Extrapolation of invitro data to preclinical and preclinical to humans.

#### REFERENCES

1. Biological standardization by J.H.BurnD.J.Finney and I.G.Goodwin
2. Screening methods in Pharmacology by Robert Turner.A
3. Evaluation of drugs activities by Laurence and Bachrach
4. Methods in Pharmacology by Arnold Schwartz.
5. Fundamentals of experimental Pharmacology by M.N.Ghosh
6. Pharmacological experiment on intact preparations by Churchill Livingstone
7. Drug discovery and Evaluation by Vogel H.G.
8. Experimental Pharmacology by R.K.Goyal.
9. Preclinical evaluation of new drugs by S.K.Guta
10. Handbook of Experimental Pharmacology, SK.Kulkarni
11. Practical Pharmacology and Clinical Pharmacy, SK.Kulkarni, 3<sup>rd</sup> Edition.
12. David R.Gross. Animal Models in Cardiovascular Research, 2<sup>nd</sup> Edi, Kluwer Academic Publishers, London, UK.
13. Screening Methods in Pharmacology, Robert A.Turner.
14. Rodents for Pharmacological Experiments, Dr.Tapan Kumar chatterjee.
15. Practical Manual of Experimental and Clinical Pharmacology by Bikash Medhi (Author), AjayPrakash (Author)



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

# CELLULAR AND MOLECULAR PHARMACOLOGY (MPL 104T)

## Scope:

The subject imparts a fundamental knowledge on the structure and functions of cellular components and help to understand the interaction of these components with drugs. This information will further help the student to apply the knowledge in drug discovery process.

## Objectives:

Upon completion of the course, the student shall be able to,

- 1 Explain the receptor signal transduction processes.
- 1 Explain the molecular pathways affected by drugs.
- 1 Appreciate the applicability of molecular pharmacology and biomarkers in drug discovery process.
- 1 Demonstrate molecular biology techniques as applicable for pharmacology

## THEORY

- |   |        |
|---|--------|
| 1. Cellbiology  | 60 Hrs |
| Structure and functions of cell and its organelles  | 12 Hrs |
| Genome organization. Gene expression and its regulation, importance of siRNA and micro RNA, gene mapping and gene sequencing  |        |
| Cell cycles and its regulation.   |        |
| Cell death- events, regulators, intrinsic and extrinsic pathways of apoptosis.  |        |
| Necrosis and autophagy.   |        |
| 2. Cell signaling   |        |
| Intercellular and intracellular signaling pathways.   | 12 Hrs |
| Classification of receptor family and molecular structure ligandgated ion channels; G-protein coupled receptors, tyrosine kinase receptors and nuclear receptors.   |        |
| Secondary messengers: cyclic AMP, cyclic GMP, calcium ion, inositol 1,4,5-trisphosphate, (IP3), NO, and diacylglycerol.   |        |
| Detailed study of following intracellular signaling pathways: cyclic AMP signaling pathway, mitogen-activated protein kinase (MAPK) signaling, Januskinase (JAK)/ signal transducer and activator of transcription (STAT) signaling pathway.            |        |
| 3. Principles and applications of genomic and proteomic tools DNA electrophoresis, PCR (reverse transcription and real time), Gene sequencing, micro array technique, SDS page, ELISA and western blotting, Recombinant DNA technology and gene therapy | 12 Hrs |
| Basic principles of recombinant DNA technology-Restriction enzymes, various types of vectors. Applications of recombinant DNA technology.   |        |
| Gene therapy- Various types of gene transfer techniques, clinical applications and recent advances in gene therapy.   |        |



*the*  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162




4. Pharmacogenomics 12 Hrs  
 Gene mapping and cloning of disease gene.  
 Genetic variation and its role in health/ pharmacology Polymorphisms affecting drug metabolism  
 Genetic variation in drug transporters  
 Genetic variation in G protein coupled receptors  
 Applications of proteomics science: Genomics, proteomics, metabolomics, functionomics, nutrigenomics Immunotherapeutics  
 Types of immunotherapeutics, humanisation antibody therapy, Immunotherapeutics in clinical practice
5. a. Cell culture techniques 12 Hrs  
 Basic equipments used in cell culture lab. Cell culture media, various types of cell culture, general procedure for cell cultures; isolation of cells, subculture, cryopreservation, characterization of cells and their application. Principles and applications of cell viability assays, glucose uptake assay, Calcium influx assays  
 Principles and applications of flow cytometry  
 b. Biosimilars

#### REFERENCES:

1. The Cell, A Molecular Approach. Geoffrey M Cooper.
2. Pharmacogenomics: The Search for Individualized Therapies. Edited by J. Licinio and M-L. Wong
3. Handbook of Cell Signaling (Second Edition) Edited by Ralph A. et al
4. Molecular Pharmacology: From DNA to Drug Discovery. John Dickenson et al
5. Basic Cell Culture protocols by Cheril D. Helgason and Cindy L. Miller
6. Basic Cell Culture (Practical Approach) by J.M. Davis (Editor)
7. Animal Cell Culture: A Practical Approach by John R. Masters (Editor)
8. Current protocols in molecular biology vol I to VI edited by Frederick M. Ausubel et al.



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mand.  
 Vizianagaram Dt., - 531162

## PHARMACOLOGY PRACTICAL - I (MPL 105PA)


1. Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
2. Simultaneous estimation of multi component containing formulations by UV spectrophotometry
3. Experiments based on HPLC
4. Experiments based on Gas Chromatography
5. Estimation of riboflavin/quinine sulphate by fluorimetry
6. Estimation of sodium/potassium by flame photometry handling of laboratory animals.
7. Various routes of drug administration.
8. Techniques of blood sampling, anesthesia and euthanasia of experimental animals.
9. Functional observation battery tests (modified Irwintest)
10. Evaluation of CNS stimulant, depressant, anxiogenics and anxiolytic, anticonvulsant activity.
11. Evaluation of analgesic, anti-inflammatory, local anesthetic, mydriatic and miotic activity.
12. Evaluation of diuretic activity.
13. Evaluation of antiulcer activity by pylorus ligation method.
14. Oral glucose tolerance test.

## PHARMACOLOGY PRACTICAL - II (MPL 105PB)

Handling of laboratory animals.

1. Isolation and identification of DNA from various sources (Bacteria, Cauliflower, onion, Goat liver).
2. Isolation of RNA from yeast
3. Estimation of proteins by Bradford/Lowry's in biological samples.
4. Estimation of RNA/DNA by UV Spectroscopy
5. Gene amplification by PCR.
6. Protein quantification Western Blotting.
7. Enzyme based in-vitro assays (MPO, AChEs,  $\alpha$  amylase,  $\alpha$  glucosidase).
8. Cell viability assays (MTT/Trypan blue/SRB).
9. DNA fragmentation assay by agarose gel electrophoresis.
10. DNA damage study by Comet assay.
11. Apoptosis determination by fluorescent imaging studies.
12. Pharmacokinetic studies and data analysis of drugs given by different routes of administration using softwares
13. Enzyme inhibition and induction activity
14. Extraction of drug from various biological samples and estimation of drugs in biological fluids using different analytical techniques (UV)
15. Extraction of drug from various biological samples and estimation of drugs in biological fluids using different analytical techniques (HPLC)




  
PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## REFERENCES

1. CPCSEA, OECD, ICH, USFDA, Schedule Y, EPA guidelines,
2. Fundamentals of experimental Pharmacology by M.N.Ghosh
3. Handbook of Experimental Pharmacology by S.K.Kulkarni.
4. Drug discovery and Evaluation by Vogel H.G.
5. Spectrometric Identification of Organic compounds- Robert M Silverstein,
6. Principles of Instrumental Analysis- Douglas ASkoog, F.James Holler, Timothy A. Nieman,
7. Vogel's Textbook of quantitative chemical analysis- Jeffery, Basset, Mendham, Denney,
8. Basic Cell Culture protocols by Cheril D.Helgason and Cindy L.Mille
9. Basic Cell Culture (Practical Approach) by J.M.Davis (Editor)
10. Animal Cell Culture: A Practical Approach by John R.Masters (Editor)
11. Practical Manual of Experimental and Clinical Pharmacology by Bikash Medhi(Author), Ajay Prakash (Author) Jaypee brothers' medical publishers Pvt.Ltd



  
PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## SEMESTER – II

### ADVANCED PHARMACOLOGY - II (MPL 201T)

#### Scope

The subject is designed to strengthen the basic knowledge in the field of pharmacology and to impart recent advances in the drugs used for the treatment of various diseases. In addition, the subject helps the student to understand the concepts of drug action and mechanism involved

#### Objectives


Upon completion of the course the student shall be able to:

- 1 Explain the mechanism of drug actions at cellular and molecular level
- 1 Discuss the Pathophysiology and pharmacotherapy of certain diseases
- 1 Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases

#### THEORY

- |    |   |                  |
|----|---|------------------|
| 1. | Endocrine Pharmacology  | 60 Hrs<br>12 Hrs |
|    | Molecular and cellular mechanism of action of hormones such as growth hormone, prolactin, thyroid, insulin and sex hormones.<br>Anti-thyroid drugs, Oral hypoglycemic agents, Oral contraceptives, Corticosteroids.<br>Drugs affecting calcium regulation.  |                  |
| 2  | Chemotherapy  | 12 Hrs           |
|    | Cellular and molecular mechanism of actions and resistance of antimicrobial agents such as $\beta$ -lactams, aminoglycosides, quinolones, Macrolide antibiotics. Antifungal, antiviral, and anti-TB drugs.  |                  |
| 3  | Chemotherapy  | 12 Hrs           |
|    | Drugs used in Protozoal Infections.<br>Drugs used in the treatment of Helminthiasis.<br>Chemotherapy of cancer Immunopharmacology.<br>Cellular and biochemical mediators of inflammation and immune response. Allergic or hypersensitivity reactions. Pharmacotherapy of asthma and COPD.<br>Immunosuppressants and Immunostimulants. |                  |
| 4  | GI Pharmacology   | 12 Hrs           |
|    | Antiulcer drugs, Prokinetics, antiemetics, anti-diarrheals and drugs for constipation and irritable bowel syndrome.<br>Chronopharmacology<br>Biological and circadian rhythms, applications of chronotherapy in various diseases like cardiovascular disease, diabetes, asthma and peptic ulcer.                                      |                  |



  
PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## 5 Free radicals Pharmacology

Generation of free radicals, role of free radicals in etiopathology of various diseases such as diabetes, neurodegenerative diseases and cancer.	12 Hrs
--	--------

Protective activity of certain important antioxidant

### Recent Advances in Treatment:

Alzheimer's disease, Parkinson's disease, Cancer, Diabetes mellitus

## REFERENCES

1. The Pharmacological basis of therapeutics – Goodman and Gillman's
2. Principles of Pharmacology. The Pathophysiologic basis of drug therapy by David E Golan et al.
3. Basic and Clinical Pharmacology by B.G-Katzung
4. Pharmacology by H.P.Rang and M.M. Dale.
5. Handbook of Clinical Pharmacokinetics by Gibaldi and Prescott.
6. Text book of Therapeutics, drug and disease management by E T. Herfindal and Gourley.
7. Applied Biopharmaceutics and Pharmacokinetics by Leon Shargel and Andrew B.C.Yu.
8. Handbook of Essential Pharmacokinetics, Pharmacodynamics and Drug Metabolism for Industrial Scientists
9. Robbins & Cortan Pathologic Basis of Disease, 9<sup>th</sup>Ed. (Robbins Pathology)
10. A Complete Textbook of Medical Pharmacology by Dr. S.K.Srivastava published by APC Avichal Publishing Company.
11. KD.Tripathi. Essentials of Medical Pharmacology
12. Principles of Pharmacology. The Pathophysiologic basis of drug Therapy by David E Golan, Armen H, Tashjian Jr, Ehrin J, Armstrong, April W, Armstrong, Wolters, Kluwer-Lippincott Williams & Wilkins Publishers



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

# PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS-II

## (MPL 202T)

### Scope:

This subject imparts knowledge on the preclinical safety and toxicological evaluation of drug & new chemical entity. This knowledge will make the student competent in regulatory toxicological evaluation.

### Objectives:


Upon completion of the course, the student shall be able to,

- 1 Explain the various types of toxicity studies.
- 1 Appreciate the importance of ethical and regulatory requirements for toxicity studies.
- 1 Demonstrate the practical skills required to conduct the preclinical toxicity studies.

### THEORY

- |    |   |                  |
|----|---|------------------|
| 1. | Basic definition and types of toxicology (general, mechanistic, regulatory and descriptive)   | 60 Hrs<br>12 Hrs |
|    | Regulatory guidelines for conducting toxicity studies OECD, ICH, EPA and Schedule Y   |                  |
|    | OECD principles of Good laboratory practice (GLP)   |                  |
|    | History, concept and its importance in drug development   |                  |
| 2  | Acute, sub-acute and chronic- oral, dermal and inhalational studies as per OECD guidelines.   | 12 Hrs           |
|    | Acute eye irritation, skin sensitization, dermal irritation & dermal toxicity studies.  |                  |
|    | Test item characterization- importance and methods in regulatory toxicology studies.  |                  |
| 3  | Reproductive toxicology studies, Male reproductive toxicity studies, female reproductive studies (segment I and segment III), teratogenicity studies (segment II) | 12 Hrs           |
|    | Genotoxicity studies (Ames Test, in vitro and in vivo Micronucleus and Chromosomal aberrations studies)   |                  |
|    | Invivo carcinogenicity studies.   |                  |
| 4  | IND enabling studies (IND studies)- Definition of IND, importance of IND, industry perspective, list of studies needed for IND submission.                        | 12 Hrs           |
|    | Safety pharmacology studies origin, concepts and importance of safety pharmacology.   |                  |
|    | Tier1- CVS, CNS and respiratory safety pharmacology, HERG assay. Tier2- GI, renal and other studies.  |                  |
| 5  | Toxicokinetics- Toxicokinetic evaluation in preclinical studies, saturation kinetics  | 12 Hrs           |
|    | Importance and applications of toxicokinetic studies.   |                  |
|    | Alternative methods to animal toxicity testing.   |                  |



  
PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## REFERENCES

1. Hand book on GLP, Quality practices for regulated non-clinical research and development (<http://www.who.int/tdr/publications/documents/glp-handbook.pdf>).
2. Schedule Y Guideline: drugs and cosmetics (second amendment) rules, 2005, ministry of health and family welfare (department of health) New Delhi
3. Drugs from discovery to approval by Rick NG.
4. Animal models in Toxicology, 3<sup>rd</sup> Edition, Lower and Bryan
5. OECD test guidelines.
6. Principles of toxicology by Karen E. Stine, Thomas M. Brown.
7. Guidance for Industry M3 (R2) Nonclinical Safety Studies for the Conduct of Human Clinical Trials and Marketing Authorization for Pharmaceuticals ([http://www.fda.gov/downloads/drugs/guidance compliance regulatory information/guidances/ ucm073246.pdf](http://www.fda.gov/downloads/drugs/guidance%20compliance%20regulatory%20information/guidances/ucm073246.pdf))



*Handwritten signature in green ink.*

**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram - 531144  
Vizianagaram Dt., - 531102

# PRINCIPLES OF DRUG DISCOVERY

## (MPL 203T)

### Scope:

The subject imparts basic knowledge of drug discovery process. This information will make the student competent in drug discovery process

### Objectives:


Upon completion of the course, the student shall be able to,

- 1 Explain the various stages of drug discovery
- 1 Appreciate the importance of the role of genomics, proteomics and bioinformatics in drug discovery
- 1 Explain various targets for drug discovery.
- 1 Explain various lead seeking method and lead optimization
- 1 Appreciate the importance of the role of computer aided drug design in drug discovery

### THEORY

- |    |  |                  |
|----|--|------------------|
| 1. | An overview of modern drug discovery process: Target identification, target validation, lead identification and lead Optimization. Economics of drug discovery.<br>Target Discovery and validation- Role of Genomics, Proteomics and Bioinformatics. Role of Nucleic acid microarrays, Protein microarrays, Antisense technologies, siRNAs, antisenseoligo nucleotides, Zinc finger proteins. Role of transgenic animals in target validation. | 60 Hrs<br>12 Hrs |
| 2  | Lead Identification- combinatorial chemistry & high throughput screening, in silico lead discovery techniques, Assay development for hit identification.<br>Protein structure<br>Levels of protein structure, Domains, motifs, and folds in protein structure. Computational prediction of protein structure: Threading and homology modeling methods. Application of NMR and X-ray crystallography in protein structure prediction.           | 12 Hrs           |
| 3  | Rational DrugDesign<br>Traditional vs rational drug design, Methods followed in traditional drug design, High throughput screening, Concepts of Rational Drug Design, Rational Drug Design Methods: Structure and Pharmacophore based approaches<br>Virtual Screening techniques: Drug likeness screening, Concept of pharmacophore mapping and pharmacophore based Screening,   | 12 Hrs           |
| 4  | Molecular docking: Rigid docking, flexible docking, manual docking; Docking based screening. De novo drug design. Quantitative analysis of Structure Activity Relationship<br>History and development of QSAR, SAR versus QSAR, Physicochemical parameters, Hansch analysis, Fee Wilson analysis and relationship between them.  | 12 Hrs           |



  
**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



- 5 QSAR Statistical methods – regression analysis, partial least square analysis (PLS) and other multivariate statistical methods. 3D-QSAR approaches like COMFA and COMSIA 12 Hrs
- Prodrug design- Basic concept, Prodrugs to improve patient acceptability, Drug solubility, Drug absorption and distribution, site specific drug delivery and sustained drug action. Rationale of prodrug design and practical consideration of prodrug design

#### REFERENCES

1. MouldySioud. Target Discovery and Validation Reviews and Protocols: Volume 2 Emerging Molecular Targets and Treatment Options. 2007 Humana Press Inc.
2. Darryl León. Scott Markel In. Silico Technologies in Drug Target Identification and Validation. 2006 by Taylor and Francis Group, LLC.
3. Johanna K. DiStefano. Disease Gene Identification. Methods and Protocols. Springer New York Dordrecht Heidelberg London.
4. Hugo Kubiny. QSAR: Hansch Analysis and Related Approaches. Methods and Principles in Medicinal Chemistry. Publisher Wiley-VCH
5. Klaus Gubernator, Hans-Joachim Böhm. Structure- Based Ligand Design. Methods and Principles in Medicinal Chemistry. Publisher Wiley-VCH
6. Abby L. Parrill. M. Rami Reddy. Rational Drug Design. Novel Methodology and Practical Applications. ACS Symposium Series; American Chemical Society: Washington, DC, 1999.
7. J.Rick Turner. New drug development design, methodology and, analysis. John Wiley & Sons, Inc., New Jersey.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

# CLINICAL RESEARCH AND PHARMACOVIGILANCE (MPL 204T)

## Scope:

This subject will provide a value addition and current requirement for the students in clinical research and pharmacovigilance. It will teach the students on conceptualizing, designing, conducting, managing and reporting of clinical trials. This subject also focuses on global scenario of Pharmacovigilance in different methods that can be used to generate safety data. It will teach the students in developing drug safety data in Pre-clinical, Clinical phases of Drug development and post market surveillance.

## Objectives:

Upon completion of the course, the student shall be able to,

- 1 Explain the regulatory requirements for conducting clinical trial
- 1 Demonstrate the types of clinical trial designs
- 1 Explain the responsibilities of key players involved in clinical trials
- 1 Execute safety monitoring, reporting and close-out activities
- 1 Explain the principles of Pharmacovigilance
- 1 Detect new adverse drug reactions and their assessment
- 1 Perform the adverse drug reaction reporting systems and communication in Pharmacovigilance

## THEORY

60 Hrs

### 1. Regulatory Perspectives of Clinical Trials:

10 Hrs

Origin and Principles of International Conference on Harmonization- Good Clinical Practice (ICH-GCP) guidelines Ethical Committee: Institutional Review Board, Ethical Guidelines for Biomedical Research and Human Participant- Schedule Y, ICMR

Informed Consent Process: Structure and content of an Informed Consent Process Ethical principles governing informed consent process.

### 2 Clinical Trials: Types and Design Experimental Study- RCT and Non RCT, Observation Study: Cohort, Case Control, Cross sectional Clinical Trial Study Team

10 Hrs

Roles and responsibilities of Clinical Trial Personnel: Investigator, Study Coordinator, Sponsor, Contract Research Organization and its management.

### 3 Clinical Trial Documentation- Guidelines to the preparation of documents, Preparation of protocol, Investigator Brochure, Case Report Forms, Clinical Study Report Clinical Trial Monitoring- Safety Monitoring in CT

10 Hrs

Adverse Drug Reactions: Definition and types. Detection and reporting methods. Severity and seriousness assessment. Predictability and preventability assessment, Management of adverse drug reactions; Terminologies of ADR.



*Handwritten signature*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162




- 4 Basic aspects, terminologies and establishment of pharmacovigilance 10 Hrs  
History and progress of pharmacovigilance, Significance of safety monitoring, Pharmacovigilance in India and international aspects, WHO international drug monitoring programme, WHO and Regulatory terminologies of ADR, evaluation of medication safety, Establishing pharmacovigilance centres in Hospitals, Industry and National programmes related to pharmacovigilance. Roles and responsibilities in Pharmacovigilance.
- 5 Methods, ADR reporting and tools used in Pharmacovigilance 10 Hrs  
International classification of diseases, International Non-proprietary names for drugs, Passive and Active surveillance, Comparative observational studies, Targeted clinical investigations and Vaccine safety surveillance. Spontaneous reporting system and Reporting to regulatory authorities, Guidelines for ADRs reporting. Argus, ARISg Pharmacovigilance, Vigiflow, Statistical methods for evaluating medication safety data.
- 6 Pharmacoepidemiology, pharmacoconomics safety 10 Hrs  
pharmacology

#### REFERENCES

1. Central Drugs Standard Control Organization- Good Clinical Practices, Guidelines for Clinical Trials on Pharmaceutical Products in India. New Delhi: Ministry of Health; 2001.
2. International Conference on Harmonization of Technical requirements for registration of Pharmaceuticals for human use. ICH Harmonized Tripartite Guideline. Guideline for Good Clinical Practice. F6; May 1996.
3. Ethical Guidelines for Biomedical Research on Human Subjects 2000. Indian Council of Medical Research, New Delhi.
4. Textbook of Clinical Trials edited by David Machin, Simon Day and Sylvan Green, March 2005, John Wiley and Sons.
5. Clinical Data Management edited by R K Rondels, S A Varley, C F Webbs. Second Edition, Jan 2000, Wiley Publications.
6. Handbook of clinical Research. Julia Lloyd and AnnRaven Ed. Churchill Livingstone.
7. Principles of Clinical Research edited by GiovannadiIgnazio, Di Giovanna and Ilaynes.



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

### PHARMACOLOGY PRACTICAL - III (MPL 205PA)

1. To record the DRC of agonist using suitable isolated tissues preparation.
2. To study the effects of antagonist/potentiating agents on DRC of agonist using suitable isolated tissue preparation.
3. To determine to the strength of unknown sample by matching bioassay by using suitable tissue preparation.
4. To determine to the strength of unknown sample by interpolation bioassay by using suitable tissue preparation
5. To determine to the strength of unknown sample by bracketing bioassay by using suitable tissue preparation
6. To determine to the strength of unknown sample by multiple point bioassay by using suitable tissue preparation.
7. Estimation of PA<sub>2</sub> values of various antagonists using suitable isolated tissue preparations.
8. To study the effects of various drugs on isolated heart preparations
9. Recording of rat BP, heart rate and ECG.
10. Recording of rat ECG

### PHARMACOLOGY PRACTICAL - IV (MPL 205PB)

1. Drug absorption studies by averted rat ileum preparation.
2. Acute oral toxicity studies as per OECD guidelines.
3. Acute dermal toxicity studies as per OECD guidelines.
4. Repeated dose toxicity studies- Serum biochemical, haematological, urine analysis, functional observation tests and histological studies.
5. Drug mutagenicity study using mice bone-marrow chromosomal aberration test.
6. Protocol design for clinical trial.(3Nos.)
7. Design of ADR monitoring protocol.
8. In-silico docking studies. (2Nos.)
9. In-silico pharmacophore based screening.
10. In-silico QSAR studies.
11. ADR reporting.

#### REFERENCES

1. Fundamentals of experimental Pharmacology -by M.N. Ghosh
2. Handbook of Experimental Pharmacology- S.K. Kulakarni
3. Textbook of in-vitro practical Pharmacology by Ian Kitchen
4. Bioassay Techniques for Drug Development by Atta-ur-Rahman, Iqbal choudhary and William Thomsen
5. Applied Biopharmaceutics and Pharmacokinetics by Leon Shargel and Andrew B.C. Yu.
6. Handbook of Essential Pharmacokinetics, Pharmacodynamics and Drug Metabolism for Industrial Scientists.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### SYLLABUS REGULATION (PCI)

Avanthi Institute Of Pharmaceutical Sciences (AIPS) follows PCI Syllabus for all the programs such as B.Pharm, M.Pharm, Pharm.D. PCI Syllabus covered the vast and categorically includes Pharmacy subjects which later the needs of students both in professional and scientific requirements.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# भारत का राजपत्र The Gazette of India

साप्ताहिक/WEEKLY

प्राधिकार से प्रकाशित  
PUBLISHED BY AUTHORITY

० 19] नई दिल्ली, शनिवार, मई 10—मई 16, 2008 (वैशाख 20, 1930)  
o. 19] NEW DELHI, SATURDAY, MAY 10—MAY 16, 2008 (VAISAKHA 20, 1930)

इस भाग में भिन्न पृष्ठ संख्या दी जाती है जिससे कि यह अलग संकलन के रूप में रखा जा सके।  
(Separate paging is given to this Part in order that it may be filed as a separate compilation)

भाग III—खण्ड 4

[PART III—SECTION 4]

सांविधिक निकायों द्वारा जारी की गई विविध अधिसूचनाएं जिसमें कि आदेश, विज्ञापन और सूचनाएं सम्मिलित हैं।  
[Miscellaneous Notifications including Notifications, Orders, Advertisements and Notices issued by  
Statutory Bodies]

भारतीय रिज़र्व बैंक

मुंबई-400001, दिनांक 9 अप्रैल 2008

संदर्भ : बैंपविवि. सं. आईबीडी.-14241/23.13.048/2007-08--भारतीय रिज़र्व बैंक अधिनियम,  
934 (1934 का 2) की धारा 42 की उप-धारा (6) के खण्ड (ग) के अनुसरण में भारतीय रिज़र्व बैंक  
सके द्वारा निदेश देता है कि उक्त अधिनियम की दूसरी अनुसूची में निम्नलिखित परिवर्तन किये जाएं :--

“अरब बांग्लादेश बैंक लिमिटेड” शब्दों के स्थान पर “एबी बैंक लिमिटेड” शब्द होंगे।



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

आनन्द सिन्हा

कार्यपालक निदेशक



[PUBLISHED IN THE GAZETTE OF INDIA, No.19, PART III, SECTION 4]

Ministry of Health and Family Welfare  
(Pharmacy Council of India)

New Delhi, 10<sup>th</sup> May, 2008.

### **Pharm.D. Regulations 2008**

Regulations framed under section 10 of the Pharmacy Act, 1948 (8 of 1948).

(As approved by the Government of India, Ministry of Health vide, letter No.V.13013/1/2007-PMS, dated the 13<sup>th</sup> March, 2008 and notified by the Pharmacy Council of India).

No.14-126/2007-PCI.— In exercise of the powers conferred by section 10 of the Pharmacy Act, 1948 (8 of 1948), the Pharmacy Council of India, with the approval of the Central Government, hereby makes the following regulations, namely:-

#### **CHAPTER-I**

1. Short title and commencement. – (1) These regulations may be called the Pharm.D. Regulations 2008.  
(2) They shall come into force from the date of their publication in the official Gazette.
2. Pharm.D. shall consist of a certificate, having passed the course of study and examination as prescribed in these regulations, for the purpose of registration as a pharmacist to practice the profession under the Pharmacy Act, 1948.



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## CHAPTER-II

### 3. Duration of the course. –

- a) Pharm.D: The duration of the course shall be six academic years (five years of study and one year of internship or residency) full time with each academic year spread over a period of not less than two hundred working days. The period of six years duration is divided into two phases –

Phase I – consisting of First, Second, Third, Fourth and Fifth academic year.

Phase II – consisting of internship or residency training during sixth year involving posting in speciality units. It is a phase of training wherein a student is exposed to actual pharmacy practice or clinical pharmacy services and acquires skill under supervision so that he or she may become capable of functioning independently.

- b) Pharm.D. (Post Baccalaureate): The duration of the course shall be for three academic years (two years of study and one year internship or residency) full time with each academic year spread over a period of not less than two hundred working days. The period of three years duration is divided into two phases –

Phase I – consisting of First and Second academic year.

Phase II – consisting of Internship or residency training during third year involving posting in speciality units. It is a phase of training wherein a student is exposed to actual pharmacy practice or clinical pharmacy services, and acquires skill under supervision so that he or she may become capable of functioning independently.

### 4. Minimum qualification for admission to. –

- a) Pharm.D. Part-I Course – A pass in any of the following examinations -

(1) 10+2 examination with Physics and Chemistry as compulsory subjects along with one of the following subjects:

Mathematics or Biology.


(2) A pass in D.Pharm course from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act.

(3) Any other qualification approved by the Pharmacy Council of India as equivalent to any of the above examinations.

Provided that a student should complete the age of 17 years on or before 31<sup>st</sup> December of the year of admission to the course.

Provided that there shall be reservation of seats for the students belonging to the Scheduled Castes, Scheduled Tribes and other Backward Classes in accordance with the instructions issued by the Central Government/State Government/Union Territory Administration as the case may be from time to time.



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



b) Pharm.D. (Post Baccalaureate) Course -

A pass in B.Pharm from an institution approved by the Pharmacy Council of India under section 12 of the Pharmacy Act:

Provided that there shall be reservation of seats for the students belonging to the Scheduled Castes, Scheduled Tribes and other Backward Classes in accordance with the instructions issued by the Central Government/State Government/Union Territory Administration as the case may be from time to time.

5. Number of admissions in the above said programmes shall be as prescribed by the Pharmacy Council of India from time to time and presently be restricted as below –
  - i) Pharm.D. Programme – 30 students.
  - ii) Pharm.D. (Post Baccalaureate) Programme – 10 students.
6. Institutions running B.Pharm programme approved under section 12 of the Pharmacy Act, will only be permitted to run Pharm.D. programme. Pharm.D. (Post Baccalaureate) programme will be permitted only in those institutions which are permitted to run Pharm.D. programme.
7. Course of study. – The course of study for Pharm.D. shall include the subjects as given in the Tables below. The number of hours in a week, devoted to each subject for its teaching in theory, practical and tutorial shall not be less than that noted against it in columns (3), (4) and (5) below.


## TABLES

**First Year :**

S.No.	Name of Subject	No. of hours of Theory	No. of hours of Practical	No. of hours of Tutorial
(1)	(2)	(3)	(4)	(5)
1.1	Human Anatomy and Physiology	3	3	1
1.2	Pharmaceutics	2	3	1
1.3	Medicinal Biochemistry	3	3	1
1.4	Pharmaceutical Organic Chemistry	3	3	1
1.5	Pharmaceutical Inorganic Chemistry	2	3	1
1.6	Remedial Mathematics/ Biology	3	3*	1
	<b>Total hours</b>	<b>16</b>	<b>18</b>	<b>6 = (40)</b>

\* For Biology



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162


**Second Year:**

S.No	Name of Subject	No. of hours of Theory	No. of hours of Practical	No. of hours of Tutorial
(1)	(2)	(3)	(4)	(5)
2.1	Pathophysiology	3	-	1
2.2	Pharmaceutical Microbiology	3	3	1
2.3	Pharmacognosy & Phytopharmaceuticals	3	3	1
2.4	Pharmacology-I	3	-	1
2.5	Community Pharmacy	2	-	1
2.6	Pharmacotherapeutics-I	3	3	1
	<b>Total Hours</b>	<b>17</b>	<b>9</b>	<b>6 = 32</b>

**Third Year:**

S.No.	Name of Subject	No. of hours of Theory	No. of hours of Practical	No. of hours of Tutorial
(1)	(2)	(3)	(4)	(5)
3.1	Pharmacology-II	3	3	1
3.2	Pharmaceutical Analysis	3	3	1
3.3	Pharmacotherapeutics-II	3	3	1
3.4	Pharmaceutical Jurisprudence	2	-	-
3.5	Medicinal Chemistry	3	3	1
3.6	Pharmaceutical Formulations	2	3	1
	<b>Total hours</b>	<b>16</b>	<b>15</b>	<b>5 = 36</b>



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



**Fourth Year:**

S.No.	Name of Subject	No. of hours of Theory	No. of hours of Practical/ Hospital Posting	No. of hours of Tutorial
(1)	(2)	(3)	(4)	(5)
4.1	Pharmacotherapeutics-III	3	3	1
4.2	Hospital Pharmacy	2	3	1
4.3	Clinical Pharmacy	3	3	1
4.4	Biostatistics & Research Methodology	2	-	1
4.5	Biopharmaceutics & Pharmacokinetics	3	3	1
4.6	Clinical Toxicology	2	-	1
	<b>Total hours</b>	<b>15</b>	<b>12</b>	<b>6 = 33</b>

**Fifth Year:**

S.No.	Name of Subject	No. of hours of Theory	No. of hours of Hospital posting*	No. of hours of Seminar
(1)	(2)	(3)	(4)	(5)
5.1	Clinical Research	3	-	1
5.2	Pharmacoepidemiology and Pharmacoeconomics	3	-	1
5.3	Clinical Pharmacokinetics & Pharmacotherapeutic Drug Monitoring	2	-	1
5.4	Clerkship *	-	-	1
5.5	Project work (Six Months)	-	20	-
	<b>Total hours</b>	<b>8</b>	<b>20</b>	<b>4 = 32</b>

\* Attending ward rounds on daily basis.



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

**Sixth Year:**

Internship or residency training including postings in speciality units. Student should independently provide the clinical pharmacy services to the allotted wards.

- (i) Six months in General Medicine department, and
- (ii) Two months each in three other speciality departments


8. Syllabus. – The syllabus for each subject of study in the said Tables shall be as specified in Appendix -A to these regulations.
9. Approval of the authority conducting the course of study. – (1) No person, institution, society or university shall start and conduct Pharm.D or Pharm.D. (Post Baccalaureate) programme without the prior approval of the Pharmacy Council of India.
- (2) Any person or pharmacy college for the purpose of obtaining permission under sub-section (1) of section 12 of the Pharmacy Act, shall submit a scheme as prescribed by the Pharmacy Council of India.
- (3) The scheme referred to in sub-regulation (2) above, shall be in such form and contain such particulars and be preferred in such manner and be accompanied with such fee as may be prescribed:
- Provided that the Pharmacy Council of India shall not approve any institution under these regulations unless it provides adequate arrangements for teaching in regard to building, accommodation, labs., equipments, teaching staff, non-teaching staff, etc., as specified in Appendix-B to these regulations.
10. Examination. – (1) Every year there shall be an examination to examine the students.
- (2) Each examination may be held twice every year. The first examination in a year shall be the annual examination and the second examination shall be supplementary examination.
- (3) The examinations shall be of written and practical (including oral nature) carrying maximum marks for each part of a subject as indicated in Tables below :

**T A B L E S****First Year examination :**

S.No.	Name of Subject	Maximum marks for Theory			Maximum marks for Practicals		
		Examination	Sessional	Total	Examination	Sessional	Total
1.1	Human Anatomy and Physiology	70	30	100	70	30	100
1.2	Pharmaceutics	70	30	100	70	30	100
1.3	Medicinal Biochemistry	70	30	100	70	30	100
1.4	Pharmaceutical Organic Chemistry	70	30	100	70	30	100
1.5	Pharmaceutical Inorganic Chemistry	70	30	100	70	30	100
1.6	Remedial Mathematics/Biology	70	30	100	70*	30*	100*
				600			600 = 1200

\* for Biology.



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



**Second Year examination :**

S.No.	Name of Subject	Maximum marks for Theory			Maximum marks for Practicals		
		Examination	Sessional	Total	Examination	Sessional	Total
2.1	Pathophysiology	70	30	100	-	-	-
2.2	Pharmaceutical Microbiology	70	30	100	70	30	100
2.3	Pharmacognosy & Phytopharmaceuticals	70	30	100	70	30	100
2.4	Pharmacology-I	70	30	100	-	-	-
2.5	Community Pharmacy	70	30	100	-	-	-
2.6	Pharmacotherapeutics-I	70	30	100	70	30	100
				600			300 = 900

**Third Year examination :**

S.No.	Name of Subject	Maximum marks for Theory			Maximum marks for Practicals		
		Examination	Sessional	Total	Examination	Sessional	Total
3.1	Pharmacology-II	70	30	100	70	30	100
3.2	Pharmaceutical Analysis	70	30	100	70	30	100
3.3	Pharmacotherapeutics-II	70	30	100	70	30	100
3.4	Pharmaceutical Jurisprudence	70	30	100	-	-	-
3.5	Medicinal Chemistry	70	30	100	70	30	100
3.6	Pharmaceutical Formulations	70	30	100	70	30	100
				600			500 = 1100

**Fourth Year examination :**

S.No.	Name of Subject	Maximum marks for Theory			Maximum marks for Practicals		
		Examination	Sessional	Total	Examination	Sessional	Total
4.1	Pharmacotherapeutics-III	70	30	100	70	30	100
4.2	Hospital Pharmacy	70	30	100	70	30	100
4.3	Clinical Pharmacy	70	30	100	70	30	100
4.4	Biostatistics & Research Methodology	70	30	100	-	-	-
4.5	Biopharmaceutics & Pharmacokinetics	70	30	100	70	30	100
4.6	Clinical Toxicology	70	30	100	-	-	-
				600			400 = 1000



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

**Fifth Year examination :**

S.No.	Name of Subject	Maximum marks for Theory			Maximum marks for Practicals		
		Examination	Sessional	Total	Examination	Sessional	Total
5.1	Clinical Research	70	30	100	-	-	-
5.2	Pharmacoepidemiology and Pharmacoeconomics	70	30	100	-	-	-
5.3	Clinical Pharmacokinetics & Pharmacotherapeutic Drug Monitoring	70	30	100	-	-	-
5.4	Clerkship *	-	-	-	70	30	100
5.5	Project work (Six Months)	-	-	-	100**	-	100
				300			200 = 500

\* Attending ward rounds on daily basis.

\*\* 30 marks – viva-voce (oral)

70 marks – Thesis work

11. Eligibility for appearing Examination.— Only such students who produce certificate from the Head of the Institution in which he or she has undergone the Pharm.D. or as the case may be, the Pharm.D. (Post Baccalaureate) course, in proof of his or her having regularly and satisfactorily undergone the course of study by attending not less than 80% of the classes held both in theory and in practical separately in each subject shall be eligible for appearing at examination.
12. Mode of examinations.— (1) Theory examination shall be of three hours and practical examination shall be of four hours duration.
  - (2) A Student who fails in theory or practical examination of a subject shall re-appear both in theory and practical of the same subject.
  - (3) Practical examination shall also consist of a viva –voce (Oral) examination.
  - (4) Clerkship examination – Oral examination shall be conducted after the completion of clerkship of students. An external and an internal examiner will evaluate the student. Students may be asked to present the allotted medical cases followed by discussion. Students' capabilities in delivering clinical pharmacy services, pharmaceutical care planning and knowledge of therapeutics shall be assessed.
13. Award of sessional marks and maintenance of records.— (1) A regular record of both theory and practical class work and examinations conducted in an institution imparting training for Pharm.D. or as the case may be, Pharm.D. (Post Baccalaureate) course, shall be maintained for each student in the institution and 30 marks for each theory and 30 marks for each practical subject shall be allotted as sessional.
  - (2) There shall be at least two periodic sessional examinations during each academic year and the highest aggregate of any two performances shall form the basis of calculating sessional marks.
  - (3) The sessional marks in practicals shall be allotted on the following basis:-
    - (i) Actual performance in the sessional examination (20 marks);
    - (ii) Day to day assessment in the practical class work, promptness, viva-voce record maintenance, etc. (10 marks).



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



14. Minimum marks for passing examination.— A student shall not be declared to have passed examination unless he or she secures at least 50% marks in each of the subjects separately in the theory examinations, including sessional marks and at least 50% marks in each of the practical examinations including sessional marks. The students securing 60% marks or above in aggregate in all subjects in a single attempt at the Pharm.D. or as the case may be, Pharm. D. (Post Baccalaureate) course examination shall be declared to have passed in first class. Students securing 75% marks or above in any subject or subjects shall be declared to have passed with distinction in the subject or those subjects provided he or she passes in all the subjects in a single attempt.
15. Eligibility for promotion to next year.— All students who have appeared for all the subjects and passed the first year annual examination are eligible for promotion to the second year and, so on. However, failure in more than two subjects shall debar him or her from promotion to the next year classes.
16. Internship.— (1) Internship is a phase of training wherein a student is expected to conduct actual practice of pharmacy and health care and acquires skills under the supervision so that he or she may become capable of functioning independently.
- (2) Every student has to undergo one year internship as per Appendix-C to these regulations.
17. Approval of examinations.— Examinations mentioned in regulations 10 to 12 and 14 shall be held by the examining authority hereinafter referred to as the university, which shall be approved by the Pharmacy Council of India under sub-section (2) of section 12 of the Pharmacy Act, 1948. Such approval shall be granted only if the examining authority concerned fulfills the conditions as specified in Appendix-D to these regulations.
18. Certificate of passing examination.— Every student who has passed the examinations for the Pharm.D. (Doctor of Pharmacy) or Pharm.D. (Post Baccalaureate) (Doctor of Pharmacy) as the case may be, shall be granted a certificate by the examining authority.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

### CHAPTER-III

#### Practical training

19. Hospital posting.— Every student shall be posted in constituent hospital for a period of not less than fifty hours to be covered in not less than 200 working days in each of second, third & fourth year course. Each student shall submit report duly certified by the preceptor and duly attested by the Head of the Department or Institution as prescribed. In the fifth year, every student shall spend half a day in the morning hours attending ward rounds on daily basis as a part of clerkship. Theory teaching may be scheduled in the afternoon.
20. Project work.— (1) To allow the student to develop data collection and reporting skills in the area of community, hospital and clinical pharmacy, a project work shall be carried out under the supervision of a teacher. The project topic must be approved by the Head of the Department or Head of the Institution. The same shall be announced to students within one month of commencement of the fifth year classes. Project work shall be presented in a written report and as a seminar at the end of the year. External and the internal examiners shall do the assessment of the project work.
- (2) Project work shall comprise of objectives of the work, methodology, results, discussions and conclusions.
21. Objectives of project work.— The main objectives of the project work is to—
- (i) show the evidence of having made accurate description of published work of others and of having recorded the findings in an impartial manner; and
  - (ii) develop the students in data collection, analysis and reporting and interpretation skills.
22. Methodology.— To complete the project work following methodology shall be adopted, namely:—
- (i) students shall work in groups of not less than *two* and not more than *four* under an authorised teacher;
  - (ii) project topic shall be approved by the Head of the Department or Head of the Institution;
  - (iii) project work chosen shall be related to the pharmacy practice in community, hospital and clinical setup. It shall be patient and treatment (Medicine) oriented, like drug utilisation reviews, pharmacoepidemiology, pharmacovigilance or pharmacoconomics;
  - (iv) project work shall be approved by the institutional ethics committee;
  - (v) student shall present at least three seminars, one in the beginning, one at middle and one at the end of the project work; and
  - (vi) two-page write-up of the project indicating title, objectives, methodology anticipated benefits and references shall be submitted to the Head of the Department or Head of the Institution.



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



23. Reporting .— (1) Student working on the project shall submit jointly to the Head of the Department or Head of the Institution a project report of about 40-50 pages. Project report should include a certificate issued by the authorised teacher, Head of the Department as well as by the Head of the Institution

(2) Project report shall be computer typed in double space using Times Roman font on A4 paper. The title shall be in bold with font size 18, sub-titles in bold with font size 14 and the text with font size 12. The cover page of the project report shall contain details about the name of the student and the name of the authorised teacher with font size 14.

(3) Submission of the project report shall be done at least one month prior to the commencement of annual or supplementary examination.

24. Evaluation.— The following methodology shall be adopted for evaluating the project work—

(i) Project work shall be evaluated by internal and external examiners.

(ii) Students shall be evaluated in groups for four hours (i.e., about half an hour for a group of four students).

(iii) Three seminars presented by students shall be evaluated for twenty marks each and the average of best two shall be forwarded to the university with marks of other subjects.

(iv) Evaluation shall be done on the following items:	<b>Marks</b>
a) Write up of the seminar	(7.5)
b) Presentation of work	(7.5)
c) Communication skills	(7.5)
d) Question and answer skills	(7.5)
<b>Total</b>	<b>(30 marks)</b>
(v) Final evaluation of project work shall be done on the following items:	<b>Marks</b>
a) Write up of the seminar	(17.5)
b) Presentation of work	(17.5)
c) Communication skills	(17.5)
d) Question and answer skills	(17.5)
<b>Total</b>	<b>(70 marks)</b>

*Explanation.*— For the purposes of differentiation in the evaluation in case of topic being the same for the group of students, the same shall be done based on item numbers b, c and d mentioned above.



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

# APPENDIX-A

(See regulation 8)

## PHARM.D. SYLLABUS

### First Year

#### 1.1 HUMAN ANATOMY & PHYSIOLOGY (THEORY)

**Theory : 3 Hrs. /Week**

1. **Scope and Objectives:** This course is designed to impart a fundamental knowledge on the structure and functions of the human body. It also helps in understanding both homeostasis mechanisms and homeostatic imbalances of various body systems. Since a medicament, which is produced by pharmacist, is used to correct the deviations in human body, it enhances the understanding of how the drugs act on the various body systems in correcting the disease state of the organs.
2. **Upon completion of the course the student shall be able to:**
  - a. describe the structure (gross and histology) and functions of various organs of the human body;
  - b. describe the various homeostatic mechanisms and their imbalances of various systems;
  - c. identify the various tissues and organs of the different systems of the human body;
  - d. perform the hematological tests and also record blood pressure, heart rate, pulse and Respiratory volumes;
  - e. appreciate coordinated working pattern of different organs of each system; and
  - f. appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body
3. **Course materials:**

**Text books**

  - a. Tortora Gerard J. and Nicholas, P. Principles of anatomy and physiology  
Publisher Harpercollins college New York.
  - b. Wilson, K.J.W. Ross and Wilson's foundations of anatomy and physiology.  
Publisher: Churchill Livingstone, Edinburg.

**Reference books**

  - a. Guyton arthur, C. *Physiology of human body*. Publisher: Holtsaunders.
  - b. Chatterjee, C.C. *Human physiology*. Volume 1&11. Publisher: medical allied agency, Calcutta.
  - c. Peter L. Williams, Roger Warwick, Mary Dyson and Lawrence, H.
  - d. *Gray's anatomy*. Publisher: Churchill Livingstone, London.



  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



#### 4. Lecture wise program :

##### Topics

- 1 Scope of anatomy and physiology, basic terminologies used in this subject (Description of the body as such planes and terminologies)
- 2 Structure of cell – its components and their functions.
- 3 Elementary tissues of the human body: epithelial, connective, Muscular and nervous tissues-their sub-types and characteristics
- 4 a) Osseous system - structure, composition and functions of the Skeleton. (done in practical classes - 6hrs)  
b) Classification of joints, Types of movements of joints and disorders of joints (Definitions only)
- 5 Haemopoetic System  
a) Composition and functions of blood  
b) Haemopoiesis and disorders of blood components (definition of disorder)  
c) Blood groups  
d) Clotting factors and mechanism  
e) Platelets and disorders of coagulation
- 6 Lymph  
a) Lymph and lymphatic system, composition, formation and circulation.  
b) Spleen: structure and functions, Disorders  
c) Disorders of lymphatic system (definition only)
- 7 Cardiovascular system  
a) Anatomy and functions of heart  
b) Blood vessels and circulation (Pulmonary, coronary and systemic circulation)  
c) Electrocardiogram (ECG)  
d) Cardiac cycle and heart sounds  
e) Blood pressure – its maintenance and regulation  
f) Definition of the following disorders  
Hypertension, Hypotension, Arteriosclerosis, Atherosclerosis, Angina, Myocardial infarction, Congestive heart failure, Cardiac arrhythmias
- 8 Respiratory system  
a) Anatomy of respiratory organs and functions  
b) Mechanism / physiology of respiration and regulation of respiration  
c) Transport of respiratory gases  
d) Respiratory volumes and capacities, and Definition of: Hypoxia, Asphyxia, Dybarism, Oxygen therapy and resuscitation.
- 9 Digestive system  
a) Anatomy and physiology of GIT  
b) Anatomy and functions of accessory glands of GIT  
c) Digestion and absorption  
d) Disorders of GIT (definitions only)



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

- 10 Nervous system
  - a) Definition and classification of nervous system
  - b) Anatomy, physiology and functional areas of cerebrum
  - c) Anatomy and physiology of cerebellum
  - d) Anatomy and physiology of mid brain
  - e) Thalamus, hypothalamus and Basal Ganglia
  - f) Spinal cord: Structure & reflexes – mono-poly-planter
  - g) Cranial nerves – names and functions
  - h) ANS – Anatomy & functions of sympathetic & parasympathetic N.S.
- 11 Urinary system
  - a) Anatomy and physiology of urinary system
  - b) Formation of urine
  - c) Renin Angiotensin system – Juxtaglomerular apparatus - acid base Balance
  - d) Clearance tests and micturition
- 12 Endocrine system
  - a) Pituitary gland
  - b) Adrenal gland
  - c) Thyroid and Parathyroid glands
  - d) Pancreas and gonads
- 13 Reproductive system
  - a) Male and female reproductive system
  - b) Their hormones – Physiology of menstruation
  - c) Spermatogenesis & Oogenesis
  - d) Sex determination (genetic basis)
  - e) Pregnancy and maintenance and parturition
  - f) Contraceptive devices
- 14 Sense organs
  - a) Eye
  - b) Ear
  - c) Skin
  - d) Tongue & Nose
- 15 Skeletal muscles
  - a) Histology
  - b) Physiology of Muscle contraction
  - c) Physiological properties of skeletal muscle and their disorders (definitions)
- 16 Sports physiology
  - a) Muscles in exercise, Effect of athletic training on muscles and muscle performance,
  - b) Respiration in exercise, CVS in exercise, Body heat in exercise, Body fluids and salts in exercise,
  - c) Drugs and athletics



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## 1.1 HUMAN ANATOMY & PHYSIOLOGY (PRACTICAL)

**Practical : 3 Hrs./Week**

**General Requirements:** Dissection box, Laboratory Napkin, muslin cloth, record, Observation book(100pages), Stationary items, Blood lancet.

### **Course materials:**

#### **Text books**

Goyal, R. K, Natvar M.P, and Shah S.A, Practical anatomy, physiology and biochemistry, latest edition, Publisher: B.S Shah Prakashan, Ahmedabad.

#### **Reference books**

Ranade VG, Text book of practical physiology, Latest edition, Publisher: PVG, Pune  
Anderson Experimental Physiology, Latest edition, Publisher: NA

### **List of Experiments:**

1. Study of tissues of human body
  - (a) Epithelial tissue.
  - (b) Muscular tissue.
2. Study of tissues of human body
  - (a) Connective tissue.
  - (b) Nervous tissue.
3. Study of appliances used in hematological experiments.
4. Determination of W.B.C. count of blood.
5. Determination of R.B.C. count of blood.
6. Determination of differential count of blood.
7. Determination of
  - (a) Erythrocyte Sedimentation Rate.
  - (b) Hemoglobin content of Blood.
  - (c) Bleeding time & Clotting time.
8. Determination of
  - (a) Blood Pressure.
  - (b) Blood group.
9. Study of various systems with the help of charts, models & specimens
  - (a) Skeleton system part I-axial skeleton.
  - (b) Skeleton system part II- appendicular skeleton.
  - (c) Cardiovascular system.
  - (d) Respiratory system.



  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

- (e) Digestive system.
- (f) Urinary system.
- (g) Nervous system.
- (h) Special senses.
- (i) Reproductive system.

10. Study of different family planning appliances.
11. To perform pregnancy diagnosis test.
12. Study of appliances used in experimental physiology.
13. To record simple muscle curve using gastrocnemius sciatic nerve preparation.
14. To record simple summation curve using gastrocnemius sciatic nerve preparation.
15. To record simple effect of temperature using gastrocnemius sciatic nerve preparation.
16. To record simple effect of load & after load using gastrocnemius sciatic nerve preparation.
17. To record simple fatigue curve using gastrocnemius sciatic nerve preparation.

#### Scheme of Practical Examination:

	Sessionals	Annual
Identification	04	10
Synopsis	04	10
Major Experiment	07	20
Minor Experiment	03	15
Viva	02	15
<b>Max Marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>03hrs</b>	<b>04hrs</b>

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## 1.2 PHARMACEUTICS (THEORY)

**Theory : 2 Hrs. /Week**

**1. Scope and objectives:** This course is designed to impart a fundamental knowledge on the art and science of formulating different dosage forms. It prepares the students for most basics of the applied field of pharmacy.

**2. Upon the completion of the course the student should be able to:**

- know the formulation aspects of different dosage forms;
- do different pharmaceutical calculation involved in formulation;
- formulate different types of dosage forms; and
- appreciate the importance of good formulation for effectiveness.

**3. Course materials:**

**Text books**

- Cooper and Gunns Dispensing for pharmacy students.
- A text book Professional Pharmacy by N.K.Jain and S.N.Sharma.

**Reference books**

- Introduction to Pharmaceutical dosage forms by Howard C. Ansel.
- Remington's Pharmaceutical Sciences.
- Register of General Pharmacy by Cooper and Gunn.
- General Pharmacy by M.L.Schroff.

**4. Lecture wise programme:**

**Topics**

- Introduction to dosage forms - classification and definitions
  - Prescription: definition, parts and handling
  - Posology: Definition, Factors affecting dose selection. Calculation of children and infant doses.
- Historical back ground and development of profession of pharmacy and pharmaceutical industry in brief.
- Development of Indian Pharmacopoeia and introduction to other Pharmacopoeias such as BP, USP, European Pharmacopoeia, Extra pharmacopoeia and Indian national formulary.
- Weights and measures, Calculations involving percentage solutions, allegation, proof spirit, isotonic solutions etc.
- Powders and Granules: Classification advantages and disadvantages, Preparation of simple, compound powders, Insufflations, Dusting powders, Eutectic and Explosive powders, Tooth powder and effervescent powders and granules.
- Monophasic Dosage forms: Theoretical aspects of formulation including adjuvant like stabilizers, colorants, flavours with examples. Study of Monophasic liquids like gargles, mouth washes, Throat paint, Ear drops, Nasal drops, Liniments and lotions, Enemas and collodions.



  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

- 7 Biphase dosage forms: Suspensions and emulsions, Definition, advantages and disadvantages, classification, test for the type of emulsion, formulation, stability and evaluation.
- 8 Suppositories and pessaries: Definition, advantages and disadvantages, types of base, method of preparation, Displacement value and evaluation.
- 9 Galenicals: Definition, equipment for different extraction processes like infusion, Decoction, Maceration and Percolation, methods of preparation of spirits, tinctures and extracts.
- 10 Pharmaceutical calculations.
- 11 Surgical aids: Surgical dressings, absorbable gelatin sponge, sutures, ligatures and medicated bandages.
- 12 Incompatibilities: Introduction, classification and methods to overcome the incompatibilities.

## 1.2 PHARMACEUTICS (PRACTICAL)

**Practical : 3 Hrs./Week**

### List of Experiments:

1. **Syrups**
  - a. Simple Syrup I.P
  - b. Syrup of Ephedrine Hcl NF
  - c. Syrup Vasaka IP
  - d. Syrup of ferrous Phosphate IP
  - e. Orange Syrup
2. **Elixir**
  - a. Piperizine citrate elixir BP
  - b. Cascara elixir BPC
  - c. Paracetamol elixir BPC
3. **Linctus**
  - a. Simple Linctus BPC
  - b. Pediatric simple Linctus BPC
4. **Solutions**
  - a. Solution of cresol with soap IP
  - b. Strong solution of ferric chloride BPC
  - c. Aqueous Iodine Solution IP
  - d. Strong solution of Iodine IP
  - e. Strong solution of ammonium acetate IP



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



5. **Liniments**
  - a. Liniment of turpentine IP\*
  - b. Liniment of camphor IP
6. **Suspensions\***
  - a. Calamine lotion
  - b. Magnesium Hydroxide mixture BP
7. **Emulsions\***
  - a. Cod liver oil emulsion
  - b. Liquid paraffin emulsion
8. **Powders\***
  - a. Eutectic powder
  - b. Explosive powder
  - c. Dusting powder
  - d. Insufflations
9. **Suppositories\***
  - a. Boric acid suppositories
  - b. Chloral suppositories
10. **Incompatibilities**
  - a. Mixtures with Physical
  - b. Chemical & Therapeutic incompatibilities

\* colourless bottles required for dispensing \* Paper envelope (white), butter paper and white paper required for dispensing.

#### Scheme of Practical Examination:

	Sessionals	Annual
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max Marks	20	70
Duration	03hrs	04hrs

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

### 1.3 MEDICINAL BIOCHEMISTRY (THEORY)

**Theory : 3 Hrs. /Week**

**1. Scope of the Subject:** Applied biochemistry deals with complete understanding of the molecular level of the chemical process associated with living cells. Clinical chemistry deals with the study of chemical aspects of human life in health and illness and the application of chemical laboratory methods to diagnosis, control of treatment, and prevention of diseases.

**2. Objectives of the Subject (Know, do, appreciate) :**

The objective of the present course is providing biochemical facts and the principles to the students of pharmacy. Upon completion of the subject student shall be able to –

- understand the catalytic activity of enzymes and importance of isoenzymes in diagnosis of diseases;
- know the metabolic process of biomolecules in health and illness (metabolic disorders);
- understand the genetic organization of mammalian genome; protein synthesis; replication; mutation and repair mechanism;
- know the biochemical principles of organ function tests of kidney, liver and endocrine gland; and
- do the qualitative analysis and determination of biomolecules in the body fluids.

**Text books (Theory)**

- Harpers review of biochemistry - Martin
- Text book of biochemistry – D.Satyanarayana
- Text book of clinical chemistry- Alex kaplan & Laverve L.Szabo

**Reference books (Theory)**

- Principles of biochemistry -- Lehninger
- Text book of biochemistry -- Ramarao
- Practical Biochemistry-David T.Plummer.
- Practical Biochemistry-Pattabhiraman.

**3. Lecture wise programme:**

**Topics**

- Introduction to biochemistry:** Cell and its biochemical organization, transport process across the cell membranes. Energy rich compounds; ATP, Cyclic AMP and their biological significance.
- Enzymes:** Definition; Nomenclature; IUB classification; Factor affecting enzyme activity; Enzyme action; enzyme inhibition. Isoenzymes and their therapeutic and diagnostic applications; Coenzymes and their biochemical role and deficiency diseases.
- Carbohydrate metabolism:** Glycolysis, Citric acid cycle (TCA cycle), HMP shunt, Glycogenolysis, gluconeogenesis, glycogenesis. Metabolic disorders of carbohydrate metabolism (diabetes mellitus and glycogen storage diseases); Glucose, Galactose tolerance test and their significance; hormonal regulation of carbohydrate metabolism.



  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt. - 531162



- 4 **Lipid metabolism:** Oxidation of saturated ( $\beta$ -oxidation); Ketogenesis and ketolysis; biosynthesis of fatty acids, lipids; metabolism of cholesterol; Hormonal regulation of lipid metabolism. Defective metabolism of lipids (Atherosclerosis, fatty liver, hypercholesterolemia).
- 5 **Biological oxidation:** Coenzyme system involved in Biological oxidation. Electron transport chain (its mechanism in energy capture; regulation and inhibition); Uncouplers of ETC; Oxidative phosphorylation;
- 6 **Protein and amino acid metabolism:** protein turn over; nitrogen balance; Catabolism of Amino acids (Transamination, deamination & decarboxylation). Urea cycle and its metabolic disorders; production of bile pigments; hyperbilirubinemia, porphoria, jaundice. Metabolic disorder of Amino acids.
- 7 **Nucleic acid metabolism:** Metabolism of purine and pyrimidine nucleotides; Protein synthesis; Genetic code; inhibition of protein synthesis; mutation and repair mechanism; DNA replication (semiconservative / onion peel models) and DNA repair mechanism.
- 8 **Introduction to clinical chemistry: Cell;** composition; malfunction; Roll of the clinical chemistry laboratory.
- 9 **The kidney function tests:** Role of kidney; Laboratory tests for normal function includes-
  - a) Urine analysis (macroscopic and physical examination, quantitative and semiquantitative tests.)
  - b) Test for NPN constituents. (Creatinine /urea clearance, determination of blood and urine creatinine, urea and uric acid)
  - c) Urine concentration test
  - d) Urinary tract calculi. (stones)
- 10 **Liver function tests:** Physiological role of liver, metabolic, storage, excretory, protective, circulatory functions and function in blood coagulation.
  - a) Test for hepatic dysfunction-Bile pigments metabolism.
  - b) Test for hepatic function test- Serum bilirubin, urine bilirubin, and urine urobilinogen.
  - c) Dye tests of excretory function.
  - d) Tests based upon abnormalities of serum proteins.
 Selected enzyme tests.
- 11 **Lipid profile tests:** Lipoproteins, composition, functions. Determination of serum lipids, total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides.
- 12 **Immunochemical techniques** for determination of hormone levels and protein levels in serum for endocrine diseases and infectious diseases.  
Radio immuno assay (RIA) and Enzyme Linked Immuno Sorbent Assay (ELISA)
- 13 **Electrolytes:** Body water, compartments, water balance, and electrolyte distribution. Determination of sodium, calcium potassium, chlorides, bicarbonates in the body fluids.



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

### 1.3 MEDICINAL BIOCHEMISTRY (PRACTICAL)

**Practical : 3 Hrs./Week**

**Title of the Experiment:**

- 1 Qualitative analysis of normal constituents of urine.\*
  - 2 Qualitative analysis of abnormal constituents of urine.\*
  - 3 Quantitative estimation of urine sugar by Benedict's reagent method.\*\*
  - 4 Quantitative estimation of urine chlorides by Volhard's method.\*\*
  - 5 Quantitative estimation of urine creatinine by Jaffe's method.\*\*
  - 6 Quantitative estimation of urine calcium by precipitation method.\*\*
  - 7 Quantitative estimation of serum cholesterol by Libermann Burchard's method.\*\*
  - 8 Preparation of Folin Wu filtrate from blood.\*
  - 9 Quantitative estimation of blood creatinine.\*\*
  - 10 Quantitative estimation of blood sugar Folin-Wu tube method.\*\*
  - 11 Estimation of SGOT in serum.\*\*
  - 12 Estimation of SGPT in serum.\*\*
  - 13 Estimation of Urea in Serum.\*\*
  - 14 Estimation of Proteins in Serum.\*\*
  - 15 Determination of serum bilirubin\*\*
  - 16 Determination of Glucose by means of Glucoseoxidase.\*\*
  - 17 Enzymatic hydrolysis of Glycogen/Starch by Amylases.\*\*
  - 18 Study of factors affecting Enzyme activity. (pH & Temp.)\*\*
  - 19 Preparation of standard buffer solutions and its pH measurements (any two)\*
  - 20 Experiment on lipid profile tests\*\*
  - 21 Determination of sodium, calcium and potassium in serum.\*\*
- \*\* indicate major experiments & \* indicate minor experiments

**Assignments:**

Format of the assignment


1. Minimum & Maximum number of pages.
2. It shall be computer draft copy.
3. Reference(s) shall be included at the end.
4. Name and signature of the student.
5. Assignment can be a combined presentation at the end of the academic year.
6. Time allocated for presentation may be 8+2 Min.

**Scheme of Practical Examination:**

	Sessionals	Annual
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
Max Marks	20	70
Duration	03hrs	04hrs

Note: Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dist - 531162



## 1.4 PHARMACEUTICAL ORGANIC CHEMISTRY (THEORY)

Theory : 3 Hrs. /Week

- 1. Scope and objectives:** This course is designed to impart a very good knowledge about
  - IUPAC/Common system of nomenclature of simple organic compounds belonging to different classes of organic compounds;
  - Some important physical properties of organic compounds;
  - Free radical/ nucleophilic [alkyl/ acyl/ aryl] /electrophilic substitution, free radical/ nucleophilic / electrophilic addition, elimination, oxidation and reduction reactions with mechanism, orientation of the reaction, order of reactivity, stability of compounds;
  - Some named organic reactions with mechanisms; and
  - Methods of preparation, test for purity, principle involved in the assay, important medicinal uses of some important organic compounds.

### 2. Course materials:

#### Text books

- T.R.Morrison and R. Boyd - Organic chemistry,
- Bentley and Driver-Text book of Pharmaceutical chemistry
- I.L.Finer- Organic chemistry, the fundamentals of chemistry

#### Reference books

- Organic chemistry – J.M.Cram and D.J.Cram
- Organic chemistry- Brown
- Advanced organic chemistry- Jerry March, Wiley
- Organic chemistry- Cram and Hammered, Pine Hendrickson

### 3. Lecture wise programme :

#### Topics

- Structures and Physical properties:
  - Polarity of bonds, polarity of molecules, M.P, Inter molecular forces, B.P, Solubility, non ionic solutes and ionic solutes, protic and aprotic Solvents, ion pairs,
  - Acids and bases, Lowry bronsted and Lewis theories
  - Isomerism
- Nomenclature of organic compound belonging to the following classes Alkanes, Alkenes, Dienes, Alkynes, Alcohols, Aldehydes, Ketones, Amides, Amines, Phenols, Alkyl Halides, Carboxylic Acid, Esters, Acid Chlorides And Cycloalkanes.
- Free radicals chain reactions of alkane : Mechanism, relative reactivity and stability
- Alicyclic compounds : Preparations of cyclo alkanes, Bayer strain theory and orbital picture of angle strain.
- Nucleophilic aliphatic substitution mechanism: Nucleophiles and leaving groups, kinetics of second and first order reaction, mechanism and kinetics of  $SN_2$  reactions. Stereochemistry and steric hindrance, role of solvents, phase transfer catalysis, mechanism and kinetics of  $SN_1$  reactions, stereochemistry, carbocation and their stability, rearrangement of carbocation, role of solvents in  $SN_1$  reaction, Ion dipole bonds,  $SN_2$  versus  $SN_1$  solvolyses, nucleophilic assistance by the solvents.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



- 6 Dehydro halogenation of alkyl halides: 1,2 elimination, kinetics, E2 and E1 mechanism, elimination via carbocation, evidence for E2 mechanism, absence of rearrangement isotope effect, absence hydrogen exchange, the element effect, orientation and reactivity, E2 versus E1, elimination versus substitution, dehydration of alcohol, ease of dehydration, acid catalysis, reversibility, orientation.
- 7 Electrophilic and free radicals addition: Reactions at carbon-carbon, double bond, electrophile, hydrogenation, heat of hydrogenation and stability of alkenes, markownikoff rule, addition of hydrogen halides, addition of hydrogen bromides, peroxide effect, electrophilic addition, mechanism, rearrangement, absence of hydrogen exchange, orientation and reactivity, addition of halogen, mechanism, halohydrin formation, mechanism of free radicals addition, mechanism of peroxide initiated addition of hydrogen bromide, orientation of free addition, additions of carbene to alkene, cyclo addition reactions.
- 8 Carbon-carbon double bond as substituents: Free radical halogenations of alkenes, comparison of free radical substitution with free radical addition, free radical substitution in alkenes, orientation and reactivity, allylic rearrangements.
- 9 Theory of resonance: Allyl radical as a resonance hybrid, stability, orbital picture, resonance stabilisation of allyl radicals, hyper conjugation, allyl cation as a resonance hybrid, nucleophilic substitution in allylic substrate, SN1 reactivity, allylic rearrangement, resonance stabilisation of allyl cation, hyper conjugation, nucleophilic substitution in allylic substrate, SN2 nucleophilic substitution in vinylic substrate, vinylic cation, stability of conjugated dienes, resonance in alkenes, hyper conjugation, ease of formation of conjugated dienes, orientation of elimination, electrophilic addition to conjugated dienes, 1,4- addition, 1,2-versus 1,4-addition, rate versus equilibrium, orientation and reactivity of free radical addition to conjugated dienes.
- 10 Electrophilic aromatic substitution: Effect of substituent groups, determination of orientation, determination of relative reactivity, classification of substituent group, mechanism of nitration, sulphonation, halogenation, friedel craft alkylation, friedel craft acylation, reactivity and orientation, activating and deactivating O,P,M directing groups, electron release via resonance, effect of halogen on electrophilic aromatic substitution in alkyl benzene, side chain halogenation of alkyl benzene, resonance stabilization of benzyl radical.
- 11 Nucleophilic addition reaction: Mechanism, ionisation of carboxylic acids, acidity constants, acidity of acids, structure of carboxylate ions, effect of substituent on acidity, nucleophilic acyl substitution reaction, conversion of acid to acid chloride, esters, amide and anhydride. Role of carboxyl group, comparison of alkyl nucleophilic substitution with acyl nucleophilic substitution.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



- 12 Mechanism of aldol condensation, claisen condensation, cannizzaro reaction, crossed aldol condensation, crossed cannizzaro reaction, benzoin condensation, perkin condensation. Knoevenagel, Reformatsky reaction, Wittig reaction, Michael addition.
- 13 Hoffman rearrangement: Migration to electron deficient nitrogen, Sandmeyer's reaction, basicity of amines, diazotisation and coupling, acidity of phenols, Williamson synthesis, Fries rearrangement, Kolbe reaction, Reimer tieman's reactions.
- 14 Nucleophilic aromatic substitution: Bimolecular displacement mechanisms, orientation, comparison of aliphatic nucleophilic substitution with that of aromatic.
- 15 Oxidation reduction reaction.
- 16 Study of the following official compounds- preparation, test for purity, assay and medicinal uses of Chlorbutol, Dimercaprol, Glyceryl trinitrate, Urea, Ethylene diamine dihydrate, Vanillin, Paraldehyde, Ethylene chloride, Lactic acid, Tartaric acid, citric acid, salicylic acid, aspirin, methyl salicylate, ethyl benzoate, benzyl benzoate, dimethyl phthalate, sodium lauryl sulphate, saccharin sodium, mephensin.

#### 1.4 PHARMACEUTICAL ORGANIC CHEMISTRY (PRACTICAL)

**Practical : 3 Hrs./Week**

**I. Introduction to the various laboratory techniques through demonstration involving synthesis of the following compounds (at least 8 compounds to be synthesised):**

1. Acetanilide / aspirin (Acetylation)
2. Benzanilide / Phenyl benzoate (Benzoylation)
3. P-bromo acetanilide / 2,4,6 – tribromo aniline (Bromination)
4. Dibenzylidene acetone (Condensation)
5. 1-Phenylazo-2-naphthol (Diazotisation and coupling)
6. Benzoic acid / salicylic acid (Hydrolysis of ester)
7. M-dinitro benzene (Nitration)
8. 9, 10 – Anthraquinone (Oxidation of anthracene) / preparation of benzoic acid from toluene or benzaldehyde
9. M-phenylene diamine (Reduction of M-dinitrobenzene) / Aniline from nitrobenzene
10. Benzophenone oxime
11. Nitration of salicylic acid
12. Preparation of picric acid
13. Preparation of O-chlorobenzoic acid from O-chlorotoluene
14. Preparation of cyclohexanone from cyclohexanol



  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences:  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**II. Identification of organic compounds belonging to the following classes by :**

Systematic qualitative organic analysis including preparation of derivatives  
Phenols, amides, carbohydrates, amines, carboxylic acids, aldehyde and ketones,  
Alcohols, esters, hydrocarbons, anilides, nitrocompounds.

**III. Introduction to the use of stereo models:**

Methane, Ethane, Ethylene, Acetylene, Cis alkene, Trans alkene, inversion of configuration.

**Scheme of Practical Examination:**

	<b>Sessionals</b>	<b>Annual</b>
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
<b>Max Marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>03hrs</b>	<b>04hrs</b>

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## 1.5 PHARMACEUTICAL INORGANIC CHEMISTRY (THEORY)

**Theory : 2 Hrs. /Week**

1. **Scope and objectives:** This course mainly deals with fundamentals of Analytical chemistry and also the study of inorganic pharmaceuticals regarding their monographs and also the course deals with basic knowledge of analysis of various pharmaceuticals.
2. **Upon completion of the course student shall be able to:**
  - a. understand the principles and procedures of analysis of drugs and also regarding the application of inorganic pharmaceuticals;
  - b. know the analysis of the inorganic pharmaceuticals their applications; and
  - c. appreciate the importance of inorganic pharmaceuticals in preventing and curing the disease.

### 3. Course materials:

#### Text books

- a. A text book Inorganic medicinal chemistry by Surendra N. Pandeya
- b. A. H. Beckett and J. B. Stanlake's Practical Pharmaceutical chemistry Vol-I & Vol-II
- c. Inorganic Pharmaceutical Chemistry III-Edition P.Gundu Rao

#### Reference books

- a. Inorganic Pharmaceutical Chemistry by Anand & Chetwal
- b. Pharmaceutical Inorganic chemistry by Dr.B.G.Nagavi
- c. Analytical chemistry principles by John H. Kennedy
- d. I.P.1985 and 1996, Govt. of India, Ministry of health

### 4. Lecture wise programme:

#### Topics

- 1 Errors
- 2 Volumetric analysis
- 3 Acid-base titrations
- 4 Redox titrations
- 5 Non aqueous titrations
- 6 Precipitation titrations
- 7 Complexometric titrations
- 8 Theory of indicators
- 9 Gravimetry
- 10 Limit tests
- 11 Medicinal gases
- 12 Acidifiers
- 13 Antacids
- 14 Cathartics
- 15 Electrolyte replenishers



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

- 16 Essential Trace elements
- 17 Antimicrobials
- 18 Pharmaceutical aids
- 19 Dental Products
- 20 Miscellaneous compounds
- 21 Radio Pharmaceuticals

## 1.5 PHARMACEUTICAL INORGANIC CHEMISTRY (PRACTICAL)

**Practical : 3 Hrs./Week**

### 1. Limit test (6 exercises)

- a. Limit test for chlorides
- b. Limit test for sulphates
- c. Limit test for iron
- d. Limit test for heavy metals
- e. Limit test for arsenic
- f. Modified limit tests for chlorides and sulphates

### 2. Assays (10 exercises)

- a. Ammonium chloride- Acid-base titration
- b. Ferrous sulphate- Cerimetry
- c. Copper sulphate- Iodometry
- d. Calcium gluconate- Complexometry
- e. Hydrogen peroxide – Permanganometry
- f. Sodium benzoate – Nonaqueous titration
- g. Sodium chloride – Modified volhard's method
- h. Assay of KI –  $\text{KIO}_3$  titration
- i. Gravimetric estimation of barium as barium sulphate
- j. Sodium antimony gluconate or antimony potassium tartarate

### 3. Estimation of mixture (Any two exercises)

- a. Sodium hydroxide and sodium carbonate
- b. Boric acid and Borax
- c. Oxalic acid and sodium oxalate

### 4. Test for identity (Any three exercises)

- a. Sodium bicarbonate
- b. Barium sulphate
- c. Ferrous sulphate
- d. Potassium chloride



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**5. Test for purity (Any two exercises)**

- Swelling power in Bentonite
- Acid neutralising capacity in aluminium hydroxide gel
- Ammonium salts in potash alum
- Adsorption power heavy Kaolin
- Presence of Iodates in KI

**6. Preparations (Any two exercises)**

- Boric acids
- Potash alum
- Calcium lactate
- Magnesium sulphate

**Scheme of Practical Examination :**

	<b>Sessionals</b>	<b>Annual</b>
Synopsis	05	15
Major Experiment	10	25
Minor Experiment 1 & 2	03	15
Viva	02	15
<b>Max Marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>03hrs</b>	<b>04hrs</b>

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## 1.6 REMEDIAL MATHEMATICS/BIOLOGY (THEORY)

Theory : 3 Hrs. /Week

### REMEDIAL MATHEMATICS :

1. **Scope and objectives:** This is an introductory course in mathematics. This subjects deals with the introduction to matrices, determinants, trigonometry, analytical geometry, differential calculus, integral calculus, differential equations, laplace transform.
2. **Upon completion of the course the student shall be able to : –**
  - a. Know Trigonometry, Analytical geometry, Matrices, Determinant, Integration, Differential equation, Laplace transform and their applications;
  - b. solve the problems of different types by applying theory; and
  - c. appreciate the important applications of mathematics in pharmacy.

### 3. Course materials:

#### Text books

- a. Differential calculus By Shantinakaran
- b. Text book of Mathematics for second year pre-university by Prof.B.M.Sreenivas

#### Reference books

- a. Integral calculus By Shanthinarayan
- b. Engineering mathematics By B.S.Grewal
- c. Trigonometry Part-I By S.L.Loney

### 4. Lecture wise programme :

#### Topics

- 1 **Algebra :** Determinants, Matrices
- 2 **Trigonometry :** Sides and angles of a triangle, solution of triangles
- 3 **Analytical Geometry :** Points, Straight line, circle, parabola
- 4 **Differential calculus:** Limit of a function, Differential calculus, Differentiation of a sum, Product, Quotient Composite, Parametric, exponential, trigonometric and Logarithmic function. Successive differentiation, Leibnitz's theorem, Partial differentiation, Euler's theorem on homogeneous functions of two variables
- 5 **Integral Calculus:** Definite integrals, integration by substitution and by parts, Properties of definite integrals.
- 6 **Differential equations:** Definition, order, degree, variable separable, homogeneous, Linear, heterogeneous, linear, differential equation with constant coefficient, simultaneous linear equation of second order.
- 7 **Laplace transform:** Definition, Laplace transform of elementary functions, Properties of linearity and shifting.



**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## BIOLOGY :

1. **Scope and objectives:** This is an introductory course in Biology, which gives detailed study of natural sources such as plant and animal origin. This subject has been introduced to the pharmacy course in order to make the student aware of various naturally occurring drugs and its history, sources, classification, distribution and the characters of the plants and animals. This subject gives basic foundation to Pharmacognosy.

2. **Course materials:**

**Text books**

- a. Text book of Biology by S.B.Gokhale
- b. A Text book of Biology by Dr.Thulajappa and Dr. Seetaram.

**Reference books**

- a. A Text book of Biology by B.V.Sreenivasa Naidu
- b. A Text book of Biology by Naidu and Murthy
- c. Botany for Degree students By A.C.Dutta.
- d. Outlines of Zoology by M.Ekambaranatha ayyer and T.N.Ananthakrishnan.
- e. A manual for pharmaceutical biology practical by S.B.Gokhale and C.K.Kokate.

3. **Lecture wise programme :**

**Topic**

**PART – A**

- 01 Introduction
- 02 General organization of plants and its inclusions
- 03 Plant tissues
- 04 Plant kingdom and its classification
- 05 Morphology of plants
- 06 Root, Stem, Leaf and Its modifications
- 07 Inflorescence and Pollination of flowers
- 08 Morphology of fruits and seeds
- 09 Plant physiology
- 10 Taxonomy of Leguminosae, umbelliferae, Solanaceae, Lilliacae, Zinziberaceae, Rubiaceae
- 11 Study of Fungi, Yeast, Penicillin and Bacteria

**PART-B**

- 01 Study of Animal cell
- 02 Study animal tissues
- 03 Detailed study of frog
- 04 Study of Pisces, Raptiles, Aves
- 05 General organization of mammals
- 06 Study of poisonous animals



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## 1.6 BIOLOGY (PRACTICAL)

**Practical : 3 Hrs./Week**

**Title:**

1. Introduction of biology experiments
2. Study of cell wall constituents and cell inclusions
3. Study of Stem modifications
4. Study of Root modifications
5. Study of Leaf modifications
6. Identification of Fruits and seeds
7. Preparation of Permanent slides
8. T.S. of Senna, Cassia, Ephedra, Podophyllum.
9. Simple plant physiological experiments
10. Identification of animals
11. Detailed study of Frog
12. Computer based tutorials

**Scheme of Practical Examination :**

	<b>Sessionals</b>	<b>Annual</b>
Identification	04	10
Synopsis	04	10
Major Experiment	07	20
Minor Experiment	03	15
Viva	02	15
<b>Max Marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>03hrs</b>	<b>04hrs</b>

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance.



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## Second year

### 2.1 PATHOPHYSIOLOGY (THEORY)

**Theory : 3 Hrs. /Week**

1. **Scope of the Subject:** This course is designed to impart a thorough knowledge of the relevant aspects of pathology of various conditions with reference to its pharmacological applications, and understanding of basic Pathophysiological mechanisms. Hence it will not only help to study the syllabus of pathology, but also to get baseline knowledge of its application in other subject of pharmacy.
2. **Objectives of the Subject :** Upon completion of the subject student shall be able to –
  - a. describe the etiology and pathogenesis of the selected disease states;
  - b. name the signs and symptoms of the diseases; and
  - c. mention the complications of the diseases.

#### **Text books (Theory)**

- a. Pathologic basis of disease by- Cotran, Kumar, Robbins
- b. Text book of Pathology- Harsh Mohan
- c. Text book of Pathology- Y.M. Bhide

#### **Reference books (Theory)**

- a. Clinical Pharmacy and Therapeutics; Second edition; Roger Walker; Churchill Livingstone publication

### 3. Detailed syllabus and lecture wise schedule :

#### **Chapter**

- 1 **Basic principles of cell injury and Adaptation**
  - a) Causes, Pathogenesis and morphology of cell injury
  - b) Abnormalities in lipoproteinaemia, glycogen infiltration and glycogen infiltration and glycogen infiltration and glycogen storage diseases
- 2 **Inflammation**
  - a) Pathogenesis of acute inflammation, Chemical mediators in inflammation, Types of chronic inflammation
  - b) Repairs of wounds in the skin, factors influencing healing of wounds
- 3 **Diseases of Immunity**
  - a) Introduction to T and B cells
  - b) MHC proteins or transplantation antigens
  - c) Immune tolerance
    - Hypersensitivity  
Hypersensitivity type I, II, III, IV, Biological significance, Allergy due to food, chemicals and drugs
    - Autoimmunity  
Criteria for autoimmunity, Classifications of autoimmune diseases in man, mechanism of autoimmunity, Transplantation and immunologic tolerance, allograft rejections, transplantation antigens, mechanism of rejection of allograft.
    - Acquired immune deficiency syndrome (AIDS)



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt - 531162

- Amylodosis

- 4 **Cancer:** differences between benign and malignant tumors, Histological diagnosis of malignancy, invasions and metastasis, patterns of spread, disturbances of growth of cells, classification of tumors, general biology of tumors, spread of malignant tumors, etiology and pathogenesis of cancer.
- 5 Types of shock, mechanisms, stages and management
- 6 Biological effects of radiation
- 7 Environmental and nutritional diseases
  - i) Air pollution and smoking- SO<sub>2</sub>, NO, NO<sub>2</sub>, and CO
  - ii) Protein calorie malnutrition, vitamins, obesity, pathogenesis of starvation.
- 8 Pathophysiology of common diseases
  - a. Parkinsonism
  - b. Schizophrenia
  - c. Depression and mania
  - d. Hypertension,
  - e. Stroke (ischaemic and hemorrhage)
  - f. Angina, CCF, Atherosclerosis, Myocardial infarction
  - g. Diabetes Mellitus
  - h. Peptic ulcer and inflammatory bowel diseases
  - i. Cirrhosis and Alcoholic liver diseases
  - j. Acute and chronic renal failure
  - k. Asthma and chronic obstructive airway diseases
- 9 Infectious diseases :  
Sexually transmitted diseases (HIV, Syphilis, Gonorrhea), Urinary tract infections, Pneumonia, Typhoid, Tuberculosis, Leprosy, Malaria Dysentery (bacterial and amoebic ), Hepatitis- infective hepatitis.

#### 4. Assignments :

##### Title of the Experiment

- 1 Chemical Mediators of inflammation
- 2 Drug Hypersensitivity
- 3 Cigarette smoking & its ill effects
- 4 Biological Effects of Radiation
- 5 Etiology and hazards of obesity
- 6 Complications of diabetes
- 7 Diagnosis of cancer
- 8 Disorders of vitamins
- 9 Methods in Pathology-Laboratory values of clinical significance
- 10 Pathophysiology of Dengue Hemorrhagic Fever (DHF)

##### Format of the assignment

- 1 Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year
4. It shall be computer draft copy.
5. Name and signature of the student
6. Time allocated for presentation may be 8-12 Min.



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



## 2.2 PHARMACEUTICAL MICROBIOLOGY (THEORY)

**Theory : 3 Hrs. /Week**

- 1. Scope of the Subject:** Microbiology has always been an essential component of pharmacy curriculum. This is because of the relevance of microbiology to pharmaceutical sciences and more specifically to pharmaceutical industry. Pharmaceutical biotechnology is the logical extension of pharmaceutical microbiology, which is expected to change the complete drug product scenario in the future.

This course deals with the various aspects of microorganisms, its classification, morphology, laboratory cultivation identification and maintenance. Its also discusses with sterilization of pharmaceutical products, equipment, media etc. The course further discusses the immunological preparations, diseases its transmission, diagnosis, control and immunological tests.

### 2. Objectives of the Subject :

Upon completion of the subject student shall be able to –

- a. know the anatomy, identification, growth factors and sterilization of microorganisms;
- b. know the mode of transmission of disease causing microorganism, symptoms of disease, and treatment aspect;
- c. do estimation of RNA and DNA and there by identifying the source;
- d. do cultivation and identification of the microorganisms in the laboratory;
- e. do identification of diseases by performing the diagnostic tests; and
- f. appreciate the behavior of motility and behavioral characteristics of microorganisms.

### Text books (Theory)

- a. Vanitha Kale and Kishor Bhusari “ Applied Microbiology ” Himalaya Publishing house Mumbai.
- b. Mary Louis Turgeon “ Immunology and Serology in Laboratory Medicines” 2<sup>nd</sup> edition, 1996 Mosby- Year book inc St. Louis Missouri 63146.
- c. Harsh Mohan, “ Text book of Pathology” 3<sup>rd</sup> edition, 1998, B-3 Ansari road Darya ganj N. Delhi.

### Reference books (Theory)

- a. Prescott L.M., Jarley G.P Klein D.A “Microbiology” 2<sup>nd</sup>- edition Mc Graw Hill Company Inc
- b. Rawlins E.A.”Bentley’s Text Book of Pharmaceutics” B ailliere Tindals 24-28 London 1988
- c. Forbisher “ Fundamentals of Microbiology” Philidelphia W.B. Saunders.
- d. Prescott L.M. Jarley G.P., Klein.D.A. “ Microbiology.”2<sup>nd</sup> edition WMC Brown Publishers, Oxford. 1993
- e. War Roitt, Jonathan Brostoff, David male, “ Immunology”3<sup>rd</sup> edition 1996, Mosby-year book Europe Ltd, London.
- f. Pharmacopoeia of India, Govt of India, 1996.



  
**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

### 3. Detailed syllabus and lecture wise schedule :

#### Title of the topic

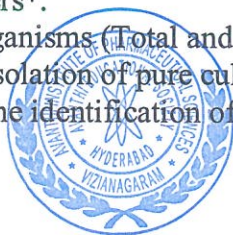
- 1 Introduction to the science of microbiology. Major divisions of microbial world and Relationship among them.
- 2 Different methods of classification of microbes and study of Bacteria, Fungi, virus, Rickettsiae, Spirochetes.
- 3 Nutritional requirements, growth and cultivation of bacteria and virus. Study of different important media required for the growth of aerobic and anaerobic bacteria & fungi. Differential media, enriched media and selective media, maintenance of lab cultures.
- 4 Different methods used in isolation and identification of bacteria with emphasis to different staining techniques and biochemical reactions. Counting of bacteria -Total and Viable counting techniques.
- 5 Detailed study of different methods of sterilization including their merits and demerits. Sterilization methods for all pharmaceutical products. Detailed study of sterility testing of different pharmaceutical preparations . Brief information on Validation.
- 6 Disinfectants- Study of disinfectants, antiseptics, fungicidal and virucidal agents factors affecting their activation and mechanism of action. Evaluation of bactericidal, bacteristatic, , virucidal activities, evaluation of preservatives in pharmaceutical preparations.
- 7 Immunology- Immunity, Definition, Classification, General principles of natural immunity, Phagocytosis, acquired immunity( active and passive ) . Antigens, chemical nature of antigens structure and formation of Antibodies, Antigen-Antibody reactions. Bacterial exotoxins and endotoxins. Significance of toxoids in active immunity, Immunization programme, and importance of booster dose.
- 8 Diagnostic tests : Schick's Test, Elisa test, Western Blot test, Southern Blot PCR Widal, QBC, Mantoux Peripheral smear. Study of malarial parasite.
- 9 Microbial culture sensitivity Testing: Interpretation of results Principles and methods of different microbiological assays, microbiological assay of Penicillin, Streptomycin and vitamin B<sub>2</sub> and B<sub>12</sub>. Standardisation of vaccines and sera.
- 10 Study of infectious diseases: Typhoid, Tuberculosis, Malaria, Cholera, Hepatitis, Meningitis, Syphilis & Gonorrhea and HIV.

## 2.2 PHARMACEUTICAL MICROBIOLOGY (PRACTICAL)

**Practical : 3 Hrs./Week**

#### Title of the Experiment:

- 1 Study of apparatus used in experimental microbiology\*.
- 2 Sterilisation of glass ware's. Preparation of media and sterilisation.\*
- 3 Staining techniques – Simple staining ; Gram's staining ; Negative staining\*\*
- 4 Study of motility characters\*.
- 5 Enumeration of micro-organisms (Total and Viable)\*
- 6 Study of the methods of isolation of pure culture.\*
- 7 Bio chemical testing for the identification of micro\*-organisms.



**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences:  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



- 8 Cultural sensitivity testing for some micro-organisms.\*
- 9 Sterility testing for powders and liquids.\*
- 10 Determination of minimum inhibitory concentration.\*
- 11 Microbiological assay of antibiotics by cup plate method.\*
- 12 Microbiological assay of vitamins by Turbidometric method\*\*
- 13 Determination of RWC.\*\*
- 14 Diagnostic tests for some common diseases, Widal, malarial parasite.\*\*

\* Indicate minor experiment & \*\* indicate major experiment

#### Assignments:

- 1 Visit to some pathological laboratories & study the activities and equipment/instruments used and reporting the same.
2. Visit to milk dairies (Pasturization) and microbial laboratories (other sterilization methods) & study the activities and equipment/instruments used and reporting the same.
3. Library assignments
  - a. Report of recent microbial techniques developed in diagnosing some common diseases.
  - b. Latest advancement developed in identifying, cultivating & handling of microorganisms.

#### Format of the assignment:

1. Minimum & Maximum number of pages.
2. It shall be computer draft copy.
3. Reference(s) shall be included at the end.
4. Name and signature of the student.
5. Assignment can be a combined presentation at the end of the academic year.
6. Time allocated for presentation may be 8+2 Min.

#### Scheme of Practical Examination:

	Sessionals	Annual
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
<b>Max Marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>03hrs</b>	<b>04hrs</b>

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

## 2.3 PHARMACOGNOSY & PHYTOPHARMACEUTICALS (THEORY)

**Theory : 3 Hrs. /Week**

1. **Scope and objectives:** This subject has been introduced for the pharmacy course in order to make the student aware of medicinal uses of various naturally occurring drugs its history, sources, distribution, method of cultivation, active constituents, medicinal uses, identification tests, preservation methods, substitutes and adulterants.
2. **Upon completion of the course student shall be able to:**
  - a. under stand the basic principles of cultivation, collection and storage of crude drugs;
  - b. know the source, active constituents and uses of crude drugs; and
  - c. appreciate the applications of primary and secondary metabolites of the plant.

### 3. Course materials:

#### Text books

- a. Pharmacognosy by G.E. Trease & W.C.Evans.
- b. Pharmacognosy by C.K.Kokate,Gokhale & A.C.Purohit.

#### Reference books

- a. Pharmacognosy by Brady &Tyler.E.
- b. Pharmacognosy by T.E.Wallis.
- c. Pharmacognosy by C.S. Shah & Qadery.
- d. Pharmacognosy by M.A. Iyengar.

### 4. Lecture wise programme:

#### Topics

- 1 Introduction.
- 2 Definition, history and scope of Pharmacognosy.
- 3 Classification of crude drugs.
- 4 Cultivation, collection, processing and storage of crude drugs.
- 5 Detailed method of cultivation of crude drugs.
- 6 Study of cell wall constituents and cell inclusions.
- 7 Microscopical and powder Microscopical study of crude drugs.
- 8 Study of natural pesticides.
- 9 Detailed study of various cell constituents.
- 10 Carbohydrates and related products.
- 11 Detailed study carbohydrates containing drugs.(11 drugs)
- 12 Definition sources, method extraction, chemistry and method of analysis of lipids.
- 13 Detailed study of oils.
- 14 Definition, classification, chemistry and method of analysis of protein.
- 15 Study of plants fibers used in surgical dressings and related products.
- 16 Different methods of adulteration of crude drugs.



*for*  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## 2.3 PHARMACOGNOSY & PHYTOPHARMACEUTICALS (PRACTICAL)

**Practical : 3 Hrs./Week**

**General Requirements:** Laboratory Napkin, Observation Book 150 pages Zero brush, Needle, Blade, Match box.

**List of experiments:**

- 1 Introduction of Pharmacognosy laboratory and experiments.
- 2 Study of cell wall constituents and cell inclusions.
- 3 Macro, powder and microscopic study of Datura.
- 4 Macro, powder and microscopic study of Senna.
- 5 Macro, powder and microscopic study of Cassia.cinnamon.
- 6 Macro, powder and microscopic study of Cinchona.
- 7 Macro, powder and microscopic study of Ephedra.
- 8 Macro, powder and microscopic study of Quassia.
- 9 Macro, powder and microscopic study of Clove
- 10 Macro, powder and microscopic study of Fennel.
- 11 Macro, powder and microscopic study of Coriander.
- 12 Macro, powder and microscopic study of Isapgol.
- 13 Macro, powder and microscopic study of Nux vomica.
- 14 Macro, powder and microscopic study of Rauwolfia.
- 15 Macro, powder and microscopic study of Liquorice.
- 16 Macro, powder and microscopic study of Ginger.
- 17 Macro, powder and microscopic study of Podophyllum.
- 18 Determination of Iodine value.
- 19 Determination of Saponification value and unsaponifiable matter.
- 20 Determination of ester value.
- 21 Determination of Acid value.
- 22 Chemical tests for Acacia.
- 23 Chemical tests for Tragacanth.
- 24 Chemical tests for Agar.
- 25 Chemical tests for Starch.
- 26 Chemical tests for Lipids.(castor oil,sesame oil, shark liver oil,bees wax)
- 27 Chemical tests for Gelatin.

**Scheme of Practical Examination:**

	<b>Sessionals</b>	<b>Annual</b>
Identification	04	10
Synopsis	04	10
Major Experiment	07	20
Minor Experiment	03	15
Viva	02	15
<b>Max Marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>03hrs</b>	<b>04hrs</b>

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance.



  
**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## 2.4 PHARMACOLOGY – I (THEORY)

**Theory : 3 Hrs. /Week**

1. **Scope of the Subject:** This subject will provide an opportunity for the student to learn about the drug with regard to classification, pharmacodynamic and pharmacokinetic aspects, adverse effects, uses, dose, route of administration, precautions, contraindications and interaction with other drugs. In this subject, apart from general pharmacology, drugs acting on autonomic nervous system, cardiovascular system, central nervous system, blood and blood forming agents and renal system will be taught. In addition to theoretical knowledge, the basic practical knowledge relevant to therapeutics will be imparted.
2. **Objectives of the Subject :** Upon completion of the subject student shall be able to (Know, do, appreciate) –
  - a. understand the pharmacological aspects of drugs falling under the above mentioned chapters;
  - b. handle and carry out the animal experiments;
  - c. appreciate the importance of pharmacology subject as a basis of therapeutics; and
  - d. correlate and apply the knowledge therapeutically.

**Text books (Theory)** (Author, Title, Edition, Publication Place, Publisher, Year of Publication)

- a. Tripathi, K. D. Essentials of medical pharmacology. 4<sup>th</sup> Ed, 1999. Publisher: Jaypee, Delhi.
- b. Satoskar, R.S. and Bhadarkar, S.D. Pharmacology and pharmacotherapeutics. 16<sup>th</sup> edition (single volume), 1999. Publisher: Popular, Dubai.
- c. Rang, H.P. & Dale, M.M. Pharmacology. 4<sup>th</sup> edition, 1999. Publisher: Churchill Living stone.

**Reference books (Theory)**(Author, Title, Edition, Publication Place, Publisher, Publication Year)

- a. Goodman Gilman, A., Rall, T.W., Nies, A.I.S. and Taylor, P. Goodman and Gilman's The pharmacological Basis of therapeutics. 9<sup>th</sup> Ed, 1996. Publisher Mc Graw Hill, Pergamon press.
- b. Craig, C.R.&Stitzel, R.E. Modern Pharmacology. Latest edition. Publisher: Little Brown.Co
- c. Katzung, B.G. Basic and clinical pharmacology. Latest edition. Publisher: Prentice Hall, Int.
- d. Shargel and Leon. Applied Biopharmaceutics and pharmacokinetics. Latest edition. Publisher: Prentice Hall, London.


**Text books (Practical) :**

Kulkarni, S. K. and Dandia, P. C. Hand book of experimental pharmacology. Latest edition, Publisher: Vallab, Delhi.

**Reference books (Practical)**

- a. Macleod, L.J. Pharmacological experiments on intact preparations. Latest edition, Publisher: Churchill livingstone.



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt - 531162



- b. Macleod, L.J. Pharmacological experiments on isolated preparations. Latest edition, Publisher: Churchill livingstone.
- c. Ghosh, M.N. Fundamentals of experimental pharmacology. Latest edition, Publisher: Scientific book agency, Kolkata.
- d. Ian Kitchen. Textbook of in vitro practical pharmacology. Latest edition, Publisher: Black well Scientific.

### 3. Detailed syllabus and lecture wise schedule :

#### Title of the topic

#### 1. General Pharmacology

- a) Introduction, definitions and scope of pharmacology
- b) Routes of administration of drugs
- c) Pharmacokinetics (absorption, distribution, metabolism and excretion)
- d) Pharmacodynamics
- e) Factors modifying drug effects
- f) Drug toxicity - Acute, sub- acute and chronic toxicity.
- g) Pre-clinical evaluations
- h) Drug interactions

*Note:* The term Pharmacology used here refers to the classification, mechanism of action, pharmacokinetics, pharmacodynamics, adverse effects, contraindications, Therapeutic uses, interactions and dose and route of administration.

#### 2. Pharmacology of drugs acting on ANS

- a) Adrenergic and antiadrenergic drugs
- b) Cholinergic and anticholinergic drugs
- c) Neuromuscular blockers
- d) Mydriatics and miotics
- e) Drugs used in myasthenia gravis
- f) Drugs used in Parkinsonism

#### 3. Pharmacology of drugs acting on cardiovascular system

- a) Antihypertensives
- b) Anti-anginal drugs
- c) Anti-arrhythmic drugs
- d) Drugs used for therapy of Congestive Heart Failure
- e) Drugs used for hyperlipidaemias



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

4. **Pharmacology of drugs acting on Central Nervous System**
  - a) General anesthetics
  - b) Sedatives and hypnotics
  - c) Anticonvulsants
  - d) Analgesic and anti-inflammatory agents
  - e) *Psychotropic drugs*
  - f) Alcohol and methyl alcohol
  - g) CNS stimulants and cognition enhancers
  - h) Pharmacology of local anaesthetics
5. **Pharmacology of Drugs acting on Respiratory tract**
  - a) Bronchodilators
  - b) Mucolytics
  - c) Expectorants
  - d) Antitussives
  - e) Nasal Decongestants
6. **Pharmacology of Hormones and Hormone antagonists**
  - a) Thyroid and Antithyroid drugs
  - b) Insulin, Insulin analogues and oral hypoglycemic agents
  - c) Sex hormones and oral contraceptives
  - d) Oxytocin and other stimulants and relaxants
7. **Pharmacology of autocooids and their antagonists**
  - a) Histamines and Antihistaminics
  - b) 5-Hydroxytryptamine and its antagonists
  - c) Lipid derived autocooids and platelet activating factor



  
**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## 2.5 COMMUNITY PHARMACY (THEORY)

**Theory : 2 Hrs. /Week**

1. **Scope:** In the changing scenario of pharmacy practice in India, Community Pharmacists are expected to offer various pharmaceutical care services. In order to meet this demand, students will be learning various skills such as dispensing of drugs, responding to minor ailments by providing suitable safe medication, patient counselling, health screening services for improved patient care in the community set up.
2. **Objectives:** Upon completion of the course, the student shall be able to –
  - a. know pharmaceutical care services;
  - b. know the business and professional practice management skills in community pharmacies;
  - c. do patient counselling & provide health screening services to public in community pharmacy;
  - d. respond to minor ailments and provide appropriate medication;
  - e. show empathy and sympathy to patients; and
  - f. appreciate the concept of Rational drug therapy.

**Text Books:**

- a. Health Education and Community Pharmacy by N.S.Parmar.
- b. WHO consultative group report.
- c. Drug store & Business management by Mohammed Ali & Jyoti.

**Reference books:**

- a. Handbook of pharmacy – health care. Edt. Robin J Harman. The Pharmaceutical press.
- b. Comprehensive Pharmacy Review – Edt. Leon Shargel. Lippincott Williams & Wilkins.

**Special requirements:**

1. Either the college is having model community pharmacy (meeting the schedule N requirement) or sign MoU with at least 4-5 community pharmacies nearby to the college for training the students on dispensing and counselling activities.
2. Special equipments like B.P apparatus, Glucometer, Peak flow meter, and apparatus for cholesterol estimation.

**3. Scheme of evaluation (80 Marks)**

- |   |    |
|---|----|
| 1. Synopsis   | 10 |
| 2. Major Experiment<br>(Counselling of patients with specific diseases – emphasis should be given on Counselling introduction, content, process and conclusion) | 30 |
| 3. Minor Experiment(Ability to measure B.P/ CBG / Lung function)  | 15 |
| 4. Prescription Analysis (Analyzing the prescriptions for probable drug interaction and ability to tell the management)   | 15 |
| 5. Viva – Voce  | 10 |



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

#### 4. Lecture wise programme :

##### Topics

- 1 Definition, scope, of community pharmacy**  
**Roles and responsibilities of Community pharmacist**
- 2 Community Pharmacy Management**
  - a) Selection of site, Space layout, and design
  - b) Staff, Materials- coding, stocking
  - c) Legal requirements
  - d) Maintenance of various registers
  - e) Use of Computers: Business and health care soft wares
- 3 Prescriptions** – parts of prescription, legality & identification of medication related problems like drug interactions.
- 4 Inventory control in community pharmacy**  
Definition, various methods of Inventory Control  
**ABC, VED, EOQ, Lead time, safety stock**
- 5 Pharmaceutical care**  
Definition and Principles of Pharmaceutical care.
- 6 Patient counselling**  
Definition, outcomes, various stages, barriers, Strategies to overcome barriers  
Patient information leaflets- content, design, & layouts, advisory labels
- 7 Patient medication adherence**  
Definition, Factors affecting medication adherence, role of pharmacist in improving the adherence.
- 8 Health screening services**  
Definition, importance, methods for screening  
Blood pressure/ blood sugar/ lung function  
and Cholesterol testing
- 9 OTC Medication- Definition, OTC medication list & Counselling**
- 10 Health Education**  
WHO Definition of health, and health promotion, care for children, pregnant & breast feeding women, and geriatric patients.  
Commonly occurring Communicable Diseases, causative agents,  
Clinical presentations and prevention of communicable diseases – Tuberculosis, Hepatitis, Typhoid, Amoebiasis, Malaria, Leprosy, Syphilis, Gonorrhea and AIDS  
Balance diet, and treatment & prevention of deficiency disorders  
Family planning – role of pharmacist
- 11 Responding to symptoms of minor ailments**  
Relevant pathophysiology, common drug therapy to,  
Pain, GI disturbances (Nausea, Vomiting, Dyspepsia, diarrhea, constipation), Pyrexia, Ophthalmic symptoms, worms infestations.
- 12 Essential Drugs concept and Rational Drug Therapy**  
**Role of community pharmacist**
- 13 Code of ethics for community pharmacists**



  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## 2.6 PHARMACOTHERAPEUTICS - I (THEORY)

**Theory : 3 Hrs. /Week**

1. **Scope of the Subject:** This course is designed to impart knowledge and skills necessary for contribution to quality use of medicines. Chapters dealt cover briefly pathophysiology and mostly therapeutics of various diseases. This will enable the student to understand the pathophysiology of common diseases and their management.
2. **Objectives:** At completion of this subject it is expected that students will be able to understand –
  - a. the pathophysiology of selected disease states and the rationale for drug therapy;
  - b. the therapeutic approach to management of these diseases;
  - c. the controversies in drug therapy;
  - d. the importance of preparation of individualised therapeutic plans based on diagnosis;
  - e. needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects);
  - f. describe the pathophysiology of selected disease states and explain the rationale for drug therapy;
  - g. summarise the therapeutic approach to management of these diseases including reference to the latest available evidence;
  - h. discuss the controversies in drug therapy;
  - i. discuss the preparation of individualised therapeutic plans based on diagnosis; and
  - j. identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).


### Text Books

- a. Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone publication.
- b. Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton & Lange.

### Reference Books

- a. Pathologic basis of disease - Robins SL, W.B.Saunders publication.
- b. Pathology and therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice - Green and Harris, Chapman and Hall publication.
- c. Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication.
- d. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA
- e. Avery's Drug Treatment, 4th Edn, 1997, Adis International Limited.
- f. Relevant review articles from recent medical and pharmaceutical literature.



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

### 3. Detailed syllabus and lecture wise schedule :

**Etiopathogenesis and pharmacotherapy of diseases associated with following systems/ diseases**

**Title of the topic**

- 1 **Cardiovascular system:** Hypertension, Congestive cardiac failure, Angina Pectoris, Myocardial infarction, , Hyperlipidaemias , Electrophysiology of heart and Arrhythmias
- 2 **Respiratory system :** Introduction to Pulmonary function test, Asthma, Chronic obstructive airways disease, Drug induced pulmonary diseases  
**Endocrine system :** Diabetes, Thyroid diseases, Oral contraceptives, Hormone replacement therapy, Osteoporosis
- 3 **General prescribing guidelines for**
  - a. Paediatric patients
  - b. Geriatric patients
  - c. Pregnancy and breast feeding
- 4 **Ophthalmology:** Glaucoma, Conjunctivitis- viral & bacterial
- 5 **Introduction to rational drug use**  
Definition, Role of pharmacist Essential drug concept Rational drug formulations

## 2.6 PHARMACOTHERAPEUTICS - I (PRACTICAL)

**Practical : 3 Hrs./Week**

**Practicals :**

Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion; attending ward rounds; follow up the progress and changes made in drug therapy in allotted patients; case presentation upon discharge. Students are required to maintain a record of cases presented and the same should be submitted at the end of the course for evaluation. A minimum of 20 cases should be presented and recorded covering most common diseases.

**Assignments :**

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 – 2000 words] should be submitted for evaluation.



  
**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**Format of the assignment:**


1. Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year.
4. It shall be computer draft copy.
5. Name and signature of the student.
6. Time allocated for presentation may be 8+2 Min.

**Scheme of Practical Examination:**

	<b>Sessionals</b>	<b>Annual</b>
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
<b>Max Marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>03hrs</b>	<b>04hrs</b>

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

## Third Year

### 3.1 PHARMACOLOGY – II (THEORY)

**Theory : 3 Hrs. /Week**

1. **Scope of the Subject:** This subject will provide an opportunity for the student to learn about the drug with regard to classification, pharmacodynamic and pharmacokinetic aspects, adverse effects, uses, dose, route of administration, precautions, contraindications and interaction with other drugs. In this subject, drugs acting on autacoids, respiratory system, GIT, immune system and hormones, and pharmacology of autacoids and hormones will be concentrated. In addition, pharmacology of chemotherapeutic agents, vitamins, essential minerals and principles of toxicology are also taught. In addition to theoretical knowledge, the basic practical knowledge relevant to therapeutics will be imparted.
2. **Objectives of the Subject Upon completion of the subject student shall be able to:**
  - a. understand the pharmacological aspects of drugs falling under the above mentioned chapters,
  - b. carry out the animal experiments confidently,
  - c. appreciate the importance of pharmacology subject as a basis of therapeutics, and
  - d. correlate and apply the knowledge therapeutically.

#### **Text books (Theory)**

- a. Tripathi, K. D. Essentials of medical pharmacology. 4<sup>th</sup> edition, 1999. Publisher: Jaypee, Delhi.
- b. Satoskar, R.S. and Bhadarkar, S.D. Pharmacology and pharmacotherapeutics. 16<sup>th</sup> edition (single volume), 1999. Publisher: Popular, Dubai.
- c. Rang, H.P. and Dale, M.M. Pharmacology. 4<sup>th</sup> edition, 1999. Publisher: Churchill Living stone.

#### **Reference books (Theory)**

- a. Goodman Gilman, A., Rall, T.W., Nies, A.I.S. and Taylor, P. Goodman and Gilman's The pharmacological Basis of therapeutics. 9<sup>th</sup> edition, 1996. Publisher: Mc Graw Hill, Pergamon press.
- b. Craig, C.R. and Stitzel, R.E. Modern Pharmacology. Latest edition. Publisher: Little Brown and company.
- c. Katzung, B.G. Basic and clinical pharmacology. Latest edition. Publisher: Prentice Hall, International.
- d. Gupta, P.K. and Salunkhe, D.K. Modern Toxicology. Volume I, II and III. Latest edition. Publisher: B.V. Gupta, Metropolitan Book Co. (p) Ltd, New Delhi.

#### **Text books (Practical)**

Kulkarni, S. K. and Dandia, P. C. Hand book of experimental pharmacology. Latest edition, Publisher: Vallab, Delhi.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**Reference books (Practical) :**

- a. Macleod, L.J. Pharmacological experiments on intact preparations. Latest edition, Publisher: Churchill livingstone.
- b. Macleod, L.J. Pharmacological experiments on isolated preparations. Latest edition, Publisher: Churchill livingstone.
- c. Ghosh, M.N. Fundamentals of experimental pharmacology. Latest edition, Publisher: Scientific book agency, Kolkata.
- d. Ian Kitchen. Textbook of in vitro practical pharmacology. Latest edition, Publisher: Black well Scientific.

**3. Detailed syllabus and lecture wise schedule:****Title of the topic**

1. **Pharmacology of Drugs acting on Blood and blood forming agents**
  - a) Anticoagulants
  - b) Thrombolytics and antiplatelet agents
  - c) Haemopoietics and plasma expanders
2. **Pharmacology of drugs acting on Renal System**
  - a) Diuretics
  - b) Antidiuretics
3. **Chemotherapy**
  - a) Introduction
  - b) Sulfonamides and co-trimoxazole
  - c) Penicillins and Cephalosporins
  - d) Tetracyclins and Chloramphenicol
  - e) Macrolides, Aminoglycosides, Polyene & Polypeptide antibiotics
  - f) Quinolines and Fluroquinolines
  - g) Antifungal antibiotics
  - h) Antiviral agents
  - i) Chemotherapy of tuberculosis and leprosy
  - j) Chemotherapy of Malaria
  - k) Chemotherapy of protozoal infections (amoebiasis, Giardiasis)
  - l) Pharmacology of Anthelmintic drugs
  - m) Chemotherapy of cancer (Neoplasms)
4. **Immunopharmacology**  
Pharmacology of immunosuppressants and stimulants
5. **Principles of Animal toxicology**  
Acute, sub acute and chronic toxicity



  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

6. **The dynamic cell: The structures and functions of the components of the cell**

- a) Cell and macromolecules: Cellular classification, subcellular organelles, macromolecules, large macromolecular assemblies
- b) Chromosome structure: Pro and eukaryotic chromosome structures, chromatin structure, genome complexity, the flow of genetic information.
- c) DNA replication: General, bacterial and eukaryotic DNA replication.
- d) The cell cycle: Restriction point, cell cycle regulators and modifiers.
- e) Cell signaling: Communication between cells and their environment, ion-channels, signal transduction pathways (MAP kinase, P38 kinase, JNK, Ras and PI3-kinase pathways, biosensors.

**The Gene: Genome structure and function:**

- a) Gene structure: Organization and elucidation of genetic code.
- b) Gene expression: Expression systems (pro and eukaryotic), genetic elements that control gene expression (nucleosomes, histones, acetylation, HDACS, DNA binding protein families.
- c) Transcription and Transcription factors: Basic principles of transcription in pro and eukaryotes. Transcription factors that regulate transcription in pro and eukaryotes.

RNA processing: rRNA, tRNA and mRNA processing.

Protein synthesis: Mechanisms of protein synthesis, initiation in eukaryotes, translation control and post-translation events

Altered gene functions: Mutations, deletions, amplifications, LOH, traslocations, trinucleotide repeats and other genetic abnormalities.

Oncogenes and tumor suppressor genes.

The gene sequencing, mapping and cloning of human disease genes.

Introduction to gene therapy and targeting.

Recombinant DNA technology: principles. Processes (gene transfer technology) and applications

**Books:**

- 1 Molecular Biology of the Cell by Alberts B., Bray, D., Lewis, J., Raff M., Roberts, K and Watson, JD, 3<sup>rd</sup> edition.
- 2 Molecular Cell Biology By Lodish, H., Baltimore, D., Berk, A et al., 5<sup>th</sup> edition.
- 3 Molecular Biology by Turner, PC., McLennan, AG., Bates, AD and White MRH 2<sup>nd</sup> edition.
- 4 Genes VIII by Lewin, B., (2004)
- 5 Pharmaceutical Biotechnology, by Crommelin, DJA and Sindelar RD (1997)
- 6 Recombinant DNA by Watson, JD., Gilman, M., et al., (1996)
- 7 Biopharmaceutical: Biochemistry and Biotechnology by Walsh, G., (1998)



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



### 3.1 PHARMACOLOGY – II (PRACTICAL)

**Practical : 3 Hrs./Week**

**List of Experiments:**


1. Study of laboratory animals and their handling (a. Frogs, b. Mice, c. Rats, d. Guinea pigs, e. Rabbits).
2. Study of physiological salt solutions used in experimental pharmacology.
3. Study of laboratory appliances used in experimental pharmacology.
4. Study of use of anesthetics in laboratory animals.
5. To record the dose response curve of Ach using isolated ileum/rectus abdominis muscle preparation.
6. To carry out bioassay of Ach using isolated ileum/rectus abdominis muscle preparation by interpolation method.
7. To carry out bioassay of Ach using isolated ileum/rectus abdominis muscle preparation by three point method.
8. To record the dose response curve of Histamine using isolated guinea-pig ileum preparation.
9. Study of agonistic and antagonistic effects of drugs using isolated guinea-pig ileum preparation.
10. To carry out bioassay of Histamine using isolated guinea-pig ileum preparation by interpolation method.
11. To carry out bioassay of Histamine using guinea-pig ileum preparation by three point method.
12. To study the routes of administration of drugs in animals (Rats, Mice, Rabbits).
13. Study of theory, principle, procedure involved and interpretation of given results for the following experiments:
  - a) Analgesic property of drug using analgesiometer.
  - b) Antiinflammatory effect of drugs using rat-paw edema method.
  - c) Anticonvulsant activity of drugs using maximal electroshock and pentylene tetrazole methods.
  - d) Antidepressant activity of drugs using pole climbing apparatus and pentobarbitone induced sleeping time methods.
  - e) Locomotor activity evaluation of drugs using actophotometer and rotorod.
  - f) Cardiotonic activity of drugs using isolated frog heart and mammalian heart preparations.

**Scheme of Practical Examination:**

	Sessionals	Annual
Identification	02	10
Synopsis	04	10
Major Experiment (Bioassay)	08	30
Minor Experiment (Interpretation of given Graph or simulated experiment)	04	10
Viva	02	10
<b>Max Marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>3hrs</b>	<b>4hrs</b>

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance)



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

### 3.2 PHARMACEUTICAL ANALYSIS (THEORY)

Theory : 3 Hrs. /Week

#### 1. Quality Assurance:

- a. Introduction, sources of quality variation, control of quality variation.
- b. Concept of statistical quality control.
- c. Validation methods- quality of equipment, validation of equipment and validation of analytical instruments and calibration.
- d. GLP, ISO 9000.
- e. Total quality management, quality review and documentation.
- f. ICH- international conference for harmonization-guidelines.
- g. Regulatory control.

#### 2. Chromatography:

Introduction, history, classification, separation techniques, choice of methods. The following techniques be discussed with relevant examples of pharmaceutical products involving principles and techniques of separation of drugs from excipients.

- a. **Column Chromatography:** Adsorption column chromatography, Operational technique, frontal analysis and elution analysis. Factors affecting column efficiency, applications and partition chromatography.
- b. **TLC:** Introduction, principle, techniques,  $R_f$  value and applications.
- c. **PC:** Introduction, principle, types of paper chromatography, preparation techniques, development techniques, applications.
- d. **Ion-exchange chromatography:** Introduction, principles, types of ion exchange synthetic resins, physical properties, factors affecting ion exchange, methodology and applications.
- e. **HPLC:** Introduction, theory, instrumentation, and applications.
- f. **HPTLC:** Introduction, theory, instrumentation, and applications.
- g. **Gas Chromatography:** Introduction, theory, instrumentation-carrier gases, types of columns, stationary phases in GLC & GSC. Detectors- Flame ionization detectors, electron capture detector, thermal conductivity detector. Typical gas chromatogram, derivatisation techniques, programmed temperature gas chromatography, applications.
- h. **Electrophoresis:** Principles of separation, equipment for paper and gel electrophoresis, and application.
- i. **Gel filtration and affinity chromatography:** Introduction, technique, applications.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



### 3. Electrometric Methods:

Theoretical aspects, instrumentation, interpretation of data/spectra and analytical applications be discussed on the following topics.

- a. **Potentiometry:** Electrical potential, electrochemical cell, reference electrodes, indicator electrodes, measurement of potential and pH, construction and working of electrodes, Potentiometric titrations, methods of detecting end point, Karl Fischer titration.
- b. **Conductometry:** Introduction, conductivity cell, conductometric titrations and applications.
- c. **Polarography:** Instrumentation, DME, residual current, diffusion current and limiting current, polarographic wave, Ilkovic's equation, Effect of oxygen on polarographic wave, Polarographic maxima and suppressors and applications.
- d. **Amperometric Titrations:** Introduction, types of electrodes used, reference and indicator electrode, instrumentation, titration procedure, advantages and disadvantages of Amperometry over potentiometry. Pharma applications.

### 4. Spectroscopy:

Theoretical aspects, instrumentation, elements of interpretation of data/spectra and application of analytical techniques be discussed on:


#### a. Absorption Spectroscopy:

- Theory of electronic, atomic and molecular spectra. Fundamental laws of photometry, Beer-Lambert's Law, application and its deviation, limitation of Beer law, application of the law to single and multiple component analysis, measurement of equilibrium constant and rate constant by spectroscopy. Spectra of isolated chromophores, auxochromes, batho-chromic shift, hypsochromic shift, hyperchromic and hypochromic effect, effect of solvent on absorption spectra, molecular structure and infrared spectra.

**Instrumentation** – Photometer, U.V.-Visible spectrophotometer – sources of U.V.-Visible radiations, collimating systems, monochromators, samples cells and following detectors-Photocell, Barrier layer cell, Phototube, Diode array, applications of U.V.-Visible spectroscopy in pharmacy and spectrophotometric titrations.

- **Infrared Spectroscopy:** Vibrational transitions, frequency – structure correlations, Infrared absorption bands, Instrumentation-IR spectrometer – sources of IR, Collimating systems, monochromators, sample cells, sample handling in IR spectroscopy and detectors- Thermocouple, Golay Cells, Thermistor, Bolometer, Pyroelectric detector, Applications of IR in pharmacy.



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

- **Fluorimetric Analysis:** Theory, luminescence, factors affecting fluorescence, quenching. Instrumentation, Applications, fluorescent indicators, study of pharmaceutically important compounds estimated by fluorimetry.
- b. **Flame Photometry:** Theory, nebulisation, flame and flame temperature, interferences, flame spectrometric techniques and instrumentation and pharmaceutical applications.
- c. **Atomic Absorption Spectrometry:** Introduction, Theory, types of electrodes, instrumentation and applications.
- d. **Atomic Emission Spectroscopy:** Spectroscopic sources, atomic emission spectrometers, photographic and photoelectric detection.
- e. **NMR & ESR (introduction only):** Introduction, theoretical aspects and applications.
- f. **Mass Spectroscopy: (Introduction only)** – Fragmentation, types of ions produced mass spectrum and applications.
- g. **Polarimetry: (Introduction only)** – Introduction to optical rotatory dispersion, circular dichroism, polarimeter.
- h. **X-RAY Diffraction: (Introduction only)** – Theory, reciprocal lattice concept, diffraction patterns and applications.
- i. **Thermal Analysis:** Introduction, instrumentation, applications, and DSC and DTA.

### 3.2 PHARMACEUTICAL ANALYSIS (PRACTICAL)

**Practical : 3 Hrs./Week**

#### **List of Experiments:**

1. Separation and identification of Amino Acids by Paper Chromatography.
2. Separation and identification of Sulpha drugs by TLC technique.
3. Effect of pH and solvent on the UV spectrum of given compound.
4. Comparison of the UV spectrum of a compound with that of its derivatives.
5. Determination of dissociation constant of indicators using UV-Visible spectroscopy.
6. Conductometric titration of mixture of acids with a strong base.
7. Potentiometric titration of an acid with a strong base.
8. Estimation of drugs by Fluorimetric technique.
9. Study of quenching effect in fluorimetry.
10. Colourimetric estimation of Sulpha drugs using BMR reagent.



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences:**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



11. Simultaneous estimation of two drugs present in given formulation.
12. Assay of Salicylic Acid by colourimetry.
13. Determination of Chlorides and Sulphates in Calcium gluconate by Nepheloturbidimetric Method.
14. Determination of Na/K by Flame Photometry.
15. Determination of pKa using pH meter.
16. Determination of specific rotation.
17. Comparison of the IR spectrum of a compound with that of its derivatives.
18. Demonstration of HPLC.
19. Demonstration of HPTLC.
20. Demonstration of GC-MS.
21. Demonstration of DSC.
22. Interpretation of NMR spectra of any one compound.

#### Reference Books:

1. Text Book of Pharm. Analysis by Higuchi. T and Hasen. E. B., New York Inter Science Publishers.
2. Quantitative Pharma. Analysis by Jenkins, The Blakiston division, New York.
3. Quantitative Drug Analysis, by Garrot. D, Chapman & Hall Ltd., London.
4. Undergraduate Instrumental Analysis by James. E., CBS Publishers.
5. Instrumental Analysis by Willard and Merritt, EWP, East West Press Ltd., Delhi/Madras.
6. Pharm Analysis by Skoog and West, Sounders Manipal College Publishing.
7. Text Book of Chemical Analysis, by A.I.Vogel, ELBS with Macmillan press, Hampshire.
8. Textbook of Pharm. Analysis by K.A.Connors, John Wiley & Sons, New York, Brisbane, Singapore.
9. Textbook of Pharm. Analysis (Practical) by Beckett & Stenlake, CBS Publishers, Delhi.
10. Textbook of Drug Analysis by P.D. Sethi., CBS Publishers, Delhi.
11. Spectroscopy by Silverstein, John & Wiley & Sons. Inc., Canada & Singapore.
12. How to practise GMP-A Plan for total quality control by P.P. Sharma, Vandana Publications, Agra.
13. The Science & Practice of Pharmacy by Remington Vol-I & II, Mack Publishing Co. Pennsylvania.
14. TLC by Stahl, Spring Verlay.
15. Text Book of Pharm. Chemistry by Chatten, CBS Publications.
16. Spectroscopy by William Kemp, ELBS with Macmillan Press, Hampshire.
17. I.P.-1996, The Controller of Publications, New Delhi.
18. BPC- Dept. of Health, U.K. for HMSO.
19. USP - Mack Publishing Co., Easton, PA.
20. The Extra Pharmacopoeia – The Pharm. Press, London.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## Practicals

### Title of the Experiment:

- 1 Study of agonistic and antagonistic effects of drugs using Guinea-pig ileum preparation.\*\*
- 2 To study the effects of drugs on intestinal motility using frog's esophagus model\*
- 3 To study the effects of drugs using rat uterus preparation.\*\*
- 4 To study the anticonvulsant property of drugs (any one model).\*
- 5 To study antihistaminic property of drug using histamine induced anaphylactic reaction in guinea pigs.
- 6 To study the apomorphine-induced compulsive behaviour (stereotypy) in mice.\*
- 7 To study the muscle relaxant property of diazepam in mice using rotarod apparatus.\*
- 8 To study the antiinflammatory property of indomethacin against carrageenan-induced paw oedema.\*\*
- 9 To study the anxiolytic effect of diazepam in mice using mirrored-chamber apparatus.\*\*
- 10 To demonstrate the effect of various drugs on the blood pressure and respiration of anaesthetized dog.
- 11 To study the effect of anthelmintics on earthworms.
- 12 To study the taming effect of chlorpromazine.\*
- 13 To study the effects of drugs on vas deferense of the male rat.\*\*
- 14 To study the effect of drugs on pesticide toxicity using rats as model.
- 15 To study the effect of drugs on heavy metal toxicity.

\*\* indicate major experiment & \* indicate minor experiment

### Scheme of Practical Examination:

	Sessionals	Annual
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
<b>Max Marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>03hrs</b>	<b>04hrs</b>

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



### 3.3 PHARMACOTHERAPEUTICS – II (THEORY)

**Theory : 3 Hrs. /Week**

1. **Scope of the Subject:** This course is designed to impart knowledge and skills necessary for contribution to quality use of medicines. Chapters dealt cover briefly pathophysiology and mostly therapeutics of various diseases. This will enable the student to understand the pathophysiology of common diseases and their management.
2. **Objectives of the Subject Upon completion of the subject student shall be able to –**
  - a. know the pathophysiology of selected disease states and the rationale for drug therapy
  - b. know the therapeutic approach to management of these diseases;
  - c. know the controversies in drug therapy;
  - d. know the importance of preparation of individualised therapeutic plans based on diagnosis; and
  - e. appreciate the needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).

#### **Text books (Theory)**

Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone publication

#### **Reference books (Theory)**

- a. Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton & Lange
- b. Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication
- c. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA]

### 3. Detailed syllabus and lecture wise schedule :

**Etiopathogenesis and pharmacotherapy of diseases associated with following systems / diseases –**

#### **Title of the topic**

1. **Infectious disease:** Guidelines for the rational use of antibiotics and surgical Prophylaxis, Tuberculosis, Meningitis, Respiratory tract infections, Gastroenteritis, Endocarditis, Septicemia, Urinary tract infections, Protozoal infection- Malaria, HIV & Opportunistic infections, Fungal infections, Viral infections, Gonorrhoea and Syphilis
- 2 **Musculoskeletal disorders**  
Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic lupus erythematosus.
- 3 **Renal system**  
Acute Renal Failure, Chronic Renal Failure, Renal Dialysis, Drug induced renal disorders



*h2*  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

- 4 **Oncology:** Basic principles of Cancer therapy, General introduction to cancer chemotherapeutic agents, Chemotherapy of breast cancer, leukemia. Management of chemotherapy nausea and emesis
- 5 **Dermatology:** Psoriasis, Scabies, Eczema, Impetigo

### 3.3 PHARMACOTHERAPEUTICS – II (PRACTICAL)

**Practical : 3 Hrs./Week**

**Practicals :**

Hospital postings in various departments designed to complement the lectures by providing practical clinical discussion; attending ward rounds; follow up the progress and changes made in drug therapy in allotted patients; case presentation upon discharge. Students are required to maintain a record of cases presented and the same should be submitted at the end of the course for evaluation.

The student shall be trained to understand the principle and practice involved in selection of drug therapy including clinical discussion.

A minimum of 20 cases should be presented and recorded covering most common diseases.

**Assignments :**

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 – 2000 words] should be submitted for evaluation.

**Format of the assignment :**


1. Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year.
4. It shall be computer draft copy.
5. Name and signature of the student.
6. Time allocated for presentation may be 8+2 Min.

**Scheme of Practical Examination :**

	<b>Sessionals</b>	<b>Annual</b>
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
<b>Max Marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>03hrs</b>	<b>04hrs</b>

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



### 3.4 PHARMACEUTICAL JURISPRUDENCE (THEORY)

**Theory : 2 Hrs. /Week**

1. **Scope of the Subject:** (4-6 lines): This course exposes the student to several important legislations related to the profession of pharmacy in India. The Drugs and Cosmetics Act, along with its amendments are the core of this course. Other acts, which are covered, include the Pharmacy Act, dangerous drugs, medicinal and toilet preparation Act etc. Besides this the new drug policy, professional ethics, DPCO, patent and design Act will be discussed.
2. **Objectives of the Subject:** Upon completion of the subject student shall be able to (Know, do, and appreciate) –
  - a. practice the Professional ethics;
  - b. understand the various concepts of the pharmaceutical legislation in India;
  - c. know the various parameters in the Drug and Cosmetic Act and rules;
  - d. know the Drug policy, DPCO, Patent and design act;
  - e. understand the labeling requirements and packaging guidelines for drugs and cosmetics;
  - f. be able to understand the concepts of Dangerous Drugs Act, Pharmacy Act and Excise duties Act; and
  - g. other laws as prescribed by the Pharmacy Council of India from time to time including International Laws.

#### **Text books (Theory)**

Mithal , B M. Textbook of Forensic Pharmacy. Calcutta :National; 1988.

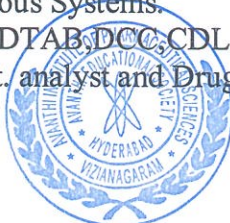
#### **Reference books (Theory)**

- a. Singh, KK, editor. Beotra's the Laws of Drugs, Medicines & cosmetics. Allahabad: Law Book House; 1984.
- b. Jain, NK. A Textbook of forensic pharmacy. Delhi: Vallabh prakashan ; 1995.
- c. Reports of the Pharmaceutical enquiry Committee
- d. I.D.M.A., Mumbai. DPCO 1995
- e. Various reports of Amendments.
- f. Deshapande, S.W. The drugs and magic remedies act 1954 and rules 1955. Mumbai: Susmit Publications; 1998.
- g. Eastern Book Company .The narcotic and psychotropic substances act 1985, Lucknow: Eastern; 1987.

### 3. Detailed syllabus and lecture wise schedule:

#### **Title of the topic**

1. **Pharmaceutical Legislations** – A brief review.
2. Principle and Significance of professional ethics. Critical study of the code of pharmaceutical ethics drafted by PCI.
3. **Drugs and Cosmetics Act, 1940, and its rules 1945.**  
Objectives, Legal definition, Study of Schedule's with reference to Schedule B, C&C1, D, E1, F&F1, F2, F3, FF, G, H, J, K, M, N, P, R, V, W, X, Y.  
Sales, Import, labeling and packaging of Drugs And Cosmetics  
Provisions Relating to Indigenous Systems.  
Constitution and Functions of DTAB, DCC, CDL.  
Qualification and duties –Govt. analyst and Drugs Inspector.



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

4. **Pharmacy Act –1948.**  
Objectives Legal Definitions, General Study, Constitution and Functions of State & Central Council, Registration & Procedure, ER.
5. **Medicinal and Toilet Preparation Act –1955.**  
Objectives, Legal Definitions, Licensing, Bonded and Non Bonded Laboratory, Ware Housing, Manufacture of Ayurvedic, Homeopathic, Patent & Proprietary Preparations.
6. **Narcotic Drugs and Psychotropic substances Act-1985 and Rules.** Objectives, Legal Definitions, General Study, Constitution and Functions of narcotic & Psychotropic Consultative Committee, National Fund for Controlling the Drug Abuse, Prohibition, Control and regulations, Schedules to the Act.
7. **Study of Salient Features of Drugs and magic remedies Act and its rules.**
8. **Study of essential Commodities Act Relevant to drugs price control Order.**
9. **Drug Price control Order & National Drug Policy (Current).**
10. **Prevention Of Cruelty to animals Act-1960.**
11. **Patents & design Act-1970.**
12. **Brief study of prescription and Non-prescription Products.**

#### 4. Assignments:

##### Format of the assignment

1. Minimum & Maximum number of pages
2. It shall be a computer draft copy
3. Reference(s) shall be included at the end.
4. Name and signature of the student
5. Assignment can be a combined presentation at the end of the academic year.
6. Time allocated for presentation may be 8+2 Min

##### Case studies relating to

1. Drugs and Cosmetics Act and rules along with its amendments, Dangerous Drugs Act, Medicinal and Toilet preparation Act, New Drug Policy, Professional Ethics, Drugs (Price control) Order, Patent and Design Act.
2. Various prescription and non-prescription products.
3. Medical and surgical accessories.
4. Diagnostic aids and appliances available in the market.



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



### 3.5 MEDICINAL CHEMISTRY (THEORY)

Theory : 3 Hrs. /Week

1. Modern concept of rational drug design: A brief introduction to Quantitative Structure Activity Relationship (QSAR), prodrug, combinatorial chemistry and computer aided drug design (CADD) and concept of antisense molecules.

A study of the development of the following classes of drugs including SAR, mechanism of action, synthesis of important compounds, chemical nomenclature, brand names of important marketed products and their side effects.

2. Anti-infective agents
  - a) Local anti-infective agents
  - b) Preservatives
  - c) Antifungal agents
  - d) Urinary tract anti-infectives
  - e) Antitubercular agents
  - f) Antiviral agents and Anti AIDS agents
  - g) Antiprotozoal agents
  - h) Anthelmintics
  - i) Antiscabies and Antipedicular agents
3. Sulphonamides and sulphones
4. Antimalarials
5. Antibiotics
6. Antineoplastic agents
7. Cardiovascular agents
  - a) Antihypertensive agents
  - b) Antianginal agents and vasodilators
  - c) Antiarrhythmic agents
  - d) Antihyperlipidemic agents
  - e) Coagulants and Anticoagulants
  - f) Endocrine
8. Hypoglycemic agents
9. Thyroid and Antithyroid agents
10. Diuretics
11. Diagnostic agents
12. Steroidal Hormones and Adrenocorticoids



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

### 3.5 MEDICINAL CHEMISTRY (PRACTICAL)

#### Practical : 3 Hrs./Week

1. Assays of important drugs from the course content.
2. Preparation of medicinally important compounds or intermediates required for synthesis of drugs.
3. Monograph analysis of important drugs.
4. Determination of partition coefficients, dissociation constants and molar refractivity of compounds for QSAR analysis.

#### Reference Books:

- a. Wilson and Gisvold's Text book of Organic, Medicinal and Pharmaceutical Chemistry, Lippincott-Raven Publishers-New York, Philadelphia.
- b. William.O.Foye, Principles of Medicinal Chemistry, B.I. Waverly Pvt. Ltd., New Delhi.
- c. Burgers, Medicinal Chemistry, M.E., Welly Med.Chemistry M.E. Walffed Johnwiley and Sons, Wiley-interscience Publication, New York, Toronto.
- d. A Text Book of Medicinal Chemistry Vol. I and II by Surendra N. Pandeya, S.G. Publisher, 6, Dildayal Nagar, Varanasi -10.
- e. Indian Pharmacopoeia 1985 and 1996. The Controller of Publications, Civil Lines, Delhi - 54.
- f. Current Index of Medical Specialities (CIMS) and MIMS India, MIMS, A.E. Morgan Publications (I) Pvt. Ltd, New Delhi-19.
- g. Organic Drug Synthesis-Ledniser Mitzsher Vol. I and II.
- h. Pharmaceutical Chemistry drug Synthesis Vol. I and II by H. J. Roth and A. Kleemann.
- i. The Science and Practice of Pharmacy Vol. 1 and 2, Remington, MACK Publishing Company, Easton, Pennsylvania.



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



### 3.6 PHARMACEUTICAL FORMULATIONS (THEORY)

**Theory : 2 Hrs. /Week**

1. **Scope of the Subject:** Scope and objectives of the course: Subject deals with the formulation and evaluation of various pharmaceutical dosage forms.
2. **Objectives of the Subject:** Upon completion of the subject student shall be able to (Know, do, appreciate) –
  - a. understand the principle involved in formulation of various pharmaceutical dosage forms;
  - b. prepare various pharmaceutical formulation;
  - c. perform evaluation of pharmaceutical dosage forms; and
  - d. understand and appreciate the concept of bioavailability and bioequivalence, their role in clinical situations.

**Text books (Theory)**

- a. Pharmaceutical dosage forms, Vol, I,II and III by lachman
- b. Rowlings Text book of Pharmaceutics
- c. Tutorial Pharmacy – Cooper & Gun

**Reference books (Theory)**


- a. Remington's Pharmaceutical Sciences
- b. USP/BP/IP

**3. Detailed syllabus and lecture wise schedule:**

**Title of the topic**

1. Pharmaceutical dosage form- concept and classification
2. **Tablets:** Formulation of different types of tablets, tablet excipients, granulation techniques quality control and evaluation of tablets. Tablet coating, Type of coating, quality control tests for coated tablet.
3. **Capsules;** Production and filling of hard gelatin capsules, Raw material for shell, finishing, quality control tests for capsules. Production and filling of soft gelatin capsules, quality control tests for soft gelatin capsules.
4. **Liquid orals:** Formulation and evaluation of suspensions, emulsions and solutions. Stability of these preparations
5. **Parenterals** Introduction Containers used for Parenterals (including official tests) Formulation of large and small volume Parenterals Sterilization
6. **Ophthalmic preparations (Semi – Solids):** Introduction and classification Factors affecting absorption and anatomy of skin Packaging storage and labeling, Ointments Types of Ointment Base Preparation of ointment, Jellies Types of jellies Formulation of jellies Suppositories, Method of preparation, Types Packaging
7. Definition and concept of **Controlled and novel Drug delivery systems** with available examples, viz. parenteral, trans dermal, buccal, rectal, nasal, implants, ocular



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

### 3.6 PHARMACEUTICAL FORMULATIONS (PRACTICAL)

**Practical : 3 Hrs./Week**

**List of Experiments :**

1. **Manufacture of Tablets**
  - a. Ordinary compressed tablet-wet granulation
  - b. Tablets prepared by direct compression.
  - c. Soluble tablet.
  - d. Chewable tablet.
2. **Formulation and filling of hard gelatin capsules**
3. **Manufacture of parenterals**
  - a. Ascorbic acid injection
  - b. Calcium gluconate injection
  - c. Sodium chloride infusion.
  - d. Dextrose and Sodium chloride injection/ infusion.
4. **Evaluation of Pharmaceutical formulations (QC tests)**
  - a. Tablets
  - b. Capsules
  - c. Injections
5. **Formulation of two liquid oral preparations and evaluation by assay**
  - a. Solution: Paracetamol Syrup
  - b. Antacid suspensions- Aluminum hydroxide gel
6. **Formulation of semisolids and evaluation by assay**
  - a. Salicylic acid and benzoic acid ointment
  - b. Gel formulation Diclofenac gel
7. **Cosmetic preparations**
  - a. Lipsticks
  - b. Cold cream and vanishing cream
  - c. Clear liquid shampoo
  - d. Tooth paste and tooth powders.
8. **Tablet coating (demonstration)**

**Scheme of Practical Examination :**

	<b>Sessionals</b>	<b>Annual</b>
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
<b>Max Marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>03hrs</b>	<b>04hrs</b>

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance)



*hys*  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## **Fourth Year**

### **4.1 PHARMACOTHERAPEUTICS – III (THEORY)**

**Theory : 3 Hrs. /Week**

1. **Scope :** This course is designed to impart knowledge and skills necessary for contribution to quality use of medicines. Chapters dealt cover briefly pathophysiology and mostly therapeutics of various diseases. This will enable the student to understand the pathophysiology of common diseases and their management.
2. **Objectives:** At completion of this subject it is expected that students will be able to understand –
  - a. the pathophysiology of selected disease states and the rationale for drug therapy;
  - b. the therapeutic approach to management of these diseases;
  - c. the controversies in drug therapy;
  - d. the importance of preparation of individualised therapeutic plans based on diagnosis;
  - e. needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects);
  - f. describe the pathophysiology of selected disease states and explain the rationale for drug therapy;
  - g. to summarize the therapeutic approach to management of these diseases including reference to the latest available evidence;
  - h. to discuss the controversies in drug therapy;
  - i. to discuss the preparation of individualised therapeutic plans based on diagnosis; and
  - j. identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).


#### **Text Books**

- a. Clinical Pharmacy and Therapeutics - Roger and Walker, Churchill Livingstone publication
- b. Pharmacotherapy: A Pathophysiologic approach - Joseph T. Dipiro et al. Appleton & Lange

#### **Reference Books**

- a. Pathologic basis of disease - Robins SL, W.B.Saunders publication
- b. Pathology and therapeutics for Pharmacists: A Basis for Clinical Pharmacy Practice - Green and Harris, Chapman and Hall publication
- c. Clinical Pharmacy and Therapeutics - Eric T. Herfindal, Williams and Wilkins Publication
- d. Applied Therapeutics: The clinical Use of Drugs. Lloyd Young and Koda-Kimble MA
- e. Avery's Drug Treatment, 4th Edn, 1997, Adis International Limited.
- f. Relevant review articles from recent medical and pharmaceutical literature.



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

## 4.1 PHARMACOTHERAPEUTICS – III (PRACTICAL)

**Practical : 3 Hrs./Week**

### Practicals:

Hospital postings for a period of at least 50 hours is required to understand the principles and practice involved in ward round participation and clinical discussion on selection of drug therapy. Students are required to maintain a record of 15 cases observed in the ward and the same should be submitted at the end of the course for evaluation. Each student should present at least two medical cases they have observed and followed in the wards.

**Etiopathogenesis and pharmacotherapy of diseases associated with following systems/ diseases:**

### Title of the topic

- 1 **Gastrointestinal system:** Peptic ulcer disease, Gastro Esophageal Reflux Disease, Inflammatory bowel disease, Liver disorders - Alcoholic liver disease, Viral hepatitis including jaundice, and Drug induced liver disorders.
- 2 **Haematological system:** Anaemias, Venous thromboembolism, Drug induced blood disorders.
- 3 **Nervous system:** Epilepsy, Parkinsonism, Stroke, Alzheimer's disease,
- 4 **Psychiatry disorders:** Schizophrenia, Affective disorders, Anxiety disorders, Sleep disorders, Obsessive Compulsive disorders
- 5 Pain management including Pain pathways, neuralgias, headaches.
- 6 Evidence Based Medicine

### Assignments:

Students are required to submit written assignments on the topics given to them. Topics allotted should cover recent developments in drug therapy of various diseases. A minimum of THREE assignments [1500 – 2000 words] should be submitted for evaluation.

### Format of the assignment:

1. Minimum & Maximum number of pages
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year
4. It shall be computer draft copy
5. Name and signature of the student
6. Time allocated for presentation may be 8+2 Min.

### Scheme of Practical Examination :

	<b>Sessionals</b>	<b>Annual</b>
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
<b>Max Marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>03hrs</b>	<b>04hrs</b>

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



**PRINCIPAL**  
**Avanthi Institute of Pharmaceutical Sciences**  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



## 4.2 HOSPITAL PHARMACY (THEORY)

**Theory : 2 Hrs. /Week**

1. **Scope:** In the changing scenario of pharmacy practice in India, for successful practice of Hospital Pharmacy, the students are required to learn various skills like drug distribution, drug dispensing, manufacturing of parenteral preparations, drug information, patient counselling, and therapeutic drug monitoring for improved patient care.
2. **Objectives:** Upon completion of the course, the student shall be able to –
  - a. know various drug distribution methods;
  - b. know the professional practice management skills in hospital pharmacies;
  - c. provide unbiased drug information to the doctors;
  - d. know the manufacturing practices of various formulations in hospital set up;
  - e. appreciate the practice based research methods; and
  - f. appreciate the stores management and inventory control.

**Text books: (latest editions)**

- a. Hospital pharmacy by William .F. Hassan
- b. A text book of Hospital Pharmacy by S.H.Merchant & Dr. J.S. Qadry. Revised by R.K.Goyal & R.K. Parikh

**References:**

- a. WHO consultative group report.
- b. R.P.S. Vol.2. Part –B; Pharmacy Practice section.
- c. Handbook of pharmacy – health care. Edt. Robin J Harman. The Pharmaceutical press.

### 3. Lecture wise programme :

**Topics**

- 1 **Hospital - its Organisation and functions**
- 2 **Hospital pharmacy-Organisation and management**
  - a) Organizational structure-Staff, Infrastructure & work load statistics
  - b) Management of materials and finance
  - c) Roles & responsibilities of hospital pharmacist
- 3 **The Budget – Preparation and implementation**
- 4 **Hospital drug policy**
  - a) Pharmacy and Therapeutic committee (PTC)
  - b) Hospital formulary
  - c) Hospital committees
    - Infection committee
    - Research and ethical committee
  - d) developing therapeutic guidelines
  - e) Hospital pharmacy communication - Newsletter



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

**5 Hospital pharmacy services**

- a) Procurement & warehousing of drugs and Pharmaceuticals
- b) Inventory control  
Definition, various methods of Inventory Control  
ABC, VED, EOQ, Lead time, safety stock
- c) Drug distribution in the hospital
  - i) Individual prescription method
  - ii) Floor stock method
  - iii) Unit dose drug distribution method
- d) Distribution of Narcotic and other controlled substances
- e) Central sterile supply services – Role of pharmacist

**6 Manufacture of Pharmaceutical preparations**

- a) Sterile formulations – large and small volume parenterals
- b) Manufacture of Ointments, Liquids, and creams
- c) Manufacturing of Tablets, granules, capsules, and powders
- d) Total parenteral nutrition

**7 Continuing professional development programs**

Education and training

**8 Radio Pharmaceuticals – Handling and packaging****9 Professional Relations and practices of hospital pharmacist****4.2 HOSPITAL PHARMACY (PRACTICAL)**

**Practical : 3 Hrs./Week**

1. Assessment of drug interactions in the given prescriptions
2. Manufacture of parenteral formulations, powders.
3. Drug information queries.
4. Inventory control

**List of Assignments:**

1. Design and Management of Hospital pharmacy department for a 300 bedded hospital.
2. Pharmacy and Therapeutics committee – Organization, functions, and limitations.
3. Development of a hospital formulary for 300 bedded teaching hospital
4. Preparation of ABC analysis of drugs sold in one month from the pharmacy.
5. Different phases of clinical trials with elements to be evaluated.
6. Various sources of drug information and systematic approach to provide unbiased drug information.
7. Evaluation of prescriptions generated in hospital for drug interactions and find out the suitable management.



  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**Special requirements:**

1. Each college should sign MoU with nearby local hospital having minimum 150 beds for providing necessary training to the students' on hospital pharmacy activities.
2. Well equipped with various resources of drug information.

**Scheme of Practical Examination:**

	<b>Sessionals</b>	<b>Annual</b>
Synopsis	05	15
Major Experiment	10	25
Minor Experiment	03	15
Viva	02	15
<b>Max Marks</b>	<b>20</b>	<b>70</b>
<b>Duration</b>	<b>03hrs</b>	<b>04hrs</b>

Note : Total sessional marks is 30 (20 for practical sessional plus 10 marks for regularity, promptness, viva-voce and record maintenance).



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

### 4.3 CLINICAL PHARMACY (THEORY)

**Theory : 3 Hrs. /Week**

#### 1. Objectives of the Subject :

Upon completion of the subject student shall be able to (Know, do, appreciate) –

- monitor drug therapy of patient through medication chart review and clinical review;
- obtain medication history interview and counsel the patients;
- identify and resolve drug related problems;
- detect, assess and monitor adverse drug reaction;
- interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states; and
- retrieve, analyse, interpret and formulate drug or medicine information.

#### Text books (Theory)

- Practice Standards and Definitions - The Society of Hospital Pharmacists of Australia.
- Basic skills in interpreting laboratory data - Scott LT, American Society of Health System Pharmacists Inc.
- Biopharmaceutics and Applied Pharmacokinetics - Leon Shargel, Prentice Hall publication.
- A text book of Clinical Pharmacy Practice; Essential concepts and skills, Dr.G.Parthasarathi et al, Orient Orient Langram Pvt.Ltd. ISSBN8125026

#### References

- Australian drug information -Procedure manual. The Society of Hospital Pharmacists of Australia.
- Clinical Pharmacokinetics - Rowland and Tozer, Williams and Wilkins Publication.
- Pharmaceutical statistics. Practical and clinical applications. Sanford Bolton, Marcel Dekker, Inc.

#### 2. Detailed syllabus and lecture wise schedule:

##### Title of the topic

- Definitions, development and scope of clinical pharmacy**
- Introduction to daily activities of a clinical pharmacist**
  - Drug therapy monitoring (medication chart review, clinical review, pharmacist interventions)
  - Ward round participation
  - Adverse drug reaction management
  - Drug information and poisons information
  - Medication history
  - Patient counseling
  - Drug utilisation evaluation (DUE) and review (DUR)
  - Quality assurance of clinical pharmacy services



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



3. **Patient data analysis**  
The patient's case history, its structure and use in evaluation of drug therapy & Understanding common medical abbreviations and terminologies used in clinical practices.
4. **Clinical laboratory tests used in the evaluation of disease states, and interpretation of test results**
  - a. Haematological, Liver function, Renal function, thyroid function tests
  - b. Tests associated with cardiac disorders
  - c. Fluid and electrolyte balance
  - d. Microbiological culture sensitivity tests
  - e. Pulmonary Function Tests
5. **Drug & Poison information**
  - a. Introduction to drug information resources available
  - b. Systematic approach in answering DI queries
  - c. Critical evaluation of drug information and literature
  - d. Preparation of written and verbal reports
  - e. Establishing a Drug Information Centre
  - f. Poisons information- organization & information resources
6. **Pharmacovigilance**
  - a. Scope, definition and aims of pharmacovigilance
  - b. Adverse drug reactions - Classification, mechanism, predisposing factors, causality assessment [different scales used]
  - c. Reporting, evaluation, monitoring, preventing & management of ADRs
  - d. Role of pharmacist in management of ADR.
7. Communication skills, including patient counselling techniques, medication history interview, presentation of cases.
8. Pharmaceutical care concepts
9. Critical evaluation of biomedical literature
10. Medication errors

### 4.3 CLINICAL PHARMACY (PRACTICAL)

#### Practical : 3 Hrs./Week

Students are expected to perform 15 practicals in the following areas covering the topics dealt in theory class.

- a. Answering drug information questions (4 Nos)
- b. Patient medication counselling (4 Nos)
- c. Case studies related to laboratory investigations (4 Nos)
- d. Patient medication history interview (3 Nos)



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**Assignment:**

Students are expected to submit THREE written assignments (1500 – 2000 words) on the topics given to them covering the following areas dealt in theory class.

Drug information, Patient medication history interview, Patient medication counselling, Critical appraisal of recently published articles in the biomedical literature which deals with a drug or therapeutic issue.

**Format of the assignment:**

1. Minimum & Maximum number of pages.
2. Reference(s) shall be included at the end.
3. Assignment can be a combined presentation at the end of the academic year.
4. It shall be computer draft copy.
5. Name and signature of the student.
6. Time allocated for presentation may be 8+2 Min.

  
**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## 4.4 BIOSTATISTICS AND RESEARCH METHODOLOGY (THEORY)

Theory : 2 Hrs. /Week

### 1. Detailed syllabus and lecture wise schedule

#### 1 Research Methodology

- a) Types of clinical study designs:  
Case studies, observational studies, interventional studies,
- b) Designing the methodology
- c) Sample size determination and Power of a study  
Determination of sample size for simple comparative experiments, determination of sample size to obtain a confidence interval of specified width, power of a study
- d) Report writing and presentation of data

#### 2 Biostatistics

##### 2.1 a) Introduction

- b) Types of data distribution
- c) Measures describing the central tendency distributions- average, median, mode
- d) Measurement of the spread of data-range, variation of mean, standard deviation, variance, coefficient of variation, standard error of mean.

##### 2.2 Data graphics

Construction and labeling of graphs, histogram, piecharts, scatter plots, semilogarithmic plots

##### 2.3 Basics of testing hypothesis

- a) Null hypothesis, level of significance, power of test, P value, statistical estimation of confidence intervals.
- b) Level of significance (Parametric data)- students t test (paired and unpaired), chi Square test, Analysis of Variance (one-way and two-way)
- c) Level of significance (Non-parametric data)- Sign test, Wilcoxon's signed rank test, Wilcoxon rank sum test, Mann Whitney U test, Kruskal-Wallis test (one way ANOVA)
- d) Linear regression and correlation- Introduction, Pearson's and Spearman's correlation and correlation co-efficient.
- e) Introduction to statistical software: SPSS, Epi Info, SAS.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## 2.4 Statistical methods in epidemiology

Incidence and prevalence, relative risk, attributable risk

## 3. Computer applications in pharmacy

Computer System in Hospital Pharmacy: Patterns of Computer use in Hospital Pharmacy – Patient record database management, Medication order entry – Drug labels and list – Intravenous solution and admixture, patient medication profiles, Inventory control, Management report & Statistics.

Computer In Community Pharmacy

Computerizing the Prescription Dispensing process

Use of Computers for Pharmaceutical Care in community pharmacy

Accounting and General ledger system

Drug Information Retrieval & Storage :

Introduction – Advantages of Computerized Literature Retrieval

Use of Computerized Retrieval

### Reference books:

- a. Pharmaceutical statistics- practical and clinical applications, Sanford Bolton 3<sup>rd</sup> edition, publisher Marcel Dekker Inc. New York.
- b. Drug Information- A Guide for Pharmacists, Patrick M Malone, Karen L Kier, John E Stanovich, 3<sup>rd</sup> edition, McGraw Hill Publications 2006



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## 4.5 BIOPHARMACEUTICS AND PHARMACOKINETICS (THEORY)

Theory : 3 Hrs. /Week

### 1. Biopharmaceutics

1. Introduction to Biopharmaceutics
  - a. Absorption of drugs from gastrointestinal tract.
  - b. Drug Distribution.
  - c. Drug Elimination.

### 2. Pharmacokinetics

2. Introduction to Pharmacokinetics.
  - a. Mathematical model
  - b. Drug levels in blood.
  - c. Pharmacokinetic model
  - d. Compartment models
  - e. Pharmacokinetic study.
3. One compartment open model.
  - a. Intravenous Injection (Bolus)
  - b. Intravenous infusion.
4. Multicompartment models.
  - a. Two compartment open model.
  - b. IV bolus, IV infusion and oral administration
5. Multiple – Dosage Regimens.
  - a. Repetitive Intravenous injections – One Compartment Open Model
  - b. Repetitive Extravascular dosing – One Compartment Open model
  - c. Multiple Dose Regimen – Two Compartment Open Model
6. Nonlinear Pharmacokinetics.
  - a. Introduction
  - b. Factors causing Non-linearity.
  - c. Michaelis-menton method of estimating parameters.
7. Noncompartmental Pharmacokinetics.
  - a. Statistical Moment Theory.
  - b. MRT for various compartment models.
  - c. Physiological Pharmacokinetic model.
8. Bioavailability and Bioequivalence.
  - a. Introduction.
  - b. Bioavailability study protocol.
  - c. Methods of Assessment of Bioavailability



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## 4.5 BIOPHARMACEUTICS AND PHARMACOKINETICS (PRACTICAL)

### Practical : 3 Hrs./Week

1. Improvement of dissolution characteristics of slightly soluble drugs by some methods.
2. Comparison of dissolution studies of two different marketed products of same drug.
3. Influence of polymorphism on solubility and dissolution.
4. Protein binding studies of a highly protein bound drug and poorly protein bound drug.
5. Extent of plasma-protein binding studies on the same drug (i.e. highly and poorly protein bound drug) at different concentrations in respect of constant time.
6. Bioavailability studies of some commonly used drugs on animal/human model.
7. Calculation of  $K_a$ ,  $K_e$ ,  $t_{1/2}$ ,  $C_{max}$ , AUC, AUMC, MRT etc. from blood profile data.
8. Calculation of bioavailability from urinary excretion data for two drugs.
9. Calculation of AUC and bioequivalence from the given data for two drugs.
10. In vitro absorption studies.
11. Bioequivalency studies on the different drugs marketed.(eg) Tetracycline, Sulphamethoxazole, Trimethoprim, Aspirin etc., on animals and human volunteers.
12. Absorption studies in animal inverted intestine using various drugs.
13. Effect on contact time on the plasma protein binding of drugs.
14. Studying metabolic pathways for different drugs based on elimination kinetics data.
15. Calculation of elimination half-life for different drugs by using urinary elimination data and blood level data.
16. Determination of renal clearance.

### References:

- a. Biopharmaceutics and Clinical Pharmacokinetics by, Milo Gibaldi
- b. Remington's Pharmaceutical Sciences, By Mack Publishing Company, Pennsylvania.
- c. Pharmacokinetics: By Milo Gibaldi Donald, R. Mercel Dekker Inc.
- d. Hand Book of Clinical Pharmacokinetics, By Milo Gibaldi and Laurie Prescott by ADIS Health Science Press.
- e. Biopharmaceutics and Pharmacokinetics; By Robert F Notari
- f. Biopharmaceutics; By Swarbrick
- g. Bio pharmaceuticals and Pharmacokinetics-A Treatise, By D. M. Brahmkar and Sunil B.Jaiswal, Vallabh Prakashan Pitampura, Delhi
- h. Clinical Pharmacokinetics, Concepts and Applications: By Malcolm Rowland and Thomas, N. Tozen, Lea and Febrger, Philadelphia, 1995.
- i. Dissolution, Bioavailability and Bioequivalence, By Abdou H.M, Mack, Publishing Company, Pennsylvania 1989.
- j. Biopharmaceutics and Clinical Pharmacokinetics-An introduction 4<sup>th</sup> edition Revised and expanded by Robert F Notari Marcel Dekker Inc, New York and Basel, 1987.
- k. Encyclopedia of Pharmaceutical Technology, Vol 13, James Swarbrick, James, C. Roylan, Marcel Dekker Inc, New York 1996.



  
**PRINCIPAL**  
 Ananthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



## 4.6 CLINICAL TOXICOLOGY (THEORY)

**Theory : 2 Hrs. /Week**

1. General principles involved in the management of poisoning
2. Antidotes and the clinical applications.
3. Supportive care in clinical Toxicology.
4. Gut Decontamination.
5. Elimination Enhancement.
6. Toxicokinetics.
7. Clinical symptoms and management of acute poisoning with the following agents –
  - a) Pesticide poisoning: organophosphorous compounds, carbamates, organochlorines, pyrethroids.
  - b) Opiates overdose.
  - c) Antidepressants
  - d) Barbiturates and benzodiazepines.
  - e) Alcohol: ethanol, methanol.
  - f) Paracetamol and salicylates.
  - g) Non-steroidal anti-inflammatory drugs.
  - h) Hydrocarbons: Petroleum products and PEG.
  - i) Caustics: inorganic acids and alkali.
  - j) Radiation poisoning
8. Clinical symptoms and management of chronic poisoning with the following agents –  
Heavy metals: Arsenic, lead, mercury, iron, copper
9. Venomous snake bites: Families of venomous snakes, clinical effects of venoms, general management as first aid, early manifestations, complications and snake bite injuries.
10. Plants poisoning. Mushrooms, Mycotoxins.
11. Food poisonings
12. Envenomations – Arthropod bites and stings.

### **Substance abuse:**

Signs and symptoms of substance abuse and treatment of dependence

- a) CNS stimulants :amphetamine
- b) Opioids
- c) CNS depressants
- d) Hallucinogens: LSD
- e) Cannabis group
- f) Tobacco

### **References:**

- a. Matthew J Ellenhorn. ELLENHORNS MEDICAL TOXICOLOGY – DIAGNOSIS AND TREATMENT OF POISONING. Second edition. Williams and Willkins publication, London
- b. V V Pillay. HANDBOOK OF FORENSIC MEDICINE AND TOXICOLOGY. Thirteenth edition 2003 Paras Publication, Hyderabad



*Handwritten signature*  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## **Fifth year**

### **5.1 CLINICAL RESEARCH (THEORY)**

**Theory : 3 Hrs. /Week**

#### **1. Drug development process:**

Introduction

Various Approaches to drug discovery

1. Pharmacological
2. Toxicological
3. IND Application
4. Drug characterization
5. Dosage form

#### **2. Clinical development of drug:**

1. Introduction to Clinical trials
2. Various phases of clinical trial.
3. Methods of post marketing surveillance
4. Abbreviated New Drug Application submission.
5. Good Clinical Practice – ICH, GCP, Central drug standard control organisation (CDSCO) guidelines
6. Challenges in the implementation of guidelines
7. Ethical guidelines in Clinical Research
8. Composition, responsibilities, procedures of IRB / IEC
9. Overview of regulatory environment in USA, Europe and India.
10. Role and responsibilities of clinical trial personnel as per ICH GCP
  - a. Sponsor
  - b. Investigators
  - c. Clinical research associate
  - d. Auditors
  - e. Contract research coordinators
  - f. Regulatory authority
11. Designing of clinical study documents (protocol, CRF, ICF, PIC with assignment)
12. Informed consent Process
13. Data management and its components
14. Safety monitoring in clinical trials.



  
**PRINCIPAL**


**Avanathi Institute of Pharmaceutical Sciences**  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



**References :**

- a. Central Drugs Standard Control Organization. Good Clinical Practices-Guidelines for Clinical Trials on Pharmaceutical Products in India. New Delhi: Ministry of Health; 2001.
- b. International Conference on Harmonisation of Technical requirements for registration of Pharmaceuticals for human use. ICH Harmonised Tripartite Guideline. Guideline for Good Clinical Practice.E6; May 1996.
- c. Ethical Guidelines for Biomedical Research on Human Subjects 2000. Indian Council of Medical Research, New Delhi.
- d. Textbook of Clinical Trials edited by David Machin, Simon Day and Sylvan Green, March 2005, John Wiley and Sons.
- e. Principles of Clinical Research edited by Giovanna di Ignazio, Di Giovanna and Haynes.
- f. Clinical Data Management edited by R K Rondels, S A Varley, C F Webbs. Second Edition, Jan 2000, Wiley Publications.
- g. Goodman & Gilman: JG Hardman, LE Limbard, 10th Edn. McGraw Hill Publications, 2001.



  
**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## 5.2 PHARMACOEPIDEMIOLOGY AND PHARMACOECONOMICS (THEORY)

Theory : 3 Hrs. /Week

### 1. Pharmacoepidemiology :

#### Definition and scope:

Origin and evaluation of pharmacoepidemiology need for pharmacoepidemiology, aims and applications.

#### Measurement of outcomes in pharmacoepidemiology

Outcome measure and drug use measures

Prevalence, incidence and incidence rate. Monetary units, number of prescriptions, units of drugs dispensed, defined daily doses and prescribed daily doses, medication adherence measurement

#### Concept of risk in pharmacoepidemiology

Measurement of risk, attributable risk and relative risk, time-risk relationship and odds ratio

#### Pharmacoepidemiological methods

Includes theoretical aspects of various methods and practical study of various methods with the help of case studies for individual methods

Drug utilization review, case reports, case series, surveys of drug use, cross – sectional studies, cohort studies, case control studies, case –cohort studies, meta – analysis studies, spontaneous reporting, prescription event monitoring and record linkage system.

#### Sources of data for pharmacoepidemiological studies

Ad Hoc data sources and automated data systems.

#### Selected special applications of pharmacoepidemiology

Studies of vaccine safety, hospital pharmacoepidemiology, pharmacoepidemiology and risk management, drug induced birth defects.

### 2. Pharmacoeconomics:

#### Definition, history, needs of pharmacoeconomic evaluations

Role in formulary management decisions

#### Pharmacoeconomic evaluation

Outcome assessment and types of evaluation

Includes theoretical aspects of various methods and practical study of various methods with the help of case studies for individual methods:

Cost – minimization, cost benefit, cost effectiveness, cost utility

### 3. Applications of Pharmacoeconomics

Software and case studies



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



### 5.3 CLINICAL PHARMACOKINETICS AND PHARMACOTHERAPEUTIC DRUG MONITORING (THEORY)

**Theory : 2 Hrs. /Week**

- 1. Introduction to Clinical pharmacokinetics.**
- 2. Design of dosage regimens:**  
Nomograms and Tabulations in designing dosage regimen, Conversion from intravenous to oral dosing, Determination of dose and dosing intervals, Drug dosing in the elderly and pediatrics and obese patients.
- 3. Pharmacokinetics of Drug Interaction:**
  - a. Pharmacokinetic drug interactions
  - b. Inhibition and Induction of Drug metabolism
  - c. Inhibition of Biliary Excretion.
- 4. Therapeutic Drug monitoring:**
  - a. Introduction
  - b. Individualization of drug dosage regimen (Variability – Genetic, Age and Weight, disease, Interacting drugs).
  - c. Indications for TDM. Protocol for TDM.
  - d. Pharmacokinetic/Pharmacodynamic Correlation in drug therapy.
  - e. TDM of drugs used in the following disease conditions: cardiovascular disease, Seizure disorders, Psychiatric conditions, and Organ transplantations.
- 5. Dosage adjustment in Renal and hepatic Disease.**
  - a. Renal impairment
  - b. Pharmacokinetic considerations
  - c. General approach for dosage adjustment in Renal disease.
  - d. Measurement of Glomerular Filtration rate and creatinine clearance.
  - e. Dosage adjustment for uremic patients.
  - f. Extracorporeal removal of drugs.
  - g. Effect of Hepatic disease on pharmacokinetics.
- 6. Population Pharmacokinetics.**
  - a. Introduction to Bayesian Theory.
  - b. Adaptive method or Dosing with feed back.
  - c. Analysis of Population pharmacokinetic Data.
- 7. Pharmacogenetics**
  - a. Genetic polymorphism in Drug metabolism: Cytochrome P-450 Isoenzymes.
  - b. Genetic Polymorphism in Drug Transport and Drug Targets.
  - c. Pharmacogenetics and Pharmacokinetics/Pharmacodynamic considerations



  
**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## APPENDIX-B

(See regulation 9)

### CONDITIONS TO BE FULFILLED BY THE ACADEMIC TRAINING INSTITUTION

- 1) Any authority or institution in India applying to the Pharmacy Council of India for approval of courses of study for Pharm.D. and Pharm.D. (Post Baccalaureate) under sub-section (1) of section 12 of the Pharmacy Act, 1948 shall comply with the infrastructural facilities as prescribed by the Pharmacy Council of India from time to time.
- 2) Pharm.D. and Pharm.D. (Post Baccalaureate) programmes shall be conducted only in those institutions which -
  - a) are approved by the Pharmacy Council of India for B.Pharm course as provided under section 12 of the Pharmacy Act, 1948;
  - b) have 300 bedded hospital attached to it.

#### (i) Hospital Details

1. Institution with their own hospital of minimum 300 beds.
2. Teaching hospital recognised by the Medical Council of India or University, or a Government hospital not below the level of district headquarter hospital with 300 beds with clearly defined Memorandum of Understanding including housing pharmacy practice department with minimum carpet area of 30 square feet per student along with consent to provide the professional manpower to support the programme.
3. Corporate type hospital with minimum 300 beds with clearly defined Memorandum of Understanding including housing pharmacy practice department with minimum carpet area of 30 square feet per student along with consent to provide the professional manpower to support the programme.
4. Number of institutions which can be attached to one hospital shall be restricted by the student pharmacist to bed ratio of 1:10.

#### (ii) Speciality

- a) Tertiary care hospitals are desirable
- b) Medicine[compulsory], and any three specialization of the following
  1. Surgery
  2. Pediatrics
  3. Gynecology and obstetrics
  4. Psychiatry
  5. Skin and VD
  6. Orthopedics

#### (iii) Location of the Hospital

Within the same limits of Corporation or Municipality or Campus with Medical Faculty involvement as adjunct faculty.



  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



### 3) TEACHING STAFF REQUIREMENT

- i) Staff Pattern : All faculty shall be full time. However part time perceptors in hospital shall be allowed.
- ii) Subject wise specialisation of the Teaching Staff :

S.No.	Subject	Specialisation required
1.	Pharmacy Practice	M.Pharm in Pharmacy Practice or Pharmacology or Pharmaceutics.
2.	Human Anatomy & Physiology	M.Pharm in Pharmacology or Pharmacy practice
3.	Pharmaceutics (Dispensing & General Pharmacy)	M.Pharm in Pharmaceutics
4.	Pharmacognosy-I	M.Pharm in Pharmacognosy
5.	Pharmaceutical Organic Chemistry-I	M.Pharm in Pharmaceutical chemistry or Pharmaceutical Analysis or Quality assurance or Bulk Drug
6.	Pharmaceutical Inorganic Chemistry	M.Pharm in Pharmaceutical chemistry or Pharmaceutical Analysis or Quality assurance or Bulk Drug
7.	Pharmaceutical microbiology	M.Pharm in Pharmaceutics or Pharmaceutical Biotechnology
8.	Pathophysiology	M.Pharm Pharmacy practice or Pharmacology
9.	Applied Biochemistry & Clinical Chemistry	M.Pharm in Pharmacology or Pharmacy practice or Pharmaceutical chemistry
10.	Pharmacology-I	M.Pharm in Pharmacology or Pharmacy practice
11.	Pharmaceutical Jurisprudence	M.Pharm in Pharmaceutics
12.	Pharmacology-II	M.Pharm in Pharmacology or Pharmacy practice
13.	Pharmaceutical Dosage Forms	M.Pharm in Pharmaceutics or Industrial Pharmacy
14.	Pharmacotherapeutics –I, II and III	M.Pharm Pharmacy practice or Pharmacology
15.	Community Pharmacy	M.Pharm in Pharmacy practice or Pharmacology or Pharmaceutics
16.	Hospital Pharmacy	M.Pharm in Pharmacy practice or Pharmacology or Pharmaceutics
17.	Clinical Pharmacy	M.Pharm in Pharmacy practice
18.	Computer Science or Computer Application in pharmacy	MCA
19.	Mathematics	M.Sc. (Maths)



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## iii) Teaching Staff :

Department/Division	Name of the post	No.
Department of Pharmaceutics	Professor	1
	Asst. Professor	1
	Lecturer	2
Department of Pharmaceutical Chemistry (Including Pharmaceutical Analysis)	Professor	1
	Asst. Professor	1
	Lecturer	3
Department of Pharmacology	Professor	1
	Asst. Professor	1
	Lecturer	2
Department of Pharmacognosy	Professor	1
	Asst. Professor	1
	Lecturer	1
Department of Pharmacy Practice	Professor	1
	Asst. Professor	2
	Lecturer	3

## iv) Prescribed qualifications and experience for Professor, Assistant Professor, Lecturer and others :

Sl. No.	CADRE	QUALIFICATIONS	EXPERIENCE
1.	Lecturer	i) Basic degree in pharmacy (B.Pharm). ii) Registration as a pharmacist under the Pharmacy Act. iii) First Class Master's degree in appropriate branch of specialization in Pharmacy (M.Pharm)	No minimum requirement.
2.	Assistant Professor	i) Basic degree in pharmacy (B.Pharm). ii) Registration as a pharmacist under the Pharmacy Act. iii) Master's degree in appropriate branch of specialization in Pharmacy (M.Pharm)	Three years experience in Teaching or Research at the level of Lecturer or equivalent.



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



		iv) Ph.D. degree (with First Class degree either at Bachelor's or Master's level) in the appropriate branch of specialization in Pharmacy.	
3.	Professor	i) Basic degree in pharmacy (B.Pharm). ii) Registration as a pharmacist under the Pharmacy Act. iii) Master's degree in appropriate branch of specialization in Pharmacy (M.Pharm). iv) Ph.D. degree (with first Class either at Bachelor's or Master's level) in appropriate branch of specialization in Pharmacy.	i) Ten years experience in Teaching or Research. ii) Out of which five years must be as Assistant Professor.
4.	Director or Principal or Head of institute	i) Basic degree in pharmacy (B.Pharm). ii) Registration as a pharmacist under the Pharmacy Act. iii) Master's degree in appropriate branch of specialization in Pharmacy (M.Pharm) iv) Ph.D. degree (with first Class degree either at Bachelor's or Master's level in the appropriate branch of specialization in Pharmacy.	i) Fifteen years experience in Teaching or Research. ii) Out of which five years must be as Professor or above in Pharmacy.  Desirable : Administrative experience in responsible position.  The maximum age for holding the post shall be 65 years.

**Note :** If a class or division is not awarded at Master's level, a minimum of 60% marks in aggregate or equivalent cumulative grade point average shall be considered equivalent to first class or division, as the case may be.



  
**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162

## v) Workload of Faculty :

Professor – 8 hrs. per week

Assistant Professor – 12 hrs. per week

Lecturers – 16 hrs. per week

## vi) Training of Pharmacy Practice Faculty :

- a) Teaching staff will be trained as per the module prescribed by the Central Council.
- b) Duration of training – Minimum 3 months.
- c) Training sites – Institutions running pharmacy practice or Programmes for atleast five years.
- d) Trainer – Professor or Assistant Professor with minimum of five years of clinical pharmacy teaching and practice experience.

## 4) NON-TEACHING STAFF :

Sl.No.	Designation	Required (Minimum)	Required Qualification
1	Laboratory Technician	1 for each Dept	D. Pharm
2	Laboratory Assistants or Laboratory Attenders	1 for each Lab (minimum)	SSLC
3	Office Superintendent	1	Degree
4	Accountant	1	Degree
5	Store keeper	1	D.Pharm or a Bachelor degree recognized by a University or institution.
6	Computer Data Operator	1	BCA or Graduate with Computer Course
7	Office Staff I	1	Degree
8	Office Staff II	2	Degree
9	Peon	2	SSLC
10	Cleaning personnel	Adequate	---
11	Gardener	Adequate	---



*th*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## 5) ACCOMMODATION :

Suitable and sufficient accommodation with adequate ventilation, lighting and other hygienic conditions should be provided to the rooms for Principal or the Head of the department, office, class rooms, library, staff, staff common room, students common room, museum, laboratories, stores, etc.

At least two lecture halls alongwith eight laboratories as specified below should be provided for: —

1. Pharmaceutics and Pharmacokinetics Lab	- 2
2. Life Science (Pharmacology, Physiology, Pathophysiology)	- 2
3. Phytochemistry or Pharmaceutical Chemistry	- 2
4. Pharmacy Practice	- 2
	-----
Total =	8
	-----

In addition to the laboratories, balance room, aseptic room or cabinet, animal house and a machine room shall also be provided.

Floor area of the laboratory should not be less than 30 square feet per student required to work in the laboratory at any given time subject to a minimum of 750 square feet.

Laboratories should be fitted and constructed in a manner that these can be kept reasonably clean. Gas and water fittings, shelves, fuming cupboards be provided wherever necessary.

## 6. EQUIPMENT AND APPARATUS :

### Department wise list of minimum equipments

#### A. DEPARTMENT OF PHARMACOLOGY :

##### I. Equipment:

S.No.	Name	Minimum required Nos.
1	Microscopes	15
2	Haemocytometer with Micropipettes	20
3	Sahli's haemocytometer	20
4	Hutchinson's spirometer	01
5	Spygmomanometer	05
6	Stethoscope	05
7	Permanent Slides for various tissues	One pair of each tissue Organs and endocrine glands One slide of each organ system
8	Models for various organs	One model of each organ system
9	Specimen for various organs and systems	One model for each organ system
10	Skeleton and bones	One set of skeleton and one spare bone



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

11	Different Contraceptive Devices and Models	One set of each device
12	Muscle electrodes	01
13	Lucas moist chamber	01
14	Myographic lever	01
15	Stimulator	01
16	Centrifuge	01
17	Digital Balance	01
18	Physical /Chemical Balance	01
19	Sherrington's Kymograph Machine or Polyrite	10
20	Sherrington Drum	10
21	Perspex bath assembly (single unit)	10
22	Aerators	10
23	Computer with LCD	01
24	Software packages for experiment	01
25	Standard graphs of various drugs	Adequate number
26	Actophotometer	01
27	Rotarod	01
28	Pole climbing apparatus	01
29	Analgesiometer (Eddy's hot plate and radiant heat methods)	01
30	Convulsiometer	01
31	Plethysmograph	01
32	Digital pH meter	01

## II. Apparatus:

S.No	Name	Minimum required Nos.
1	Folin-Wu tubes	60
2	Dissection Tray and Boards	10
3	Haemostatic artery forceps	10
4	Hypodermic syringes and needles of size 15,24,26G	10
5	Levers, cannulae	20


**NOTE:** Adequate number of glassware commonly used in the laboratory should be provided in each laboratory and department.

## B. DEPARTMENT OF PHARMACOGNOSY :

### I. Equipment:

S.No.	Name	Minimum required Nos.
1	Microscope with stage micrometer	15
2	Digital Balance	02
3	Autoclave	02



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



4	Hot air oven	02
5	B.O.D. incubator	01
6	Refrigerator	01
7	Laminar air flow	01
8	Colony counter	02
9	Zone reader	01
10	Digital pH meter	01
11	Sterility testing unit	01
12	Camera Lucida	15
13	Eye piece micrometer	15
14	Incinerator	01
15	Moisture balance	01
16	Heating mantle	15
17	Flourimeter	01
18	Vacuum pump	02
19	Micropipettes (Single and multi channeled)	02
20	Micro Centrifuge	01
21	Projection Microscope	01

## II. Apparatus:

S.No.	Name	Minimum required Nos.
1	Reflux flask with condenser	20
2	Water bath	20
3	Clavengers apparatus	10
4	Soxhlet apparatus	10
6	TLC chamber and sprayer	10
7	Distillation unit	01

**NOTE:** Adequate number of glassware commonly used in the laboratory should be provided in each laboratory and department.

## C. DEPARTMENT OF PHARMACEUTICAL CHEMISTRY :

### I. Equipment:

S.No.	Name	Minimum required Nos.
1	Hot plates	05
2	Oven	03
3	Refrigerator	01
4	Analytical Balances for demonstration	05
5	Digital balance 10mg sensitivity	10
6	Digital Balance (1mg sensitivity)	01
7	Suction pumps	06
8	Muffle Furnace	01



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

9	Mechanical Stirrers	10
10	Magnetic Stirrers with Thermostat	10
11	Vacuum Pump	01
12	Digital pH meter	01
13	Microwave Oven	02

## II. Apparatus:

S.No.	Name	Minimum required Nos.
1	Distillation Unit	02
2	Reflux flask and condenser single necked	20
3	Reflux flask and condenser double/triple necked	20
4	Burettes	40
5	Arsenic Limit Test Apparatus	20
6	Nessler's Cylinders	40

**NOTE:** Adequate number of glassware commonly used in the laboratory should be provided in each laboratory and department.

## D. DEPARTMENT OF PHARMACEUTICS :

### I. Equipment:

S.No	Name	Minimum required Nos.
1	Mechanical stirrers	10
2	Homogenizer	05
3	Digital balance	05
4	Microscopes	05
5	Stage and eye piece micrometers	05
6	Brookfield's viscometer	01
7	Tray dryer	01
8	Ball mill	01
9	Sieve shaker with sieve set	01
10	Double cone blender	01
11	Propeller type mechanical agitator	05
12	Autoclave	01
13	Steam distillation still	01
14	Vacuum Pump	01
15	Standard sieves, sieve no. 8, 10, 12, 22, 24, 44, 66, 80	10 sets
16	Tablet punching machine	01
17	Capsule filling machine	01
18	Ampoule washing machine	01
19	Ampoule filling and sealing machine	01



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



20	Tablet disintegration test apparatus IP	01
21	Tablet dissolution test apparatus IP	01
22	Monsanto's hardness tester	01
23	Pfizer type hardness tester	01
24	Friability test apparatus	01
25	Clarity test apparatus	01
26	Ointment filling machine	01
27	Collapsible tube crimping machine	01
28	Tablet coating pan	01
29	Magnetic stirrer, 500ml and 1 liter capacity with speed control	05 EACH 10
30	Digital pH meter	01
31	All purpose equipment with all accessories	01
32	Aseptic Cabinet	01
33	BOD Incubator	02
34	Bottle washing Machine	01
35	Bottle Sealing Machine	01
36	Bulk Density Apparatus	02
37	Conical Percolator (glass/copper/stainless steel)	10
38	Capsule Counter	02
39	Energy meter	02
40	Hot Plate	02
41	Humidity Control Oven	01
42	Liquid Filling Machine	01
43	Mechanical stirrer with speed regulator	02
44	Precision Melting point Apparatus	01
45	Distillation Unit	01

## II. Apparatus:

S.No	Name	Minimum required Nos.
1	Ostwald's viscometer	15
2	Stalagmometer	15
3	Desiccator*	05
4	Suppository moulds	20
5	Buchner Funnels (Small, medium, large)	05 each
6	Filtration assembly	01
7	Permeability Cups	05
8	Andreason's Pipette	03
9	Lipstick moulds	10

**NOTE:** Adequate number of glassware commonly used in the laboratory should be provided in each laboratory and department.



*[Signature]*  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**E. DEPARTMENT OF PHARMACEUTICAL BIOTECHNOLOGY :**

S.No.	Name	Minimum required Nos.
1	Orbital shaker incubator	01
2	Lyophilizer (Desirable)	01
3	Gel Electrophoresis (Vertical and Horizontal)	01
4	Phase contrast/Trinocular Microscope	01
5	Refrigerated Centrifuge	01
6	Fermenters of different capacity (Desirable)	01
7	Tissue culture station	01
8	Laminar airflow unit	01
9	Diagnostic kits to identify infectious agents	01
10	Rheometer	01
11	Viscometer	01
12	Micropipettes (single and multi channeled)	01 each
13	Sonicator	01
14	Respinometer	01
15	BOD Incubator	01
16	Paper Electrophoresis Unit	01
17	Micro Centrifuge	01
18	Incubator water bath	01
19	Autoclave	01
20	Refrigerator	01
21	Filtration Assembly	01
22	Digital pH meter	01

**NOTE:** Adequate number of glassware commonly used in the laboratory should be provided in each laboratory and department.

**F. DEPARTMENT OF PHARMACY PRACTICE :****Equipment:**

S.No.	Name	Minimum required Nos.
1	Colorimeter	2
2	Microscope	Adequate
3	Permanent slides (skin, kidney, pancreas, smooth muscle, liver etc.,)	Adequate
4	Watch glass	Adequate
5	Centrifuge	1
6	Biochemical reagents for analysis of normal and pathological constituents in urine and blood facilities	Adequate
7	Filtration equipment	2
8	Filling Machine	1
9	Sealing Machine	1



**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



10	Autoclave sterilizer	1
11	Membrane filter	1 Unit
12	Sintered glass funnel with complete filtering assemble	Adequate
13	Small disposable membrane filter for IV admixture filtration	Adequate
14	Laminar air flow bench	1
15	Vacuum pump	1
16	Oven	1
17	Surgical dressing	Adequate
18	Incubator	1
19	PH meter	1
20	Disintegration test apparatus	1
21	Hardness tester	1
22	Centrifuge	1
23	Magnetic stirrer	1
24	Thermostatic bath	1

**NOTE:**

1. Computers and Internet connection (Broadband), six computers for students with internet and staff computers as required.
2. Adequate number of glassware commonly used in the laboratory should be provided in each laboratory and the department.

**G. CENTRAL INSTRUMENTATION ROOM :**

S.No.	Name	Minimum required Nos.
1	Colorimeter	01
2	Digital pH meter	01
3	UV- Visible Spectrophotometer	01
4	Fluorimeter	01
5	Digital Balance (1mg sensitivity)	01
6	Nephelo Turbidity meter	01
7	Flame Photometer	01
8	Potentiometer	01
9	Conductivity meter	01
10	Fourier Transform Infra Red Spectrometer (Desirable)	01
11	HPLC	01
12	HPTLC (Desirable)	01
13	Atomic Absorption and Emission spectrophotometer (Desirable)	01
14	Biochemistry Analyzer (Desirable)	01
15	Carbon, Hydrogen, Nitrogen Analyzer (Desirable)	01
16	Deep Freezer (Desirable)	01
17	Ion- Exchanger	01
18	Lyophilizer (Desirable)	01



**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## APPENDIX-C

(See regulation 16)

### INTERNSHIP

#### 1) SPECIFIC OBJECTIVES :

- i) to provide patient care in cooperation with patients, prescribers, and other members of an interprofessional health care team based upon sound therapeutic principles and evidence-based data, taking into account relevant legal, ethical, social cultural, economic, and professional issues, emerging technologies, and evolving biomedical, pharmaceutical, social or behavioral or administrative, and clinical sciences that may impact therapeutic outcomes.
- ii) to manage and use resources of the health care system, in cooperation with patients, prescribers, other health care providers, and administrative and supportive personnel, to promote health; to provide, assess, and coordinate safe, accurate, and time-sensitive medication distribution; and to improve therapeutic outcomes of medication use.
- iii) to promote health improvement, wellness, and disease prevention in co-operation with patients, communities, at-risk population, and other members of an interprofessional team of health care providers.
- iv) to demonstrate skills in monitoring of the National Health Programmes and schemes, oriented to provide preventive and promotive health care services to the community.
- v) to develop leadership qualities to function effectively as a member of the health care team organised to deliver the health and family welfare services in existing socio-economic, political and cultural environment.
- vi) to communicate effectively with patients and the community.

#### 2) OTHER DETAILS :

- i) All parts of the internship shall be done, as far as possible, in institutions in India. In case of any difficulties, the matter may be referred to the Pharmacy Council of India to be considered on merits.
- ii) Where an intern is posted to district hospital for training, there shall be a committee consisting of representatives of the college or university, and the district hospital administration, who shall regulate the training of such trainee. For such trainee a certificate of satisfactory completion of training shall be obtained from the relevant administrative authorities which shall be countersigned by the Principal or Dean of College.



  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



- iii) Every candidate shall be required, after passing the final Pharm.D. or Pharm.D. (Post Baccalaureate) examination as the case may be to undergo compulsory rotational internship to the satisfaction of the College authorities and University concerned for a period of twelve months so as to be eligible for the award of the degree of Pharm.D. or Pharm.D. (Post Baccalaureate) as the case may be.

### 3. ASSESSMENT OF INTERNSHIP :

- i) The intern shall maintain a record of work which is to be verified and certified by the preceptor (teacher/practitioner) under whom he works. Apart from scrutiny of the record of work, assessment and evaluation of training shall be undertaken by an objective approach using situation tests in knowledge, skills and attitude during and at the end of the training. Based on the record of work and date of evaluation, the Dean or Principal shall issue certificate of satisfactory completion of training, following which the university shall award the degree or declare him eligible for it.
- ii) Satisfactory completion of internship shall be determined on the basis of the following:-
- (1) Proficiency of knowledge required for each case management SCORE 0-5
  - (2) The competency in skills expected for providing Clinical Pharmacy Services SCORE 0-5
  - (3) Responsibility, punctuality, work up of case, involvement in patient care SCORE 0-5
  - (4) Ability to work in a team (Behavior with other healthcare professionals including medical doctors, nursing staff and colleagues). SCORE 0-5
  - (5) Initiative, participation in discussions, research aptitude. SCORE 0-5

Poor	Fair	Below Average	Average	Above Average	Excellent
0	1	2	3	4	5

A Score of less than 3 in any of above items will represent unsatisfactory completion of internship.



  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



**Faculty Workload PG (2022 - 2023) June - November**

S. No.	Name of the Faculty	Subjects					Department/ Institute Level duties	Work Load (hrs)	Signature
		Theory -1	Theory-2	Lab-1	Lab-2	Project/ Seminar			
1.	Dr. M.B.V. Raju	I/II/M.PHARM QCQA	----	Practical-IV	----	Project GPAT	Professor & Principal	11	
2.	Dr. M. Pavani	I/II M.PHARM-CADDS	----	Practical-IV	----	Project GPAT	Pharmaceutical Technology Professor	11	
3.	Dr. G. Prasanthi	I/II M.PHARM-CADDS	----	Practical-IV	----	Project	Pharmaceutics Professor	10	
4.	Dr. K. Murali Krishna	I/II M.PHARM PTSM-II	----	----	----	Seminar/ Assignments Project	Pharmacology Professor	10	
5.	Dr. S. Arun Satya Dev	III.PHARM.D MC	----	III.PHARM.D MC	----	Project	Student Mentor	7	
6.	B. Ramavathi	I/II M.PHARM PDD	II-PHARM.D COLOGY	III-PHARM.D COLOGY	----	Project	Student Mentor	10	
7.	Ch. Madhu	I/II M.PHARM CMB	----	Practical-IV	----	Project	Exam cell Incharge	10	
8.	V. Uma Sankar	IV-PHARM.D HP	I PHARM.D RB	IV-PHARM.D HP	I PHARM.D RB	Project GPAT	1. Vice-Principal & HOD of Pharmacy Practice. 2. Member, Women Empowerment cell 3. Member, NSS 4. Coordinator, IQAC 5. Coordinator, <b>PRINCIPAL</b>	10	





ESTD : 2005

# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

							Purchase & Store.		
9.	B. Chaitanya	I/II M.PHAM-AIA	----	Practical – III	----	Project GPAT	Student mentor	11	B. Chaitanya
10.	A.H.V. Santhoshi	I/II M.PHARM MBT	----	Practical – IV	----	Project GPAT	Student mentor	11	A.H.V. Santhoshi
11.	Y. Vishnu Vandana	I/II M.PHARM MP	----	Practical - III	----	Project	1. Women Empowerment cell Coordinator 2. Student Mentor	10	Y. Vishnu Vandana
12.	M. Krishna Rekha	I/II M.PHARM MP	----	PRACTICAL - III	----	Project	1. Timetables in-charge 2. Student mentor	10	M. Krishna Rekha
13.	M. Madhavi Kumari	I/II M.PHARM AP-II	----	PRACTICAL - III	----	Project	Student mentor	10	M. Madhavi Kumari
14.	B. Sravani	I/II M.PHARM BPPK	----	----	----	1. Project 2. Seminars 3. GPAT	Student mentor	11	B. Sravani
15.	Dr. B. Manoj Kumar	II PHARM.D THERAPY-1	V-PHARM.D EPIDIMEOL OGY	II PHARM.D THERAPY-1	----	Project	1. Class Incharge- V Pharm.D 2. Member , NSS 3. Member , IQAC 4. NAAC Incharge-7 5. Coordinator, relation & media.	11	Dr. B. Manoj Kumar
16.	M. Suresh Kumar	III/I B.PHARM PJ	I/II M.PHARM JOURNAL	----	----	Project	Member, NSS	7	M. Suresh Kumar



Avanathi Institute of Pharmaceutical Sciences

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences:  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt. - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

			CLUB						
17.	S. Chandra Sekhar	I/II POC -I (SEC- B)	----	I/II POC -I (SEC- B)	----	Project	Tutorial	13	<i>S. Chandra Sekhar</i>
18.	B. Poornima	I/II PH. BIOCHEM (SEC- B)	----	I/II BIOCHEM (SEC- B)	----	Project	Student mentor	12	<i>Poornima</i>
19.	L. Divyasri	I/II BIOCHEM (SEC- A)	----	I/II BIOCHEM (SEC- A)	----	Project	Student mentor	11	<i>Divya Sri</i>
20.	B. Bhagya Sri	I/II M.PHARM BPPK	----	----	----	1. Project 2.Seminars	Student mentor	10	<i>B. Bhagya Sri</i>
21.	P. Sandeep	IV-PHARM.D BPPK	----	IV-PHARM.D BPPK	----	Project	----	10	<i>P. Sandeep</i>
22.	S. Rama Krishna	IV/I IP - II ( SEC - B )	----	----	----	Project	Student mentor	5	<i>Rama Krishna</i>
23.	A. Naga Srinivas	III/I COGNOSY- II (SEC - B)	----	III/I COGNOSY- II (SEC - B)	----	Project	Student mentor	11	<i>A. Srinivas</i>
24.	M. Divya	IV /I PP ( SEC- B)	----	----	----	Project	Student mentors	6	<i>Divya</i>
25.	V. C. Randeep Raj	III PHARM D THERAPY	IV PHARM D CP	III PHARM D THERAPY	IV PHARM D CP	Project	1. Class Incharge -VI Pharm.D. 2.Member , women empowerment cell 3.Member , NSS 4. Coordinator sports	14	<i>V. C. Randeep Raj</i>

Avanthi Institute of Pharmaceutical Sciences



Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

26.	Ch. Geetha	III PHARM D PA	IV PHARM D BIostat	III PHARM D PA	----	Project	1.Class Incharge- III Pharm.D	11	<i>G</i>
27.	M.S.V Sudeep	I PHARM D CEUTICS	V PHARM D CR	I PHARM D CEUTICS	----	Project	Student Mentor	11	<i>M.S.V Sudeep</i>
28.	D. Subha Sri	I PHARM D PIC	II PHARM D MB	I PHARM D PIC	II PHARM D MB	Project	Class Incharge – I Pharm.D.	14	<i>Subha Sri</i>
29.	M. Geethanjali	III/I PJ (SEC-A)	----	----	----	Project	Student Mentor	5	<i>M. Geethanjali</i>
30.	B. Teja Sree	II PHARM D COLOGY	III PHARM D PF IV PHARM D CT	III PHARM D PF	----	Project	Class Incharge – IV Pharm.D	15	<i>B. Teja Sree</i>
31.	T. Rushi	IV PHARM D THERAPY	V PHARM D PKTDM	IV PHARM D THERAPY	----	Project	1.NSS Coordinator 2. Member , WEC 3. Senior Administrative Officer	10	<i>Rushi</i>
32.	A. Jyotsna	I PHARM D POC	II PHARM D COGNOSY	I PHARM D POC	II PHARM D COGNOSY	Project	Class Incharge – II Year.	14	<i>A. Jyotsna</i>
33.	A. Naga Phani Sharma	I PHARM D HAP	II PHARM D – PP	I PHARM D HAP	----	Project	Student Mentor	11	<i>Phani</i>
34.	N. Hema Madhuri	I PHARM D BIOCHEM	II PHARM D CP III PHARM D PJ	I PHARM D BIOCHEM	----	Project	1. Member, NSS. 2.Member , WEC	14	<i>N. Hema Madhuri</i>
35.	A. Seshu	I PHARM D RM	-----	-----	----	----		3	<i>A. Seshu</i>



Avanathi Institute of Pharmaceutical Sciences

**Principal**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### FACULTY WORKLOAD PG (2022 – 23) December -May

S. No	Name of the faculty	Subjects					Department/ Institute Level duties	Work Load (hrs)	Signature
		Theory -1	Theory-2	Lab-1	Lab-2	Project/ Seminar			
1.	Dr. M.B.V. Raju	I/I M.PHARM MPAT	----	Practical-I	----	Project GPAT	Professor& Principal	11	
2.	Dr. M. Pavani	I/I M.PHARM MPAT	----	Practical-I	----	GPAT	Professor	11	
3.	Dr. G. Prasanthi	I/I M.PHARM MPAT	----	Practical-I	----	----	Professor	10	
4.	Dr. K. Murali Krishna	I/I M.PHARM MPAT	----	Practical-I	----	----	Professor	10	
5.	Dr. S. Arun Satya Dev	III PHARM.D MC	----	III PHARM.D MC	----	----	Student Mentor	7	
6.	B. Ramavathi	III PHARM.D COLOGY	I/I M.PHARM PTSM-1	III PHARM.D COLOGY	----	----	Student Mentor	10	
7.	Ch. Madhu	I/I M.PHARM SEM-1 CMB	II/I M.PHARM SEM-1 RM&BS	I/I M.PHARM Practical-I	----	Project	Exam Cell Incharge	14	
8.	V. Uma Shankar	IV PHARM.D HP	----	IV PHARM.D HP	----	Project GPAT	1. Vice-Principal & HOD of Pharmacy Practice. 2. Member , Women Empowerment Cell 3. Member , NSS	8	

**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences



Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162











## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

						4. Co-ordinator, IQAC. 5. Co-ordinator, Purchase & Store			
9.	B. Chaitanya	I/I M. PHARM APA	----	Practical- II	----	Project GPAT	Student Mentor	10	
10.	A. H. V. Santhoshi	I/I M. PHARM PV	----	----	----	Seminars Project GPAT	Student Mentor	10	
11.	Y. Vishru Vandana	I/I M. PHARM DDS	----	Practical-II	----	Project GPAT	1. Women Empowerment Cell Co-ordinator 2. Student Mentor	10	
12.	M. Krishna Rekha	MATERNITY LEAVE							
13.	M. Madhavi Kumari	I/I M.PHARM SEM-1 AP-I	----	Practical-II		Project	Student Mentor	10	
14.	B. Sravani	I/I M.PHARM RA	----	Practical-II	----	Seminars Project GPAT	Student Mentor	16	
15.	Dr. B. Manoj Kumar	II PHARM.D THERAPY-I	V PHARM.D EPIDIMEOLOGY	II PHARM.D THERAPY-I	----	Project	1. Class Incharge- V Pharm.D. 2. Member , NSS 3. Member , IQAC 4. NAAC Incharge-7 5. Co-ordinator, Relation & Media.	11	

Avanathi Institute of Pharmaceutical Sciences



*Principal*  
**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

ESTD : 2005

16.	M. Suresh Kumar	III/II HDT (SEC- A )	I/I M. PHARM MP	III/II HDT (SEC- A )	----	Project	Student Mentor	15	<i>Suresh Kumar</i>
17.	S. Chandra Sekhar	I/I CEUTICS -I (SEC- B )	I/I M.PHARM DDS	I/I CEUTICS -I (SEC- B )	----	Assignments	Student Mentor	16	<i>S. Chandra</i>
18.	B. Poornima	II/I MB (SEC- B)	----	II/I MB (SEC- B)	----	Assignment/ Project	Student Mentor	12	<i>Poornima</i>
19.	B. Bhagya Sri	I/I M. PHARM RA	----	----	----	Seminars	Student Mentor	10	<i>BA</i>
20.	P. Sandeep	IV PHARM. D BPPK	----	IV PHARM. D BPPK	----	Assignments	Student Mentor	7	<i>P. Sandeep</i>
21.	D. Purnima Yadav	II/I PE (SEC- B )	----	II/I PE (SEC- B )	----	----	Student Mentor	11	<i>D. Purnima</i>
22.	S. Rama Krishna	II/I POC- II ( SEC - A )	----	II/I POC- II ( SEC - A )	----	Project	Student Mentor	11	<i>Rama Krishna</i>
23.	A. Naga Srinivas	II/I POC- II ( SEC - B )	----	II/I POC- II ( SEC - B )	----	Project	Student Mentor	11	<i>A. Srinivas</i>
24.	M. Divya	IV /II CS (SEC A&B)	----	----	----	Assignments Project	Student Mentor	10	<i>Divya</i>
25.	V. C. Randeep Raj	III PHARM D THERAPY	IV PHARM D CP	III PHARM D THERAPY	IV PHARM .D CP	Project	1. Class Incharge – VI Year 2. Member , Women Empowerment Cell 3. Member , NSS 4. Coordinator, Sports & Games.	14	<i>Randeep</i>

Avanathi Institute of Pharmaceutical Sciences



Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

PRINCIPAL





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

ESTD : 2005

26.	M. S. V Sudeep	I PHARM D CEUTICS	V PHARM D CR	I PHARM D CEUTICS	----	Project	Student Mentor	11	<i>m.s.v Sudeep</i>
27.	D. Subha Sri	I PHARM D PIC	II PHARM D MB	I PHARM D PIC	II PHARM D MB	Project	Class Incharge – I Pharm.D	14	<i>Subha Sri</i>
28.	B. Teja Sree	II PHARM D COLOGY	III PHARM D PF	III PHARM D PF	IV PHARM D CT	Project	Class Incharge – IV Pharm.D	15	<i>B. Teja Sree</i>
29.	T. Rushi	IV PHARM D THERAPY	V PHARM D PKTDM	IV PHARM D THERAPY	----	Project	1.NSS Coordinator 2.Member , WEC Senior Administrative Officer	11	<i>Alho</i>
30.	A. Jyotsna	I PHARM D POC	II PHARM D COGNOSY	I PHARM D POC	II PHARM D COGNOSY	Project	Class Incharge – II Pharm.D.	14	<i>A. Jyotsna</i>
31.	A. Naga Phani Sharma	I PHARM D HAP	II PHARM D PP	I PHARM D HAP	----	Project	1. Member, NSS. 2. Member , WEC	11	<i>Naga Phani</i>
32.	N. Hema Madhuri	I PHARM D BIOCHEM	II PHARM D CP III PHARM D PJ	I PHARM D BIOCHEM	----	Project	Student Mentor	15	<i>N. Hema Madhuri</i>
33.	Ch. Geetha	III PHARM D PA	IV PHARM D – BRM	III PHARM D PA	----	Project	1. Class Incharge- III Pharm.D.	11	<i>Ch. Geetha</i>
34.	A. Seshu	I PHARM.D RM	I/I RM (SEC-A&B)	----	----	----	----	7	<i>A. Seshu</i>
35.	C.Subba lakshmi	I/I CS (SEC-A&B)	----	----	----	----	----	8	<i>Subba Lakshmi</i>

**Principal**  
**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences



Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



ESTD : 2005

**AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES**  
 (Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
 Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

**Faculty Workload UG (2022 - 2023) June - November**

S. No.	Name of the Faculty	Subjects					Department/ Institute Level duties	Work Load (hrs)	Signature
		Theory -1	Theory-2	Lab-1	Lab-2	Project/ Seminar			
1.	Dr. Saraswathi Sowmya	III/I MC II	----	----	----	Project	1.Coordinator, library. 2.Class Incharge– III-B-Pharm (Sec -B)	12	M.S.Sowmya
2.	A. Nanaji	III/I COGNOSY-II (SEC- A )	----	III/I COGNOSY-II (SEC- A )	----	Project GPAT	1. Member, IQAC 2. Member, AC& AC 3. Coordinator, Examination, Time Table and Admissions.	12	Anone
3.	S. Chandra Sekhar	I/II POC –I (SEC- B )	----	I/II POC –I (SEC- B )	----	Project	Tutorial	13	S.Chandra
4.	D. Purnima Yadav	I ;I/II POC – (SEC- A )	----	I/II POC –I (SEC- A )	----	Project	Member , IQAC Tutorial	12	D.Purnima
5.	Y. Anveshi Dhananjaya	I /II – HAP -II (SEC- B)	----	I /II HAP (SEC – B)	----	Project	Student mentor	11	Y.Anveshi
6.	B. Meher Jyothi	I/II PP (SEC – A&B)	----	----	----	Project	Student mentor	10	B.Meherjyothi
7.	J. Vinay Ramji	I /II HAP	----	I /II HAP	----	Project	Tutorial	12	J.Vinay

**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences



Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162





ESTD : 2005

# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

8.	B. Aruna	IV / I IMA (SEC - A)	----	IV / I IMA (SEC - A)	----	Project GPAT	1. Class teacher 2. Tutorial 3. Member, IQAC	14	B. Aruna
9.	B. Rama Madhuri	I / II CA (SEC - B)	----	I / II CA (SEC - B)	----	----	Student mentor	10	B. Rama Madhuri
10.	Vamsi Krishna Yadav	III/I COLOGY - II (SEC- A)	----	III/I COLOGY - II (SEC- A)	----	----	Tutorial	12	Vamsi
11.	K. Venkata Radhika	I / II CA (SEC - A)	----	I / II CA (SEC - A)	----	----	Student mentors	10	K. Venkata Radhika
12.	I. Adi Lakshmi	III/I IP - I (SEC- A)	----	III/I IP - I (SEC- A)	----	Project	1. Class teacher 2. tutorial	12	I. Adi Lakshmi
13.	M. Venkat Naga Deepika	IV / I NDDS (SEC- B)	----	----	----	Project	Student Ment	5	M. Deepika
14.	Y. Pavani	IV / I IMA (SEC - B)	----	IV / I IMA (SEC - B)	----	Project	1. Class Incharge - IV B. Pharm (SEC -B)	11	Y. Pavani
15.	B. Yerni Kumar	III/I COLOGY - II (SECT- B)	----	III/I COLOGY - II (SEC - B)	----	Project	Student Mentors	12	B. Yerni Kumar
16.	Bhargav Krishna Raju	III/I IP - I (SEC - B)	----	III/I IP - I (SEC - B)	----	Project	Student Mentors	11	B.K. Raju
17.	M. Vasu	IV / I PP (SEC- A)	----	----	----	Project	Student Mentors	5	M. Vasu
18.	V. H. S. Reddy	IV / I NDDS	----	----	----	Project	Class Incharge - II B.Pharm (Sec - B)	5	V.H.S. Reddy

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences



Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



ESTD : 2005

## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

		(SEC- A)							
19.	M. Rajeswara Rao	IV/I IP – II (SEC – A)	----	----	----	Project	1.Class Incharge – II B. Pharm (Sec – A) 2.Student Mentor	5	<i>Rajeswara</i>
20.	M. Geetanjali	III/I PJ (SEC-A)	----	----	----	Project	Student Mentor	5	<i>M. Geetanjali</i>
21.	K. Rohini	I/II B.PHARM EVS (SEC-A&B)	----	----	----	Project	Student Mentor	6	<i>K. Rohini</i>



*[Signature]*  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## FACULTY WORKLOAD UG (2022 – 23) December -May

S. No	Name of the faculty	Subjects					Department/ Institute Level duties	Work Load (hrs)	Signature
		Theory -1	Theory-2	Lab-1	Lab-2	Project/ Seminar			
1.	Dr. Saraswathi Sowmya	III/II MC-III Sec-A	----	III/II MC-III Sec-A	----	Project	1. Class Teacher 2. Tutorial	11	M.S. Sowmya
2.	A. Nanaji	II/II COGNOSY (SEC – A&B)	----	II/II COGNOSY (SEC – A&B)	----	Project GPAT	Exam Cell Member	23	Ananji
3.	S. Chandra Sekhar	I/I CEUTICS –I (SEC- B )	I/I M.PHARM DDS	I/I CEUTICS –I (SEC- B )	----	Assignments	Student Mentor	16	S. Chandra
4.	B. Poornima	II/I MB (SEC- B)	----	II/I MB (SEC- B)	----	Assignment/ Project	Student Mentor	12	Poornima
5.	D. Purnima Yadav	II/I PE (SEC- B )	----	II/I PE (SEC- B )	----	----	Student Mentor	11	D. Purnima
6.	Y. Anveshi Dhananjaya	IV /II SPP SEC – A&B	----	----	----	Project	Class Teacher	10	Anveshi
7.	B. Meher Jyothi	III/II COLOGY (SEC – A)	----	III/II COLOGY (SEC – A)	----	Project	Tutorial	11	B. Meher Jyothi
8.	J. Vinay Ramji	III/II COLOGY (SEC – B)	----	III/II COLOGY (SEC – B)	----	Project	Tutorial	11	Vinay



*[Signature]*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

09.	B. Aruna	III / II QA (SEC - A&B)	----	----	----	Project GPAT	Class Teacher	11	B. Aruna
10.	B. Rama Madhuri	I / I PA-I (SEC-B)	IV/II BRM ( SEC-B)	I / I PA-I (SEC-B)	----	Project	Student Mentor Student Mentor	16	Radhika
11.	Vamsi Krishna Yadav	I/I HAP-I (SEC- A )	----	I/I HAP-I (SEC- A )	----	Project	Student Mentor	11	Vamsi
12.	K. Venkata Radhika	I / I PIC (SEC - B)	----	I / I PIC (SEC - B)	----	Project	Student Mentor	11	Radhika
13.	I. Adi Lakshmi	I/I CEUTICS -I (SEC- A)	----	I/I CEUTICS -I (SEC- A)	----	Project	1. Class Teacher 2. Tutorial	11	Adi Lakshmi
14.	M. Venkat Naga Deepika	II/I PE (SEC- A )	----	II/I PE (SEC- A )	----	Project	Tutorial	12	M. Deepika
15.	Y. Pavani	I / I PA-I (SEC-A)	III/II BIOTECH (SEC-A)	I / I PA-I (SEC-A)	----	----	Student Mentor	15	Y. Pavani
16.	B. Yerni Kumar	I/I HAP-I (SEC- B )	IV/II BRM (SEC-B)	I/I HAP-I (SEC- B )	----	Project	Student Mentor	16	Yerni Kumar
17.	Bhargav Krishna Raju	III/II BPPK (SEC - A&B)	----	----	----	Project	Student Mentor	10	B.K. Raju
18.	M. Vasu	III/II MC III Sec- B	----	III/II MC III Sec- B	----	Project	1. Class Teacher 2. Tutorial	11	M. Vasu



Avanthi Institute of Pharmaceutical Sciences

  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

19	V. H. S. Reddy	II / I PP-I (SEC -B)	III/II BIOTECH (SEC -B)	II / I PP-I (SEC -B)	----	----	1. Class Teacher 2. Tutorial 3. Student Teacher Interaction	17	<i>V.H.S. Reddy</i>
20	M. Rajeswara Rao	II / I PP-I (SEC -A)	----	II / I PP-I (SEC -A)	----	Project	1. Class Teacher 2. Tutorial 3. Student-Teacher Interaction	13	<i>M. Rajeswara Rao</i>
21	M. Geetanjali	I / I PIC (SEC - A)	----	I / I PIC (SEC - A))	----	----	Student Mentor	11	<i>M. Geetanjali</i>
22	K. Rohini	II/I MB (SEC - A)	----	II/I MB (SEC - A)	----	Project	Tutorial	12	<i>K. Rohini</i>



*[Signature]*  
**Principal**  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**CLASS TIME TABLE AY: 2022-23**

**CLASS: I B.Pharm I Sem (PCI Regulation)**  
**SECTION- A (2022 Admitted Batch)**

**w.e.f:26/12/2022**

Class Teacher: Mrs.M. Geethanjali				Batch A:Roll 01-25		Batch B: Roll 26-55		
DAY/ TIME	9.30 - 10.30	10.30 - 11.20	11.20 - 12.10	12.10 - 01.00	1.00 - 1.50	1.50 - 2.40	2.40 - 3.20	3.20 - 4.30
MON	HAP-I	CEUTICS	PA - I	L U N C H	CS	BATCH A - HAP-I LAB BATCH B - PA I LAB		
TUE	PA - I	HAP-I	CEUTICS		PIC	BATCH A - PA I LAB BATCH B - HAP-I LAB		
WED	RM / RB	PA - I	HAP-I		PIC	BATCH A - PIC LAB BATCH B- CEUTICS LAB		
THU	CEUTICS	HAP-I	PIC		RM/ RB	BATCH A - CEUTICS LAB BATCH B- PIC LAB		
FRI	CEUTICS	PIC	PA - I		HAP-I	BATCH A - RM /RB BATCH B- CS		
SAT	CS	PA - I	CEUTICS		PIC	BATCH A- CS BATCH B- RM /RB		

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Mr. Vamsi Krishna Yadav	Associate Professor	Human Anatomy and Physiology -I( HAP-I) (5)	B. Pharm
2.	Mrs.Y. Pavani	Assistant Professor	Pharmaceutical Analysis -I (PA-I) (5)	B. Pharm
3.	Mrs. M. Geethanjali	Associate Professor	Inorganic Chemistry (PIC) (5)	B. Pharm
4.	Mrs.I. Adi Lakshmi	Associate Professor	Pharmaceutics (5)	B. Pharm
5.	Mr A. Nanaji	Associate Professor	Remedial Biology (RB) (2)	B. Pharm
6.	Mr. A Seshu	Assistant Professor	Remedial Maths- (RM) (2)	B. Pharm
7.	Mrs.K. Subha Lakshmi	Assistant Professor	Communication Skills-(CS) (2)	B. Pharm
8.	Mr. Vamsi Krishna Yadav	Associate Professor	Human Anatomy and Physiology-I (HAP-I) Lab (6)	B. Pharm
9.	Mrs.Y. Pavani	Assistant Professor	Pharmaceutical Analysis -I(PA-I) Lab (6)	B. Pharm
10.	Mrs.M. Geethanjali	Associate Professor	Inorganic Chemistry Lab (PIC) (6)	B. Pharm
11.	Mrs.I. Adi Lakshmi	Associate Professor	Pharmaceutics Lab (6)	B. Pharm
12.	Mr. A. Nanaji	Associate Professor	Remedial Biology Lab- (RB) (3)	B. Pharm
13.	Mrs.K. Subha Lakshmi	Assistant Professor	Communication Skills Lab (CS) (2)	B. Pharm

*Ammy*  
**Time Table Incharge**

*Principal*  
**Principal**







**CLASS TIME TABLE AY: 2022-23**

**CLASS: I B.Pharm I Sem (PCI Regulation)**  
**SECTION- B (2022 Admitted Batch)**

**w.e.f: 26/12/2022**

Class Teacher: Mr.B.Yerni Kumar				Batch C: Roll 56-80		Batch D: Roll 81-B0		
DAY/ TIME	9.30 - 10.30	10.30 - 11.20	11.20 - 12.10	2.10- 01.00	1.00 - 1.50	1.50- 2.40	2.40- 3.20	3.20 4.30
MON	CEUTICS	HAP-I	PIC	L U N C H	PA-I	Batch C: RB Lab Batch D: CS Lab		
TUE	PA-I	RM/RB	CEUTICS		HAP-I	Batch C: Tutorial Batch D: CS Lab		
WED	PIC	PA-I	CS		HAP-I	Batch C: HAP Lab Batch D: PA1 Lab		
THU	CS	CEUTICS	PA-I		PIC	Batch C: PA1 Lab Batch D: HAP Lab		
FRI	CEUTICS	PIC	HAP-I		CEUTICS	Batch C: PIC Lab Batch D: CEUTICS Lab		
SAT	HAP-I	RM/RB	PA-I		PIC	Batch C: CEUTICS Lab Batch D: PIC Lab		

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Mr. B. Yerni Kumar	Assistant Professor	Human Anatomy and Physiology -I(HAP-I) (5)	B. Pharm
2.	Mrs. B. Rama Madhuri	Associate Professor	Pharmaceutical Analysis -I (PA-I) (5)	B. Pharm
3.	Mrs. K. Venkata Radhika	Associate Professor	Inorganic Chemistry (PIC) (5)	B. Pharm
4.	Mr. S. Chandrasekhar	Associate Professor	Pharmaceutics (5)	B. Pharm
5.	Mr. A. Nanaji	Associate Professor	Remedial Biology (RB) (3)	B. Pharm
6.	Mr. A Seshu	Assistant Professor	Remedial Maths (RM) (2)	B. Pharm
7.	Mrs. K. Subha Lakshmi	Assistant Professor	Communication Skills (CS) (2)	B. Pharm
8.	Mr. B. Yerni Kumar	Assistant Professor	Human Anatomy and Physiology -I Lab (HAP) (6)	B. Pharm
9.	Ms. B. Rama Madhuri	Associate Professor	Pharmaceutical Analysis -I Lab (PA)(6)	B. Pharm
10.	Mrs. K. Venkata Radhika	Associate Professor	Inorganic Chemistry Lab (PIC) (6)	B. Pharm
11.	Mr. S. Chandrasekhar	Associate Professor	Pharmaceutics Lab (6)	B. Pharm
12.	Mr. A. Nanaji	Associate Professor	Remedial Biology Lab (RB) (3)	B. Pharm
13.	Mrs. K. Subha Lakshmi	Assistant Professor	Communication Skills Lab (CS) (2)	B. Pharm

*Mony*  
**Time Table Incharge**

*Principal*  
**Principal**







**CLASS TIME TABLE AY: 2022-23**

**CLASS:II B.Pharm I Sem (PCI Regulation)**  
**SECTION- A (2021 Admitted Batch)**

**w.e.f:08/11/2022**

CLASS TEACHER - Mr.M.Rajeswara Rao				Batch A:Roll 01-25		Batch B: Roll 26-55		
DAY/ TIME	9:30- 10:30	10:30- 11:20	11:20- 12:10	12:10 1:00	1:00 - 01:50	1:50 - 2:40	2:40 - 3:30	3:30 - 4:20
MON	PE	POC-II	PP-I	L U N C H	MB	BATCH A - POC-II LAB BATCH B - PP-I LAB		
TUE	PP-I	PE	MB		POC-II	BATCH A - PP-I LAB BATCH B - POC-II LAB		
WED	MB	PP-I	PE		TUTORIAL (PP-I)	BATCH A -MB LAB BATCH B -PE LAB		
THU	POC-II	MB	PP-I		PE	BATCH A - MB LAB BATCH B - PE LAB		
FRI	MB	PE	POC-II		TUTORIAL (PE)	PP-I	TUTORIAL (POC-II)	LIBRARY/ SPORTS
SAT	PP-I	POC-II	MB		PE	STI	TUTORIAL (MB)	LIBRARY/ SPORTS

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Mr. S. Rama Krishna	Associate Professor	Pharmaceutical Organic Chemistry-II (POC-II) (5)	B. Pharm
2.	Mr.M. Rajeswararao	Assistant Professor	Physical Pharmaceutics – I (PP-I) (5)	B. Pharm
3.	Ms. K. Rohini	Assistant Professor	Pharmaceutical Microbiology (MB)(5)	B. Pharm
4.	Mrs.M. Venkata Naga Deepika	Associate Professor	Pharmaceutical Engineering (PE)(5)	B. Pharm
5.	Mr. S.Rama Krishna	Associate Professor	Pharmaceutical Organic Chemistry-II (POC-II) lab (6)	B. Pharm
6.	Mr M. Rajeswararao	Assistant Professor	Physical Pharmaceutics – I (PP-I) Lab (6)	B. Pharm
7.	Ms. K. Rohini	Assistant Professor	Pharmaceutical Microbiology (MB) Lab (6)	B. Pharm
8.	Mrs. M. V.Naga Deepika	Associate Professor	Pharmaceutical Engineering (PE) Lab (6)	B. Pharm
9.	Mr.S. Rama Krishna	Associate Professor	Pharmaceutical Organic Chemistry-II (POC-II) Tutorial (1)	B. Pharm
10.	Mr.M. Rajeswararao	Assistant Professor	Physical Pharmaceutics – I (PP-I) Tutorial (1)	B. Pharm
11.	Ms. K. Rohini	Assistant Professor	Pharmaceutical Microbiology (MB) Tutorial (1)	B. Pharm
12.	Mrs. M. Venkata Naga Deepika	Associate Professor	Pharmaceutical Engineering (PE) Tutorial (1)	B. Pharm
13.	Mr. M. Rajeswara Rao	Associate Professor	Student Teacher Interaction (STI) (1)	B. Pharm
14.	Mr. R. Ramana	Librarian	Library (1)	B. Pharm
15.	Mr. D. Koteswara Rao	Physical Director	Sports (1)	B. Pharm

*More*  
**Time Table Incharge**

*Principal*  
**Principal**

Avanthi Institute of Pharmaceutical Sciences

**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt - 531162







**CLASS TIME TABLE AY: 2022-23**

**CLASS: II B.Pharm I Sem (PCI Regulation)**  
**SECTION- B (2021 Admitted Batch)**

**w.e.f: 08/11/2022**

CLASS TEACHER : Mr.V.I.LS REDDY				Batch C:Roll 56-80			Batch D: Roll 81-A7	
DAY/ TIME	9:30 - 10:30	10:30 – 11:20	11:20– 12:10	12:10 -1:00	1:00 – 01:50	1:5– 2:40	2:40– 3:30	3:30 – 4:20
MON	PP-I	MB	PE	L U N C H	POC-II	BATCH C – MB LAB BATCH D – PE LAB		
TUE	MB	POC-II	PP-I		PE	BATCH C – PE LAB BATCH D – MB LAB		
WED	PE	POC-II	PP-I		TUTORIAL (MB)	BATCH C - POC-II LAB BATCH D - PP-II LAB		
THU	PP-I	PE	POC-II		MB	BATCH C - PP-II LAB BATCH D - POC-II LAB		
FRI	POC-II	PP-I	MB		TUTORIAL (POC-II)	STI	TUTORIAL (PE)	LIBRARY/ SPORTS
SAT	MB	PE	PP-I		POC-II	MB	TUTORIAL (PP-I)	LIBRARY/ SPORTS

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Mr. A. Srinivas	Associate Professor	Pharmaceutical Organic Chemistry-II (POC-II) (6)	B. Pharm
2.	Mr. V.H.S.Reddy	Associate Professor	Physical Pharmaceutics - I (PP-I) (5)	B. Pharm
3.	Mrs.B.Poornima	Associate Professor	Pharmaceutical Microbiology (MB) (6)	B. Pharm
4.	Ms.D.Purnima	Associate Professor	Pharmaceutical Engineering (PE) (5)	B. Pharm
5.	Mr. A. Srinivas	Associate Professor	Pharmaceutical Organic Chemistry-II (POC-II) Lab(6)	B. Pharm
6.	Mr.V.H.S.Reddy	Associate Professor	Physical Pharmaceutics - I (PP-I) Lab (6)	B. Pharm
7.	Mrs.B.Poornima	Associate Professor	Pharmaceutical Microbiology (MB) Lab (5)	B. Pharm
8.	Ms.D.Purnima	Associate Professor	Pharmaceutical Engineering (PE) Lab (5)	B. Pharm
9.	Mr. A. Srinivas	Associate Professor	Pharmaceutical Organic Chemistry-II (POC-II) Tutorial(1)	B. Pharm
10.	Mr.V.H.S.Reddy	Associate Professor	Physical Pharmaceutics - I (PP-I) Tutorial (1)	B. Pharm
11.	Mrs.B.Poornima	Associate Professor	Pharmaceutical Microbiology Tutorial (MB) (1)	B. Pharm
12.	Ms. D.Purnima	Associate Professor	Pharmaceutical Engineering (PE) Tutorial (1)	B. Pharm
13.	Mr. V.H.S.Reddy	Associate Professor	Student Teacher Interaction (STI) (1)	B. Pharm
14.	Mr. R.Ramana	Librarian	Library (1)	B. Pharm
15.	Mr. D.Koteswara Rao	Physical Director	Sports (1)	B. Pharm

**Time Table Incharge**

**Principal**







**CLASS TIME TABLE AY: 2022-23**

**CLASS: III B.Pharm I Sem (PCI Regulation)**

**SECTION – A (2020 Admitted Batch)**

**w.e.f: 15/07/2022**

Class Teacher– Dr.M.Sowmya				Batch A: Roll 01-25		Batch B: Roll 25 - 50		
DAY/ TIME	9:30 - 10:30	10:30 – 11:20	11:20 – 12:10	12:10 -1:00	1:00 – 01:50	1:50 2:40	2:40– 3:30	3:30 – 4:20
<b>MON</b>	MC-II	COLOGY	IP-I	<b>L U N C H</b>	COGNOSY - II	BATCH A - IP-I LAB BATCH B - COLOGYLAB		
<b>TUE</b>	PJ	MC-II	COLOGY		TUTORIA L (IP-I)	BATCH A - COLOGY LAB BATCH B - IP-I LAB		
<b>WED</b>	IP-I	COGNOSY - II	MC-II		COLOGY	BATCH A –LIBRARY/SPORTS BATCH B – COGNOSY -II LAB		
<b>THU</b>	PJ	COLOGY	COGNOSY - II		IP-I	BATCH A – COGNOSY -II LAB BATCH B -LIBRARY/SPORTS		
<b>FRI</b>	COLOGY	COGNOSY - II	PJ		MC-II	PJ	TUTORIAL (MC-II)	LIBRARY/ SPORTS
<b>SAT</b>	COGNOSY - II	MC-II	PJ		IP-I	STI	TUTORIAL (COL)	LIBRARY /SPORTS

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Dr. M.Sowmya	Associate Professor	Medicinal Chemistry – II (MC-II) (5)	B. Pharm
2.	Mr.B.Yerni Kumar	Assistant Professor	Pharmacology (COLOGY) (5)	B. Pharm
3.	Mr.K.B.K.Raju	Assistant Professor	Industrial Pharmacy – I (IP-I) (4)	B. Pharm
4.	Mr. A.Srinivas	Associate Professor	Pharmacognosy – II (5)	B. Pharm
5.	Mr.M.Suresh Kumar	Associate Professor	Pharmaceutical Jurisprudence (5)	B. Pharm
6.	Mr.B.Yerni Kumar	Assistant Professor	Pharmacology Lab (6)	B. Pharm
7.	Mr.K.B.K.Raju	Assistant Professor	Industrial Pharmacy – I Lab (6)	B. Pharm
8.	Mr. A.Srinivas	Associate Professor	Pharmacognosy – II (COGNOSY-II) Lab (6)	B. Pharm
10.	Mr.B.Yerni Kumar	Assistant Professor	Pharmacology (COLOGY-II) Tutorial (1)	B. Pharm
11.	Mr.K.B.K.Raju	Assistant Professor	Industrial Pharmacy – I (IP-I) Tutorial (1)	B. Pharm
12.	Dr. M.Sowmya	Associate Professor	Student Teacher Interaction (STI) (1)	B. Pharm
13.	Mr. R.Ramana	Librarian	Library (2)	B. Pharm
14.	Mr. D.Koteswara Rao	Physical Director	Sports (2)	B. Pharm

*Time Table Incharge*

*Principal*



Avanthi Institute of Pharmaceutical Sciences

**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**CLASS TIME TABLE AY: 2022-23**

**CLASS: III B.Pharm I Sem (PCI Regulation)**

**SECTION – B (2020 Admitted Batch)**

**w.e.f: 15/07/2022**

Class Teacher – Mrs. I. Adilakshmi				Batch C: Roll 51-75		Batch D: Roll 76-A <sub>0</sub>		
DAY/ TIME	9:30 – 10:30	10:30 – 11:20	11:20 – 12:10	12:10 -1:00	1:00 – 01:50	1:50 – 2:40	2:40 – 3:30	3:30 – 4:20
<b>MON</b>	IP-I	COGNOSY - II	MC-II	<b>L U N C H</b>	COLOGY-II	BATCH C – COGNOSY - II LAB BATCH D – LIBRARY/SPORTS		
<b>TUE</b>	COLOGY-II	COGNOSY - II	PJ		MC-II	BATCH C – LIBRARY/SPORTS BATCH D – COGNOSY - II LAB		
<b>WED</b>	MC-II	COLOGY- II	IP-I		TUTORIAL (COLOGY)	BATCH C - IP-I LAB BATCH D - COLOGY LAB		
<b>THU</b>	COGNOSY - II	MC-II	IP-I		PJ	BATCH C - COLOGY LAB BATCH D - IP-I LAB		
<b>FRI</b>	PJ	MC-II	COLOGY-II		COGNOSY- II	IP-I	TUTORIAL (IP-I)	LIBRARY/ SPORTS
<b>SAT</b>	PJ	IP-I	COGNOSY - II		COLOGY-II	PJ	STI	TUTORIAL (MC-II)

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Dr. M. Sowmya	Associate Professor	Medicinal Chemistry – II (MC-II) (5)	B. Pharm
2.	Mr. Vamsi Yadav	Associate Professor	Pharmacology-II (COLOGY-II) (5)	B. Pharm
3.	Mrs.I. AdiLakshmi	Associate Professor	Industrial Pharmacy – I (IP-I) (5)	B. Pharm
4.	Mr. A. Nanaji	Associate Professor	Pharmacognosy – II (COGNOSY-II) (5)	B. Pharm
5.	Mrs. Ch. Geetha	Associate Professor	Pharmaceutical Jurisprudence (PJ) (5)	B. Pharm
6.	Mr.Vamsi Yadav	Associate Professor	Pharmacology (COLOGY-II) Lab (6)	B. Pharm
7.	Mrs. I. Adi Lakshmi	Associate Professor	Industrial Pharmacy – I (IP-I) Lab (6)	B. Pharm
8.	Mr. A. Nanaji	Associate Professor	Pharmacognosy – II (COGNOSY-II) Lab (6)	B. Pharm
9.	Mrs. M. Sowmya	Associate Professor	Medicinal Chemistry – II (MC-II) Tutorial(1)	B. Pharm
10.	Mr. Vamsi Yadav	Associate Professor	Pharmacology Tutorial (1)	B. Pharm
11.	Mrs.I. Adi Lakshmi	Associate Professor	Industrial Pharmacy – I (IP-I) Tutorial (1)	B. Pharm
12.	Mrs.I. AdiLakshmi	Associate Professor	Student Teacher Interaction (STI) (1)	B. Pharm
13.	Mr. R. Ramana	Librarian	Library (1)	B. Pharm
14.	Mr.D.Koteswara Rao	Physical Director	Sports (1)	B. Pharm

**Time Table Incharge**

**Principal**





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist)-531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY: 2022-23

CLASS: IV B.PHARM I SEM (PCI REGULATION)

SECTION – A (2019 Admitted Batch)

w.e.f: 04/07/2022

Class Teacher: Mrs.B.Aruna				BatchA: Roll 01-25			Batch B: Roll 26-50	
DAY/ TIME	9:30- 10:30	10:30- 11:20	11:20- 12:10	12:10 1:00	1:00 01:50	1:50 2:40	2:40 3:30	3:30- 4:20
MON	IMA	IP-II	GPAT	L U N C H	NDDS	Batch-A- IMA LAB		
TUE	NDDS	IMA	IP-II		GPAT	Batch-A- PROJECT		
WED	IP-II	PP	IMA		GPAT	STI	PROJECT	LIBRARY/ SPORTS
THU	NDDS	IP-II	PP		TUTORIAL (IMA)	GPAT	PROJECT	
FRI	PP	IMA	NDDS		PP	GPAT	PROJECT	
SAT	IP-II	NDDS	PP		IMA	GPAT	PROJECT	

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Mrs. B.Aruna	Assistant Professor	Instrumental Methods of Analysis (IMA) (5)	B. Pharm
2.	Mr. M.Rajeswara Rao	Assistant Professor	Industrial Pharmacy – II (IP-II) (5)	B. Pharm
3.	Mr. M.Vasu	Associate Professor	Pharmacy Practice (PP) (5)	B. Pharm
4.	Mr. V.H.S. Reddy	Associate Professor	Novel Drug Delivery Systems (NDDS) (5)	B. Pharm
5.		Associate Professor	GPAT (6)	B. Pharm
6.	Mrs. B.Aruna	Assistant Professor	Instrumental Methods of Analysis (IMA) Lab (6)	B. Pharm
7.	Mrs. B.Aruna	Assistant Professor	Instrumental Methods of Analysis (IMA) Tutorial (1)	B. Pharm
8.	Mrs. B.Aruna	Assistant Professor	Student Teacher Interaction (STI) (1)	B. Pharm
9.	Mr. R.Ramana	Librarian	Library (1)	B. Pharm
10.	Mr. D.Koteswara Rao	Physical Director	Sports (1)	B. Pharm

Time Table Incharge

Principal



Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**CLASS TIME TABLE AY:2022-23**

**CLASS: IV B.PHARM I SEM (PCI REGULATION)**

**SECTION – B (2019 Admitted Batch)**

**w.e.f: 04/07/2022**

Class Teacher: Mrs.Y.Pavani				Batch C: Roll 51-75			Batch D: Roll 76-A <sub>3</sub>	
DAY/ TIME	9:30- 10:30	10:30- 11:20	11:20- 12:10	12:10 1:00	1:00 – 01:50	1:50 – 2:40	2:40 – 3:30	3:30 – 4:20
MON	IP-II	IMA	PP	<b>L U N C H</b>	GPAT	PROJECT		
TUE	PP	IMA	IMA		NDDS	PROJECT		GPAT
WED	IMA	NDDS	GPAT		IP-II	Batch-C- PROJECT Batch-D -IMA LAB		
THU	IP-II	IMA	GPAT		PP	Batch-C- IMA LAB Batch-D – PROJECT		
FRI	NDDS	PP	IP-II		NDDS	GPAT	PROJECT	STI
SAT	PP	IP-II	NDDS		IMA	GPAT	PROJECT	LIBRARY/ SPORTS

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Mrs. Y.Pavani	Assistant Professor	Instrumental Methods of Analysis (IMA) (5)	B. Pharm
2.	Mr. S. Rama Krishna	Associate Professor	Industrial Pharmacy – II (IP-II) (5)	B. Pharm
3.	Mrs. M.Divya	Assistant Professor	Pharmacy Practice (PP) (5)	B. Pharm
4.	Mrs. M.V.Naga Deepika	Associate Professor	Novel Drug Delivery Systems (NDDS) (5)	B. Pharm
5.		Associate Professor	GPAT (6)	B. Pharm
6.	Mrs. Y. Pavani	Assistant Professor	Instrumental Methods of Analysis (IMA) Lab (6)	B. Pharm
7.	Mrs. Y. Pavani	Assistant Professor	Student Teacher Interaction (STI) (1)	B. Pharm
8.	Mr. R.Ramana	Librarian	Library (1)	B. Pharm
9.	Mr. D.Koteswara Rao	Physical Director	Sports (1)	B. Pharm

  
**Time Table Incharge**

  
**Principal**



**PRINCIPAL**  
**Avanthi Institute of Pharmaceutical Science**  
Cherukupally (V), Bhogapuram Manda  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist)-531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY: 2022-23

CLASS: I B.Pharm II Sem (PCI Regulation)  
SECTION- A (2022 Admitted Batch)

w.e.f: 29/05/2023

CLASS TEACHER: Mrs. L. Divya Sri				Batch A: Roll 01-25		Batch B: Roll 26-55		
DAY/ TIME	9:30 – 10:30	10:30 – 11:20	11:20 – 12:20	12:00 1:00	1:00 – 1:50	1:50 2:40	2:40 3:30	3:30 – 4:20
MON	POC-I	PATHO	BIOCHEM	L U N C H	HAP-II	Batch A: POC-I Lab Batch B: BIOCHEM Lab		
TUE	BIOCHEM	HAP-II	POC-I		ES	Batch A: BIOCHEM Lab Batch B: POC-II Lab		
WED	HAP-II	CA	PATHO		POC-I	Batch A: HAP-II Lab Batch B: CA Lab		
THU	BIOCHEM	PATHO	CA		TUTORIAL (OC)	Batch A: CA Lab Batch B: HAP-II Lab		
FRI	PATHO	POC-I	CA		BIOCHEM	ES	HAP-II	TUTORIAL (HAP)
SAT	CA	BIOCHEM	HAP-II		PATHO	POC-I	ES	LIBRARY/ SPORTS

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Ms. D. Purnima Yadav	Associate Professor	Pharmaceutical Organic Chemistry-I (POC-I) (5)	B. Pharm
2.	Mrs. L. Divya Sri	Associate Professor	Pharmaceutical Biochemistry(BIOCHEM) (5)	B. Pharm
3.	Mr. Vinay Ramji	Assistant Professor	Human Anatomy and Physiology- II (HAP-II) (5)	B. Pharm
4.	Mrs. B. MeherJyoti	Assistant Professor	Pathophysiology (PATHO) (5)	B. Pharm
5.	Ms.K. Rohini	Assistant Professor	Environmental Sciences (ES) (3)	B. Pharm
6.	Mrs. K. Venkata Radhika	Assistant Professor	Computer Applications (CA) (4)	B. Pharm
7.	Ms. D. Purnima Yadav	Associate Professor	Pharmaceutical Organic Chemistry-I (POC-I)Lab (6)	B. Pharm
8.	Mrs. L. Divya Sri	Associate Professor	Pharmaceutical Biochemistry Lab (BIOCHEM) (6)	B. Pharm
9.	Mr. Vinay Ramji	Assistant Professor	Human Anatomy and Physiology- II (HAP-II) Lab (6)	B. Pharm
10.	Mrs. K. Venkata Radhika	Assistant Professor	Computer Applications (CA) Lab (6)	B. Pharm
11.	Ms. D. Purnima Yadav	Associate Professor	Pharmaceutical Organic Chemistry-I (POC-I)Tutorial (1)	B. Pharm
12.	Mr. Vinay Ramji	Assistant Professor	Human Anatomy and Physiology- II (HAP-II) Tutorial (1)	B. Pharm
13.	Mr. R. Ramana	Librarian	Library (1)	B. Pharm
14.	Mr. Koteswar Rao	Physical Director	Sports (1)	B. Pharm

Time Table Incharge

Principal

Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY: 2022-23

CLASS:I B.Pharm IISem (PCI Regulation)  
SECTION- B (2022 Admitted Batch)

w.e.f: 29/05/2023

CLASS TEACHER: Mrs. B. MeherJyoti				Batch C:Roll 56-80		Batch D : Roll- 81-B <sub>0</sub>		
DAY/ TIME	9:30- 10:30	10:30- 11:20	11:20- 12:10	12:00 1:00	1:00 – 01:50	1:50- 2:40	2:40- 3:30	3:30 – 4:20
MON	POC-I	HAP-II	BIOCHEM	L U N C H	PATHO	BATCH C-HAP-II LAB BATCH D –CA LAB		
TUE	CA	PATHO	POC-I		HAP-II	BATCH C-CA LAB BATCH D HAP II LAB		
WED	PATHO	BIOCHEM	HAP-II		CA	BATCH C-POC I LAB BATCH D-BIOCHEM LAB		
THU	POC-I	BIOCHEM	ES		CA	BATCH C- BIOCHEM LAB BATCH D-POC I LAB		
FRI	BIOCHEM	POC-I	PATHO		TUTORIAL (HAP)	POC-I	ES	(L/S)
SAT	HAP-II	PATHO	BIOCHEM		ES	CA	HAP-II	TUTORIAL (OC)

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Mr. S. Chandra Sekhar	Associate Professor	Pharmaceutical Organic Chemistry-I (POC-I) (5)	B. Pharm
2.	Mrs.B. Poornima	Associate Professor	Pharmaceutical Biochemistry(BIOCHEM) (5)	B. Pharm
3.	Mrs. Anveshi Dhananjaya	Assistant Professor	Human Anatomy and Physiology-II (HAP-II)(5)	B. Pharm
4.	Mrs.B. MeherJyoti	Assistant Professor	Pathophysiology (PATHO) (5)	B. Pharm
5.	Ms. K. Rohini	Assistant Professor	Environmental Sciences (ES) (3)	B. Pharm
6.	Mrs.B. Rama Madhuri	Assistant Professor	Computer Applications (CA) (4)	B. Pharm
7.	Mr. S. Chandra Sekhar	Associate Professor	Pharmaceutical Organic Chemistry-I (POC-I) Lab (6)	B. Pharm
8.	Mrs.B. Poornima	Associate Professor	Pharmaceutical Biochemistry (BIOCHEM) Lab (6)	B. Pharm
9.	Mrs.Anveshi Dhananjaya	Assistant Professor	Human Anatomy and Physiology-II (HAP-II) Lab (6)	B. Pharm
10.	Mrs.B. Rama Madhuri	Assistant Professor	Computer Applications (CA) Lab (6)	B. Pharm
11.	Mr. S. Chandra Sekhar	Associate Professor	Pharmaceutical Organic Chemistry-I (POC-I)(Tutorial (1)	B. Pharm
12.	Mrs. Anveshi Dhananjaya	Assistant Professor	Human Anatomy and Physiology-II (HAP-II)Tutorial (1)	B. Pharm
13.	Mr. R. Ramana	Librarian	Library (1)	B. Pharm
14.	Mr. Koteswar Rao	Physical Director	Sports(1)	B. Pharm

Time Table Incharge

Principal

Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162







# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist)-531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY: 2022-23

CLASS: II B.PHARM II SEM (PCI REGULATION)

SECTION – A (2021 Admitted Batch)

w.e.f: 20/03/2023

Class Teacher: Mr. M. Rajeswararao				Batch A: Roll 01-25			Batch B: Roll 26-55		
DAY/ TIME	9:30 - 10:30	10:30 - 11:20	11:20 - 12:10	12:10 -1:00	1:00 - 01:50	1:50 - 2:40	2:40 - 3:30	3:30 - 4:20	
MON	COLOGY-I	COGNOSY-I	MC-I	L U N C H	POC-III	BATCH A - COLOGY-I LAB BATCH B - COGNOSY-I LAB			
TUE	PP-II	COLOGY-I	COGNOSY-I		TUTORIAL (PP-II)	BATCH A - COGNOSY-I LAB BATCH B - COLOGY-I LAB			
WED	MC-I	PP-II	COLOGY-I		COGNOSY-I	BATCH A - MC-I LAB BATCH B - PP-II LAB			
THU	PP-II	MC-I	POC-III		COLOGY-I	BATCH A - PP-II LAB BATCH B - MC-I LAB			
FRI	COGNOSY -I	POC-III	COLOGY-I		TUTORIAL (COLOGY)	TUTORIAL (POC-III)	PP-II	POC-III	
SAT	POC-III	MC-I	PP-II		TUTORIAL (MC I)	COGNOSY-I	COLOGY-I	LIBRARY/ SPORTS	

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Mrs. Anveshi Dhananjaya	Assistant Professor	Pharmaceutical Organic Chemistry-III (POC-III) (5)	B. Pharm
2.	Mr. S.Rama Krishna	Associate Professor	Medicinal Chemistry-I (MC-I) (4)	B. Pharm
3.	Mr. M.Rajeswararao	Assistant Professor	Physical Pharmaceutics-II (PP-II) (5)	B. Pharm
4.	Ms. K.Rohini	Assistant Professor	Pharmacology-I (COLOGY-I) (5)	B. Pharm
5.	Mr.A.Nanaji	Associate Professor	Pharmacognosy & Phytochemistry-I (COGNOSY-I) (5)	B. Pharm
6	Mr. S.Rama Krishna	Associate Professor	Medicinal Chemistry-I Lab (MC-I) (6)	B. Pharm
7	Mr. M.Rajeswararao	Assistant Professor	Physical Pharmaceutics-II (PP-II) Lab (6)	B. Pharm
8	Ms. K.Rohini	Assistant Professor	Pharmacology-I (COLOGY-I) Lab (6)	B. Pharm
9	Mr.A.Nanaji	Associate Professor	Pharmacognosy & Phytochemistry-I (COGNOSY-I) Lab (6)	B. Pharm
10	Mr. R.Ramana	Librarian	Library(1)	B. Pharm
11	Mr. D.Koteswara Rao	Physical Director	Sports (1)	B. Pharm

*Time Table Incharge*

*Principal*

Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mand





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist)-531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY: 2022-23

CLASS: II B.PHARM II SEM (PCI REGULATION)

w.e.f: 20/03/2023

SECTION – B (2021 Admitted Batch)

Class Teacher :Ms. D.Purnima Yadav				Batch C: Roll 56-80		Batch D : Roll 81-A7		
DAY/ TIME	9:30- 10:30	10:30- 11:20	11:20- 12:10	12:10 1:00	1:00 01:50	1:50 2:40	2:40 3:30	3:30 4:20
MON	MC-I	PP-II	COLOGY-I	L U N C H	STI	BATCH C - PP-II LAB BATCH D - MC-I LAB		
TUE	COGNOSY-I	MC-I	PP-II		TUTORIAL (COLOGY-I)	BATCH C - MC-I LAB BATCH D - PP-II LAB		
WED	COLOGY-I	COGNOSY-I	MC-I		TUTORIAL (POC-III)	BATCH C – COLOGY-I LAB BATCH D – COGNOSY-I LAB		
THU	POC-III	COLOGY-I	COGNOSY-I		TUTORIAL (PP-II)	BATCH C – COGNOSY-I LAB BATCH D – COLOGY-I LAB		
FRI	MC-I	PP-II	COLOGY-I		TUTORIAL COGNOSY-I	POC-III	MC-I	CLASS TEST
SAT	PP-II	POC-III	COGNOSY-I		TUTORIAL (MC-I)	POC-III	CLASS TEST	LIBRARY/ SPORTS

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Mrs. Anveshi Dhananjaya	Assistant Professor	Pharmaceutical Organic Chemistry-III (POC-III) (4)	B. Pharm
2.	Mr. A. Naga Srinivas	Assistant Professor	Medicinal Chemistry-I (MC-I) (5)	B. Pharm
3.	Ms. D. Purnima Yadav	Assistant Professor	Physical Pharmaceutics-II (PP-II) (4)	B. Pharm
4.	Mrs. Ch. Geetha	Assistant Professor	Pharmacology-I (COLOGY-I) (4)	B. Pharm
5.	Mr. A. Nanaji	Assistant Professor	Pharmacognosy & Phytochemistry-I (4)	B. Pharm
6.	Mr. A. Naga Srinivas	Assistant Professor	Medicinal Chemistry-I (MC-I) Lab (6)	B. Pharm
7.	Ms. D. Purnima Yadav	Assistant Professor	Physical Pharmaceutics-II Lab (PP-II) (6)	B. Pharm
8.	Mrs. Ch. Geetha	Assistant Professor	Pharmacology-I (COLOGY-I) Lab (6)	B. Pharm
9.	Mr. A. Nanaji	Assistant Professor	Pharmacognosy & Phytochemistry-I (COGNOSY-I) Lab (6)	B. Pharm
10.	Ms. D. Purnima Yadav	Assistant Professor	Student Teacher Interaction (STI) (1)	B. Pharm
11.	Mr. R. Ramana	Librarian	Library (1)	B. Pharm
12.	Mr. D. Koteswara Rao	Physical Director	Sports (1)	B. Pharm

Time Table Incharge

Principal

Avanthi Institute of Pharmaceutical Sciences



PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mand  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist)-531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY: 2022-23

CLASS: III B.PHARM II SEM (PCI REGULATION)  
SECTION – A (2020 Admitted Batch)

w.e.f: 02/01/2023

Class Teacher : Dr. M. Sowmya				Batch A: Roll 01-25		Batch B: Roll 26- 50		
DAY/ TIME	9:30 - 10:30	10:30 – 11:20	11:20 – 12:10	12:10 - 1:00	1:00 – 01:50	1:50 – 2:40	2:40 – 3:30	3:30 – 4:20
MON	QA	COLOGY- III	MC-III	L U N C H	BPPK	BATCH A - HDT LAB BATCH B – LIBRARY/SPORTS		
TUE	BIOTECH	QA	COLOGY -III		MC-III	BATCH A - LIBRARY/SPORTS BATCH B - HDT LAB		
WED	HDT	BIOTECH	BPPK		COLOGY- III	BATCH A – MC-III LAB BATCH B – COLOGY LAB		
THU	MC-III	BPPK	HDT		QA	BATCH A – COLOGY LAB BATCH B – MC-III LAB		
FRI	COLOGY- III	HDT	BPPK		BIOTECH	QA	TUTORIAL (HDT)	TUTORIAL (MC-III)
SAT	BIOTECH	MC-III	HDT		TUTORIAL (COLOGY- III)	BIOTECH	QA	TUTORIAL (BPPK)

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Dr. M. Sowmya	Associate Professor	Medicinal Chemistry-III (MC-III) (4)	B. Pharm
2.	Mrs. B. Meher Jyothi	Assistant Professor	Pharmacology-III (COLOGY-III) (4)	B. Pharm
3.	Mr. M. Suresh Kumar	Associate Professor	Herbal Drug Technology (HDT) (4)	B. Pharm
4.	Mr. K. Bhargav Krishna Raju	Associate Professor	Biopharmaceutics & Pharmacokinetics(BPPK) (4)	B. Pharm
5.	Mr. V. H.S. Reddy	Associate Professor	Pharmaceutical Biotechnology (BIOTECH) (5)	B. Pharm
6.	Mrs. B. Aruna	Assistant Professor	Quality Assurance(QA) (5)	B. Pharm
7.	Dr. M. Sowmya	Associate Professor	Medicinal Chemistry-III (MC-III) Lab (6)	B. Pharm
8.	B. MeherJyothi	Assistant Professor	Pharmacology-III (COLOGY-III) Lab (6)	B. Pharm
9.	Mr. M. Suresh Kumar	Associate Professor	Herbal Drug Technology (HDT) Lab (6)	B. Pharm
10.	Dr. M. Sowmya	Associate Professor	Medicinal Chemistry-III(MC-III) (1)	B. Pharm
11.	B. Meher Jyothi	Assistant Professor	Pharmacology-III (COLOGY-III)(1)	B. Pharm
12.	Mr. M. Suresh Kumar	Associate Professor	Herbal Drug Technology (HDT)(1)	B. Pharm
13.	Mr. K. Bhargav Krishna Raju	Associate Professor	Biopharmaceutics & Pharmacokinetics (BPPK) (1)	B. Pharm
14.	Mr .R. Ramana	Librarian	Library (1)	B. Pharm
15.	Mr. D. Koteswara Rao	Physical Director	Sports (1)	B. Pharm

Time Table Incharge

Principal

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt.. - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist)-531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY: 2022-23

CLASS: III B.PHARM II SEM (PCI REGULATION)  
SECTION – B (2020 Admitted Batch)

w.e.f: 02/01/2023

Class Teacher: Mr. M. Vasu				Batch C: Roll 51-75			Batch D: Roll 76- A0	
DAY/ TIME	9:30- 10:30	10:30- 11:20	11:20- 12:10	12:10 1:00	1:00 – 01:50	1:50 – 2:40	2:40 – 3:30	3:30- 4:20
MON	BIOTECII	BPPK	COLOGY- III	L U N C H	HDT	BATCH C - MC-III LAB BATCH D – COLOGY LAB		
TUE	COLOGY- III	MC-III	BPPK		QA	BATCH C - COLOGY LAB BATCH D - MC-III LAB		
WED	QA	HDT	MC-III		BIOTECII	BATCH C – HDT LAB BATCH D – LIBRARY/SPORTS		
THU	QA	HDT	BIOTECII		TUTORIAL MC-III	BATCH C – LIBRARY/SPORTS BATCH D-HDT LAB		
FRI	BPPK	QA	HDT		TUTORIAL (COLOGY-III)	MC-III	BIOTECII	TUTORIAL (BPPK)
SAT	COLOGY- III	BPPK	QA		MC-III	TUTORIAL (IITD)	COLOGY- III	BIOTECII

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Mr. M. Vasu	Associate Professor	Medicinal Chemistry-III (MC-III) (4)	B. Pharm
2.	Mr. D. Vinay Ramji	Assistant Professor	Pharmacology-III (COLOGY-III) (4)	B. Pharm
3.	Mrs L. Divya Sri	Associate Professor	Herbal Drug Technology(HDT) (4)	B. Pharm
4.	Mr.K.BhargavKrishnaRaju	Assistant Professor	Biopharmaceutics & Pharmacokinetics(BPPK) (4)	B. Pharm
5.	Mrs Y. Pavani	Assistant Professor	Pharmaceutical Biotechnology (BIOTECII) (5)	B. Pharm
6.	Mrs B. Aruna	Assistant Professor	Quality Assurance (QA) (5)	B. Pharm
7.	Mr. M. Vasu	Assistant Professor	Medicinal Chemistry-III (MC-III)Lab (6)	B. Pharm
8.	Mr. D. Vinay Ramji	Assistant Professor	Pharmacology-III (COLOGY-III)Lab (6)	B. Pharm
9.	Mrs L. Divya Sri	Associate Professor	Herbal Drug Technology (HDT)Lab (6)	B. Pharm
10.	Mr M Vasu	Assistant Professor	Medicinal Chemistry-III (MC- III)Tutorial (1)	B. Pharm
11.	Mr. D. Vinay Ramji	Assistant Professor	Pharmacology-III (COLOGY-III) Tutorial (1)	B. Pharm
12.	Mrs.L. Divya Sri	Assistant Professor	Herbal Drug Technology (HDT) Tutorial (1)	B. Pharm
13.	Mr. K. Bhargav Krishna Raju	Assistant Professor	Biopharmaceutics & Pharmacokinetics (BPPK)Tutorial (1)	B. Pharm
14.	Mr.R. Ramana	Librarian	Library (1)	B. Pharm
15.	Mr.D. Koteswara Rao	Physical Director	Sports (1)	B. Pharm

Time Table Incharge

Principal

Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist)-531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY: 2022-23

CLASS: IV B.PHARM II SEM (PCI REGULATION)

SECTION – A (2019 Admitted Batch)

w.e.f: 05/12/2022

Class Teacher: Mrs.Y. AnveshiDhananjaya					Batch A: Roll 01-25		Batch B: Roll 26-50	
DAY/ TIME	9:30- 10:30	10:30- 11:20	11:20- 12:10	12:10 1:00	1:00 – 01:50	1:50 – 2:40	2:40 – 3:30	3:30 -4:20
MON	PMM	SPP	CS	L U N C H	GPAT	PROJECT		
TUE	BRM	PMM	SPP		GPAT	PROJECT		
WED	SPP	BRM	PMM		CS	GPAT	PROJECT	
THU	CS	BRM	PMM		SPP	GPAT	PROJECT	
FRI	BRM	CS	SPP		PROJECT/ LIBRARY	GPAT	PROJECT	
SAT	CS	PMM	BRM		PROJECT/ LIBRARY	GPAT	PROJECT	LIBRARY/ SPORTS

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Mr.B. Yerni Kumar	Assistant Professor	Biostatistics & Research Methodology (BRM) (5)	B. Pharm
2.	Mrs.Y. Anveshi Dhananjaya	Assistant Professor	Social & Preventive Pharmacy (SPP) (5)	B. Pharm
3.	Mrs.K. Venkata Radhika	Assistant Professor	Pharma Marketing Management (PMM) (5)	B. Pharm
4.	Mrs.M. Divya	Assistant Professor	Cosmetic Science (CS) (5)	B. Pharm
5.			GPAT (6)	B. Pharm
6.			PROJECT (7)	B. Pharm
7.	Mr.R.Ramana	Librarian	Library (1)	B. Pharm
8.	Mr.D.Koteswara Rao	Physical Director	Sports (1)	B. Pharm

Time Table Incharge



Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist)-531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY: 2022-23

CLASS: IV B.PHARM II SEM (PCI REGULATION)

SECTION – B (2019 Admitted Batch)

w.e.f: 05/12/2022

Class Teacher : Mrs.K. VenkataRadika				Batch C: Roll 51-75		Batch D: Roll 76- A <sub>3</sub>		
DAY/ TIME	9:30- 10:30	10:30- 11:20	11:2- 12:10	12:10 -1:00	1:00 – 01:50	1:50 2:40	2:40 3:30	3:30-4:20
MON	CS	BRM	PMM	L U N C H	GPAT	PROJECT		
TUE	SPP	CS	BRM		GPAT	PROJECT		
WED	PMM	CS	SPP		PMM	GPAT	PROJECT	
THU	BRM	SPP	CS		PROJECT/ LIBRARY	GPAT	PROJECT	
FRI	SPP	PMM	BRM		CS	GPAT	PROJECT	
SAT	BRM	SPP	PMM		PROJECT/ LIBRARY	GPAT	PROJECT	LIBRARY/ SPORTS

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Mrs.B. Rama Madhuri	Assistant Professor	Biostatistics & Research Methodology(BRM) (5)	B. Pharm
2.	Mrs.Y. Anveshi Dhananjaya	Assistant Professor	Social & Preventive Pharmacy (SPP) (5)	B. Pharm
3.	Mrs.K. VenkataRadika	Assistant Professor	Pharma Marketing Management(PMM) (4)	B. Pharm
4.	Mrs.M. Divya	Assistant Professor	Cosmetic Science(CS) (5)	B. Pharm
5.			GPAT (6)	B. Pharm
6.			PROJECT (7)	B. Pharm
7.	Mr.R.Ramana	Librarian	Library (2)	B. Pharm
8.	Mr.D.Koteswara Rao	Physical Director	Sports (1)	B. Pharm

Time Table Incharge



Principal

PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mand  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### CLASS TIME TABLE AY: 2022-23

**CLASS: M. Pharm. I Sem Pharmaceutics**

**w.e.f: 12/12/22**

Day/ Time	9.00 - 10.00.	0.00- 11.00	11.00 - 12.00	12.00- 1.00	1.00 - 2.00	2.00 - 3.00	3.00 - 4.00.
Mon	MPAT	DDS	RA	L U N C H	MP	DDS	Library/Seminar
Tue	RA	MP	MPAT		DDS	MPAT	Library/Seminar
Wed	MPAT	MP	RA		MP	DDS	RA
Thu	Seminar/Assignments						
Fri	Practical-I						
Sat	Practical-II						

S.No	Name of the Faculty	Designation	Name of the Subject	Program
1.	Dr. G.Prasanthi	Professor	Modern Pharmaceutical Analytical Techniques (4)	M.Pharm
2.	Ms. Y.Vishnu Vandana	Associate Professor	Drug Delivery Systems (4)	M.Pharm
3.	Mr. M.Suresh Kumar	Associate Professor	Modern Pharmaceutics(4)	M.Pharm
4.	Mrs. B. Bhagya sri	Associate Professor	Regulatory Affairs (4)	M.Pharm
5.	Mr.P.Sandeep	Associate Professor	Assignments (1)	M.Pharm
6.	Dr. G.Prasanthi	Professor	Practical-I(6)	M.Pharm
7.	Ms. Y.Vishnu Vandana	Associate Professor	Practical-II (6)	M.Pharm
8.	Mrs. B. Bhagya sri	Associate Professor	Seminars (6)	M.Pharm
9.	Mr.R.Ramana	Librarian	Library	M.Pharm

*Dr. G. Prasanthi*  
**Time Table Incharge**



*Dr. G. Prasanthi*  
**Principal**

**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences





**CLASS TIME TABLE AY: 2022-23**

**CLASS:M. Pharm. II Sem Pharmaceutics**

**w.e.f: 01/05/23**

DAY/ TIME	9.00 - 10.00.	10.00- 11.00	11.00 -12.00	12.00- 1.00	1.00 - 2.00	2.00 - 3.00	3.00 -4.00.
MON	MPAT	DDS	RA	I, U N C H	MP	DDS	I library/Seminar
TUE	RA	MP	MPAT		DDS	MPAT	Library/Seminar
WED	MPAT	MP	RA		MP	DDS	RA
THU	Seminar/Assignments						
FRI	Practical-I						
SAT	Practical-II						

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Dr. G.Prasanthi	Professor	Computer Aided Drug Delivery System-(CADD) (4)	M.Pharm
2.	Ms. Y.VishnuVandana	Associate Professor	Molecular Pharmaceutics- (MP) (4)	M.Pharm
3.	Mr. M.Suresh Kumar	Associate Professor	Formulation Development- (FD) (4)	M.Pharm
4.	Mrs. B. Bhagyasri	Associate Professor	Advanced Biopharmaceutics and Pharmacokinetics- (BPPK) (4)	M.Pharm
5.	Mr.P.Sandeep	Associate Professor	Assignments (1)	M.Pharm
6	Ms. Y.VishnuVandana	Associate Professor	Practical-III (6)	M.Pharm
7	Dr. G.Prasanthi	Professor	Practical-IV (6)	M.Pharm
8	Mrs. B. Bhagyasri	Associate Professor	Seminars (6)	M.Pharm
9.	Mr.R.Ramana	Librarian	Library (2)	M.Pharm

*Mane*  
**Time Table Incharge**

*[Signature]*  
**Principal**



**PRINCIPAL**  
**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCE

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

ESTD : 2005

## CLASS TIME TABLE AY: 2022-23

CLASS:I M. Pharm I Sem Pharmacology

w.e.f: 12/12/2022

DAY/ TIME	9.00 - 10.00	10.00 - 11.00	11.00 - 12.00	12.00- 1.00	1.00 - 2.00	2.00 - 3.00	3.00 - 4.00.
MON	MPAT	AP-I	CMP-I	L U N C H	PTSM-I	MPAT	Library/ Seminar
TUE	CMP-I	PTSM-I	AP-I		AP-II	PTSM-I	Library/ Seminar
WED	MPAT	CMP-I	AP-I		CMP-I	AP-I	PTSM-I
THU	Seminar/Assignments						
FRI	Practical-I						
SAT	Practical-II						

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Dr.K.Murali Krishna	Professor	Modern Pharmaceutical Analytical Techniques-(MPAT)(4)	M.Pharm
2.	Mr.Ch.Madhu	Associate Professor	Cellular and Molecular Pharmacology-I (CMP-I) (4)	M.Pharm
3.	Mrs.B.Ramavathi	Associate Professor	Pharmacological and Toxicological Screening Method-I -(PTSM-I) (4)	M.Pharm
4.	Mrs.M.Madhavi Kumari	Associate Professor	Advanced Pharmacology-(AP) (4)	M.Pharm
5.	Ms.M.Divya	Assistant Professor	Assignments (1)	M.Pharm
6.	Mrs.M.Madhavi Kumari	Associate Professor	Practical-III (6)	M.Pharm
7.	Mr.Ch.Madhu	Associate Professor	Practical-IV (6)	M.Pharm
8.	Mr.Ch.Madhu	Professor	Seminars (6)	M.Pharm
9.	Mr.R.Ramana	Librarian	Library (2)	M.Pharm

  
Time Table Incharge

  
Principal



Avanathi Institute of Pharmaceutical Sciences

PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCE

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY:2022-23

### CLASS:I M. Pharm. II Sem Pharmacology

w.e.f: 01/05/2023

DAY/ TIME	9.00 - 10.00.	10.00 - 11.00	11.00 - 12.00	12.00- 1.00	1.00 - 2.00	2.00 - 3.00	3.00 - 4.00.
MON	AP-II	PTSM-II	PDD	L U N C H	CRP	AP-II	Library/ Seminar
TUE	PDD	AP-II	PTS M-II		AP-II	CRP	PTSM-II
WED	PTSM-II	PDD	CRP		Library / Seminar	PDD	CRP
THU	Seminar/Assignments						
FRI	Practical-III						
SAT	Practical-IV						

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Dr.K.Murali Krishna	Professor	Pharmacological and Toxicological Screening Method-II -(PTSM-II) (4)	M.Pharm
2.	Mr.Ch.Madhu	Associate Professor	Cellular and Molecular Pharmacology-(CMP) (4)	M.Pharm
3.	Mrs.B.Ramavathi	Associate Professor	Principles of Drug Discovery-(PDD) (4)	M.Pharm
4.	Mrs.M.Madhavi Kumari	Associate Professor	Advanced Pharmacology-II (AP-II) (4)	M.Pharm
5.	Ms.M.Divya	Assistant Professor	Assignments (1)	M.Pharm
6.	Mrs.M.Madhavi Kumari	Associate Professor	Practical-III (6)	M.Pharm
7.	Mr.Ch.Madhu	Associate Professor	Practical-IV (6)	M.Pharm
8.	Dr.K.Murali Krishna	Professor	Seminars (6)	M.Pharm
9.	Mr.R.Ramana	Librarian	Library (2)	M.Pharm

*Anand*  
Time Table Incharge

*Anand*  
Principal



Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCE

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

ESTD : 2005

## CLASS TIME TABLE AY:2022-23

CLASS:I M. Pharm I Sem Pharmaceutical Analysis

w.e.f: 12/12/2022

DAY/ TIME	9.00- 10.00	10.00 - 11.00	11.00 -12.00	12.00 -1.00	1.00- 2.00	2.00 - 3.00	3.00- 4.00
MON	MPAT	FA	APA	L U N C H	PV	Library/ Seminars	FA
TUE	APA	PV	MPA T		FA	MPAT	Library/ Seminars
WED	MPAT	PV	APA		FA	APA	PV
THU	Seminar/Assignments						
FRI	Practical-I						
SAT	Practical-II						

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Dr.M.B.V.Raju	Professor	Modern Pharmaceutical Analytical Techniques (MPAT) (4)	M.Pharm
2.	MrsB.Chaitanya	Associate Professor	Advanced Pharmaceuital Analysis-(APA) (4)	M.Pharm
3.	Mrs.A.H.V.Santhoshi	Associate Professor	Pharmaceutical Validation-(PV) (4)	M.Pharm
4.	Mr.A.N.Srinivas	Associate Professor	Food Analysis-(FA) (4)	M.Pharm
5.	B.Poornima	Associate Professor	Assignments (1)	M.Pharm
6.	Dr.M.B.V.Raju	Professor	Practical-I (6)	M.Pharm
7.	MrsB.Chaitanya	Associate Professor	Practical-II (6)	M.Pharm
8.	Mrs.A.H.V.Santhoshi	Associate Professor	Seminars (6)	M.Pharm
9.	Mr.R.Ramana	Librarian	Library (2)	M.Pharm

Time Table Incharge

Principal

Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY: 2022-23

CLASS: I M. Pharm. II Sem Pharmaceutical Analysis

w.e.f: 01/05/23

Day/ Time	9.00 - 10.00.	10.00 - 11.00	11.00 - 12.00	12.00- 1.00	1.00 - 2.00	2.00 - 3.00	3.00 - 4.00.
Mon	AIA	QCQA	MBAT	L U N C H	AIA	HCA	Library/Seminar
Tue	MBAT	AIA	QCQA		HCA	MBAT	QCQA
Wed	QCQA	HCA	AIA		Library/ Seminar	HCA	MBAT
Thu	Seminar/Assignments						
Fri	Practical-III						
Sat	Practical-IV						

S.No	Name of the Faculty	Designation	Name of the Subject(Hrs)	Program
1.	Dr.M.B.V.Raju	Professor	Quality Control and Quality Assurance (4)	M.Pharm
2.	Mrs B.Chaitanya	Associate Professor	Advanced Instrumental Analysis(4)	M.Pharm
3.	Mrs.A.H.V.Santhoshi	Associate Professor	Modern Bioanalytical Techniques(4)	M.Pharm
4.	Mr.A.N.Srinivas	Associate Professor	Herbal and Cosmetic Analysis(4)	M.Pharm
5.	B.Poornima	Associate Professor	Assignments (1)	M.Pharm
6.	Mrs B.Chaitanya	Associate Professor	Practical-III (6)	M.Pharm
7.	Dr.M.B.V.Raju	Professor	Practical-IV (6)	M.Pharm
8.	Mrs.A.H.V.Santhoshi	Associate Professor	Seminars (6)	M.Pharm
9.	Mr.R.Ramana	Librarian	Library	M.Pharm

Time Table Incharge



Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.L.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY: 2022-23

**CLASS: M. Pharm I Sem Pharmaceutical Technology**

**w.e.f: 12/12/22**

Day/ Time	9.00 - 10.00.	0.00- 11.00	11.00 - 12.00	12.00- 1.00	1.00 - 2.00	2.00 - 3.00	3.00 -4.00.
Mon	MPAT	DDS	RA	L U N C H	MP	DDS	Library/Seminar
Tue	RA	MP	MPAT		DDS	MPAT	Library/Seminar
Wed	MPAT	MP	RA		MP	DDS	RA
Thu	Seminar/Assignments						
Fri	Practical-I						
Sat	Practical-II						

S.No	Name of the Faculty	Designation	Name of the Subject(Hrs)	Program
1.	Dr.M.Pavani	Professor	Modern Pharmaceutical Analytical Techniques (4)	M.Pharm
2.	Mrs.M.K.Rekha	Associate Professor	Drug Delivery Systems (4)	M.Pharm
3.	Mrs.B.Sravani	Associate Professor	Regulatory Affairs (4)	M.Pharm
4.	Mr.S.Ramakrishna	Associate Professor	Modern Pharmaceutics (4)	M.Pharm
5.	Mr.S.Chandra Sekhar	Associate Professor	Assignments (1)	M.Pharm
6	Dr.M.Pavani	Professor	Practical-I (6)	M.Pharm
7	Mrs.M.K.Rekha	Associate Professor	Practical-II (6)	M.Pharm
8	Mrs.B.Sravani	Associate Professor	Seminars (6)	M.Pharm
9.	Mr.R.Ramana	Librarian	Library	M.Pharm

*Anne*  
Time Table Incharge



*Principal*  
**Principal**  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCE

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### CLASS TIME TABLE AY: 2022-23

CLASS: I M. Pharm. II Sem Pharmaceutical Technology

w.e.f : 01/05/2023

DAY/ TIME	9.00 - 10.00.	10.00 - 11.00	11.00 -12.00	12.00 – 1.00	1.00 - 2.00	2.00 - 3.00	3.00 – 4.00.
MON	MP	CADD	FD	L U N C H	MP	BPPK	Library/ Seminar
TUE	CADD	FD	BPPK		CADD	FD	BPPK
WED	MP	BPPK	CADD		Library/ Seminar	FD	MP
THU	Seminar/Assignments						
FRI	Practical-III						
SAT	Practical-IV						

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Dr.M.Pavani	Professor	Computer Aided Drug Delivery System-(CADD) (4)	M.Pharm
2.	Mrs.M.K.Rekha	Associate Professor	Molecular Pharmaceutics- (MP) (4)	M.Pharm
3.	Mrs.B.Sravani	Associate Professor	Advanced Biopharmaceutics and Pharmacokinetics- (BPPK) (4)	M.Pharm
4.	Mr.S.Ramakrishna	Associate Professor	Formulation Development- (FD) (4)	M.Pharm
5.	Mr.S.ChandraSekhar	Associate Professor	Assignments (1)	M.Pharm
6.	Mrs.M.K.Rekha	Associate Professor	Practical-III (6)	M.Pharm
7.	Dr.M.Pavani	Professor	Practical-IV (6)	M.Pharm
8.	Mrs.B.Sravani	Associate Professor	Seminars (6)	M.Pharm
9.	Mr.R.Ramana	Librarian	Library (2)	M.Pharm

  
Time Table Incharge

  
Principal



Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

ESTD : 2005

## CLASS TIME TABLE AY: 2022-23

Class: Pharm.D I Year (2022-2023)

W.e.f- 26/12/2022

Class Teacher : Dr.D.Subhasri

DAY/ TIME	9:30 – 10:30	10:30 – 11:20	11:20 – 12:10	12:10- 1:00	1:00 – 01:50	1:50– 2:40	2:40- 3:30	3:30- 4:20
MON	PIC	MBC	POC	L U N C H	HAP	LIBRARY/ SPORTS		
TUE	CEUTICS	POC	PIC		CEUTICS	CEUTICS LAB		
WED	POC	PIC	HAP		RM/RB	POC LAB		
THU	CEUTICS	POC	MBC		PIC	PIC LAB		
FRI	MBC	RM/RB	HAP		RM/RB	HAP LAB		
SAT	HAP	RM/RB	CEUTICS		MBC	MBC LAB		

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Dr.D. Subha Sri	Assistant Professor	Pharmaceutical Inorganic Chemistry-(PIC) (4)	Pharm. D
2.	Dr.A. Jyotsna	Assistant Professor	Pharmaceutical Organic Chemistry-(POC) (4)	Pharm. D
3.	Dr.M.S.V. Sudeep	Assistant Professor	Pharmaceutics (4)	Pharm. D
4.	Dr.Naga Phani Sharma	Assistant Professor	Human Anatomy and Physiology-(HAP) (4)	Pharm. D
5.	Dr.N. HemaMadhuri	Assistant Professor	Medicinal Biochemistry-(MBC) (4)	Pharm. D
6.	Mr.A.Seshu	Assistant Professor	Remedial Mathematics-(RM) (4)	Pharm. D
7.	Mr.V.UmaSankar	Associate Professor	Remedial Biology-(RB) (4)	Pharm. D
8.	Dr.D. Subha Sri	Assistant Professor	Pharmaceutical Inorganic Chemistry Lab-(PIC) (3)	Pharm. D
9.	Dr.A. Jyotsna	Assistant Professor	Pharmaceutical Organic Chemistry Lab-(POC) (3)	Pharm. D
10.	Dr.M.S.V. Sudeep	Assistant Professor	Pharmaceutics Lab (3)	Pharm. D
11.	Dr.Naga Phani Sharma	Assistant Professor	Human Anatomy and Physiology Lab-(HAP) (3)	Pharm. D
12.	Dr.N. HemaMadhuri	Assistant Professor	Medicinal Biochemistry Lab-(MBC) (1)	Pharm. D
13.	Mr.V.UmaSankar	Associate Professor	Remedial Biology –(RB) (4)	Pharm. D

Time Table Incharge



Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY: 2022-23

**Class: Pharm.D II Year (2022-2023)**

**W.e.f- 07/11/2022**

**Class Teacher – Dr. A. JYOTSNA**

DAY/ TIME	9:30 - 10:30	10:30 11:20	11:20 – 12:10	12:10- 1:00	1:00 – 01:50	1:50– 2:40	2:40- 3:30	3:30- 4:20
MON	COG	PT-I	MB	L U N C H	COL -I	PT- I LAB		
TUE	MB	COL-I	PP		PT-I	COL-I	CP	TUTORIAL
WED	PT-I	PP	COG		CP	MB	PT-I	LIB/ SPORTS
THU	VISIT TO HOSPITAL							
FRI	COL -I	PP	CP	L U N C H	COG	COG LAB		
SAT	CP	COG	PP		MB	MB LAB		

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Dr.A.Jyotsna	Assistant Professor	Pharmacognosy -(COG) (4)	Pharm. D
2.	Dr.Naga Phani Sharma	Assistant Professor	Pathophysiology-(PP) (4)	Pharm. D
3.	Dr.N. HemaMadhuri	Assistant Professor	Community Pharmacy-(CP) (4)	Pharm. D
4.	Dr.D. Subha Sri	Assistant Professor	Pharmaceutical Microbiology-(MB) (4)	Pharm. D
5.	Dr.B. Manoj Kumar	Associate Professor	Pharmacotherapeutics-I-(PT-I) (4)	Pharm. D
6.	Dr.B.Tejasree	Assistant Professor	Pharmacology-I-(COL-I) (4)	Pharm. D
7.	Dr.A.Jyotsna	Assistant Professor	Pharmacognosy Lab-(COG) (3)	Pharm. D
8.	Dr.D. Subha Sri	Assistant Professor	Pharmaceutical MicrobiologyLab-(MB) (3)	Pharm. D
9.	Dr.B. Manoj Kumar	Associate Professor	Pharmacotherapeutics- I –I.ab(PT-I) (3)	Pharm. D

*Time Table Incharge*



*Principal*

**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**Avanathi Institute of Pharmaceutical Sciences**



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

ESTD : 2005

## CLASS TIME TABLE AY: 2022-23

Class: Pharm.D III year (2022-2023)

W.e.f -01/08/2022

Class Teacher: Mrs.Ch.Geetha

DAY/ TIME	9:30 – 10:30	10:30– 11:20	11:20 - 12:10	12:10 -1:00	1:00– 01:50	1:50– 2:40	2:40- 3:30	3:30- 4:20
MON	COL-II	PF	MC	L U N C H	PJ	MC LAB		
TUE	MC	PJ	COL-II		PT- II	PT- II LAB		
WED	MC	PT- II	PF		PA	PA LAB		
THU	PF	MC	PA		COL- II	PF LAB		
FRI	HOSPITAL VISIT							
SAT	PJ	PA	PT-II	L U N C H	PF	COL-II LAB		

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Dr.Arun Satyadev	Professor	Medicinal chemistry-(MC) (4)	Pharm. D
2.	Mrs.Ch.Geetha	Assistant Professor	Pharmaceutical Analysis-(PA) (3)	Pharm. D
3.	Dr.V.C.Randeep Raj	Associate Professor	Pharmacotherapy –II-(PT-II) (3)	Pharm. D
4.	Dr.N.HemaMadhuri	Assistant Professor	Pharmaceutical Jurisprudence-(PJ) (3)	Pharm. D
5.	Mrs.B.Ramavathi	Assistant Professor	Pharmacology-II (COL-II) (3)	Pharm. D
6.	Dr.B.Tejasree	Assistant Professor	Pharmaceutical Formulation (PF) (3)	Pharm. D
7.	Dr.ArunSatyadev	Professor	Medicinal chemistry Lab(MC) (3)	Pharm. D
8.	Mrs.Ch.Geetha	Assistant Professor	Pharmaceutical Analysis Lab(PA) (3)	Pharm. D
9.	Dr.V.C.Randeep Raj	Associate Professor	Pharmacotherapy -II Lab (PT-II) (3)	Pharm. D
10.	Mrs.B.Ramavathi	Assistant Professor	Pharmacology-II Lab- (COL-II) (3)	Pharm. D
11.	Dr.B.Tejasree	Assistant Professor	Formulation Lab-(PF) (3)	Pharm. D

*More*  
Time Table Incharge

*hsc*  
Principal



Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CLASS TIME TABLE AY: 2022-23

Class: Pharm.D IV year (2022-2023)

W.e.f-01/08/2022

Class Teacher: Dr.B.Teja Sree

DAY/ TIME	9:30- 10:30	10:3 – 11:20	11:20– 12:10	12:10- 1:00	1:00– 01:50	1:50–2:40	2:40- 3:30	3:30-4:20
MON	CP	BRM	CT	L U N C H	PT- III	CP LAB		
TUE	BPPK	CP	BRM		BPPK	HP LAB		
WED	PT-III	BPPK	HP		CP	BPPK LAB		
THU	BRM	PT- III	CT		HP	PT- III LAB		
FRI		HOSPITAL ROSTER						
SAT		HOSPITAL ROSTER						

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Mrs.Ch. Geetha	Assistant Professor	Biostatistics and Research Methodology-(BRM) (4)	Pharm. D
2.	Dr.V C Randeep Raj	Associate Professor	Clinical Pharmacy-(CP) (3)	Pharm. D
3.	Mr.V Uma Sankar	Associate Professor	Hospital Pharmacy-(HP) (2)	Pharm. D
4.	Dr.B. TejaSree	Assistant Professor	Clinical Toxicology (CT)(2)	Pharm. D
5.	Mr.P. Sandeep	Assistant Professor	Biopharmaceutics and Pharmacokinetics-(BPPK) (3)	Pharm. D
6.	Dr.T. Rushi	Assistant Professor	Pharmacotherapeutics – III (PT-III) (3)	Pharm. D
7.	Dr.V C Randeep Raj	Associate Professor	Clinical Pharmacy Lab (CP) (3)	Pharm. D
8.	Mr.V Uma Sankar	Associate Professor	Hospital Pharmacy Lab (HP) (3)	Pharm. D
9.	Mr.P. Sandeep	Assistant Professor	Biopharmaceutics and Pharmacokinetics Lab(BPPK) (3)	Pharm. D
10.	Dr.T. Rushi	Assistant Professor	Pharmacotherapeutics - III – (PT-III) Lab (3)	Pharm. D

Time Table Incharge

Principal



**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram M  
Vizianagaram Dt. - 531162

Avanthi Institute of Pharmaceutical Sciences



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### CLASS TIME TABLE AY: 2022-23

Class: Pharm.D Vyear (2022-2023)

W.e.f -01/08/2022

Class Teacher: Dr.B.Manoj Kumar

DAY/ TIME	9:30 – 10:30	10:30 – 11:20	11:20 – 12:10	12:10 1:00	1:00 – 01:50	1:50– 2:40	2:40– 3:30	3:30– 4:20
MON	HOSPITAL ROSTER							
TUE	HOSPITAL ROSTER							
WED	HOSPITAL ROSTER							
THU	PROJECT	CR	PKTDM	L U N C H	PKTDM	CR	CLERKSHIP	
FRI	CR	PKTDM	EM		EM	PKTDM	CLERKSHIP	
SAT	EM	CR	EM		CR	PROJECT	CLERKSHIP	

S. No	Name of The Faculty	Designation	Name of The Subject (Hrs)	Program
1.	Dr.M.S.V. Sudeep	Assistant Professor	Clinical Research –(CR) (5)	Pharm. D
2.	Dr.T. Rushi	Assistant Professor	Pharmacokinetics and Therapeutic Drug Monitoring (PKTDM) (4)	Pharm. D
3.	Dr.B. Manoj Kumar	Associate Professor	Pharmacoepidemiology (EM) (4)	Pharm. D
4.	Mr.V. Uma Sankar	Associate Professor	Clerkship (3)	Pharm. D
5.			Project (2)	Pharm. D

  
Time Table Incharge



  
Principal

PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





ESTD : 2006

# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittavalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## MASTER TIME TABLE AY: 2022-2023

### B.PHARM (SEMESTER-I)

DAY/TIME	CLASS	9:30-10:30	10:30-11:20	11:20-12:10	12:10-1:00	1:00-1:50	1:50-2:40	2:40-3:30	3:30-4:20
MONDAY	I BPHARM:A	HAP	CEUTICS	PA-I	L U N C H	CS	A: HAP LAB B: PA-I LAB		
	I BPHARM:B	CEUTICS	HAP	PIC		PA-I	C: RB LAB D: CS LAB		
	II BPHARM:A	PE	POC-II	PP-I		MB	A: POC-II LAB B: PP-I LAB		
	II BPHARM:B	PP-I	MB	PE		POC-II	C: MB LAB D: PE LAB		
	III BPHARM:A	MC-II	COLOGY-II	IP-I		COGNOSY-II	A: IP -I LAB B: COLOGY LAB		
	III BPHARM:B	IP-I	COGNOSY-II	MC II		COLOGY	C: COGNOSY-II D:SPORTS\LIBRARY		
	IV BPHARM:A	IMA	IP-II	GPAT		NDDS	A: IMA LAB B: PROJECT		
	IV BPHARM:B	IP-II	IMA	PP		GPAT	PROJECT		
TUESDAY	I BPHARM:A	PA-I	HAP	CEUTICS	L U N C H	PIC	A: PA-I LAB B: HAP LAB		
	I BPHARM:B	PA-I	RM/RB	CEUTICS		HAP	C: TUTORIAL LAB D: CS LAB		
	II BPHARM:A	PP-I	PE	MB		POC-II	A: PP-I LAB B: POC-II LAB		
	II BPHARM:B	MB	POC-II	PP-I		PE	C: PE LAB D: MB LAB		
	III BPHARM:A	PJ	MC-II	IP-I		TUTORIAL (IP -I)	A: COLOGY LAB B: IP -I LAB		
	III BPHARM:B	COLOGY-II	COGNOSY - II	PJ		MC-II	C: LIB/SPORTS D: COGNOSY-II LAB		
	IV BPHARM:A	NDDS	IMA	IP-II		GPAT	A: PROJECT B: IMA LAB		
	IV BPHARM:B	PP	IMA			NDDS	PROJECT AND GPAT		



Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

WEDNESDAY	I BPHARM:A	RM/RB	PA -I	HAP	L U N C H	PIC	A: PIC LAB B: CEUTICS LAB	
	I BPHARM:B	PIC	PA -I	CS		HAP	C: HAP LAB D: PA -I LAB	
	II BPHARM:A	MB	PP -I	PE		TUTORIAL (PP1)	A: MB LAB B: PE LAB	
	II BPHARM:B	PE	POC -II	MB		TUTORIAL (MB)	C: PP-II LAB D: POC-II LAB	
	III BPHARM:A	IP-1	COGNOSY -II	MC -II		COLOGY	A: LIB/SPORTS B: COGNOSY-II LAB	
	III BPHARM:B	MC -II	COLOGY-II	IP -I		TUTORIAL (COLOGY)	C: IP-I LAB D: COLOGY-II LAB	
	IV BPHARM:A	IP -I	PP	IMA		GPAT	PROJECT	
	IV BPHARM:B	IMA	NDDS	GPAT		IP -I	C: PROJECT D: IMA LAB	
THURSDAY	I BPHARM:A	CEUTICS	HAP	PIC	L U N C H	RM/RB	A: CEUTICS LAB B: PIC LAB	
	I BPHARM:B	CS	CEUTICS	PA-I		PIC	C: PA-I LAB D: HAP LAB	
	II BPHARM:A	POC-II	MB	PP-I		PE	A: MB LAB B: PE LAB	
	II BPHARM:B	PP-I	PE	POC- II		MB	C: PP-II LAB D: POC-II LAB	
	III BPHARM:A	PJ	COLOGY-II	COGNOSY-II		IP -I	A: COGNOSY-II LAB B: LIB/SPORTS	
	III BPHARM:B	COGNOSY 2	MC-II	IP -I		PJ	C: COLOGY LAB D: IP-I LAB	
	IV BPHARM:A	NDDS	IP-II	PP		TUTORIAL (IMA)	GPAT AND PROJECT	
	IV BPHARM:B	IP -II	IMA	GPAT		PP	C: PROJECT D: IMA LAB	
FRIDAY	I BPHARM:A	CEUTICS	PIC	PA -I	L U N C H	HAP	A: RM/RB B: CS	
	I BPHARM:B	CEUTICS	PIC	HAP		CEUTICS	C: PIC LAB D: CEUTICS LAB	
	II BPHARM:A	MB	PE	POC -II		TUTORIAL (PE)	TUTORIAL (PP-I)	TUTORIAL (POC-II) LIB/SPORT

Avanathi Institute of Pharmaceutical Sciences



Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

	II BPHARM:B	POC -II	PP-I	MB		TUTORIAL (POC 2)	STI	TUTORIAL (PE)	LIB/SPORTS
	III BPHARM:A	COLOGY-II	COGNOSY -II	PJ		MC-II	PJ	TUTORIAL (COLOGY	LIB /SPORTS
	III BPHARM:B	PJ	MC-II	COLOGY		COGNOSY - II	IP-I	TUTORIAL (IP 1)	LIB/SPORTS
	IV BPHARM:A	PP	IMA	NDDS		PP	GPAT PROJECT		
	IV BPHARM:B	NDDS	PP	IP-II		PP	GPAT	PRCJECT	STI
SATURDAY	I BPHARM:A	CS	PA-I	CEUTICS	L U N C H	PIC	A: CS LAB B: RM/RB LAB		
	I BPHARM:B	HAP	RM/RB	PA-I		PIC	C: CEUTICS LAB D: PIC LAB		
	II BPHARM:A	PP-I	POC-II	MB		PE	STI	TUTORIAL (MB)	LIB/SPORTS
	II BPHARM:B	MB	PE	PP-I		POC-II	TUTORIAL (MB)	TUTORIAL (PP1)	LIB/SPORTS
	III BPHARM:A	COGNOSY - II	MC-II	PJ		IP 1	COLOGY-II	TUTORIAL (MC)	LIB/SPORTS
	III BPHARM:B	PJ	IP-I	COGNOSY -II		COLOGY-II	PJ	STI	TUTORIAL (MC-II)
	IV BPHARM:A	IP-II	NDDS	PP		IMA	GPAT	PROJECT	
	IV BPHARM:B	PP	IP-II	NDDS		IMA	GPAT	PROJECT	LIB/SPORTS



Avanathi Institute of Pharmaceutical Sciences

  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**MASTER TIME TABLE AY: 2022-2023**  
**B.PHARM SEMESTER-II**

DAY/ TIME	CLASS	9:30-10:30	10:30-11:20	11:20-12:10	12:10-1:00	1:00-1:50	1:50-2:40	2:40-3:30	3:30-4:20
<b>MONDAY</b>	<b>I BPHARM:A</b>	POC-I	PATHO	BIOCHEM	<b>L U N C H</b>	HAP	A: POC-I LAB B: BIOCHEM LAB		
	<b>I BPHARM:B</b>	POC-I	HAP	BIOCHEM		PATHO	C:HAP LAB D: CA LAB		
	<b>II BPHARM:A</b>	COLOGY	COGNOSY	MC-I		OC-II	A : COLOGY –I LAB B:COGNOSY-I LAB		
	<b>II BPHARM:B</b>	MC-I	PP-2	COLOGY-I		CLASS TEST	C: PP-II LAB D: MC-I LAB		
	<b>III BPHARM:A</b>	QA	COLOGY-III	MC-III		BPPK	A: HDT LAB B: LIB / SPORTS		
	<b>III BPHARM:B</b>	BIOTEC	BPPK	COLOGY		HDT	C : MC-III LAB D: COLOGY LAB		
	<b>IV BPHARM:A</b>	PMM	SPP	CS		GPAT	PROJECT		
	<b>IV BPHARM:B</b>	CS	BRM	PMM		GPAT	PROJECT		
<b>TUESDAY</b>	<b>I BPHARM:A</b>	BIOCHEM	HAP	POC-I	<b>L U N C H</b>	ES	A: BIOCHEM LAB B:POC-I LAB		
	<b>I BPHARM:B</b>	CA	PATHO	POC-I		HAP	C:CA D:HAP		
	<b>II BPHARM:A</b>	PP-II	COLOGY-I	COGNOSY-I		TUTORIAL [PP-II]	A:COGNOSY-I LAB B: COLOGY-I LAB		
	<b>II BPHARM:B</b>	COGNOSY-I	MC –I	PP-II		COLOGY-I	C:MC –I LAB D: PP –II LAB		
	<b>III BPHARM:A</b>	BIOTECH	QA	COLOGY-III		MC-III	A: LIB/ SPORTS B: HDT LAB		
	<b>III BPHARM:B</b>	COLOGY-III	MC-III	BPPK		QA	C: COLOGY LAB D :MC-III LAB		
	<b>IV BPHARM:A</b>	BRM	PMM	SPP		GPAT	PROJECT		
	<b>IV BPHARM:B</b>	SPP	CS	BRM		GPAT	PROJECT		

Avanthi Institute of Pharmaceutical Sciences



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V) Bhogapuram Mandal  
Vizianagaram Dt. - 531162





ESTD : 2005

# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.TE, PCI, New Delhi Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

WEDNESDAY	I BPHARM:A	HAP	CA	PATHO	L U N C H	POC-I	A: HAP LAB    B: CA LAB		
	I BPHARM:B	PATHO	BIOCHEM	HAP		CA	C:POC-I LAB   D: BIOCHEM LAB		
	II BPHARM:A	MC-I	PP-II	COLOGY-I		COGNOSY-I	A: MC-I LAB B: PP-II LAB		
	II BPHARM:B	COLOGY-I	COGNOSY-I	MC-I		OC-III	C: COLOGY –I LAB D: COGNOSY LAB		
	III BPHARM:A	HDT	BIOTECH	BPPK		COLOGY –III	A: MC-III LAB   B: COLOGY LAB		
	III BPHARM:B	QA	HDT	MC-III		BIOTECH	C: HDT LAB       D:LIB/SPORTS		
	IV BPHARM:A	SPP	BRM	PMM		CS	GPAT AND PROJECT		
	IV BPHARM:B	PMM	ES	SPP		PMM	GPAT AND PROJECT		
THURSDAY	I BPHARM:A	BIOCHEM	PATHO	CA	L U N C H	TJTO[OC]	A: CA LAB   B; HAP LAB		
	I BPHARM:B	POC-I	BIOCHEM	ES		CA	C: BIOCHEM LAB   D: POC-I LAB		
	II BPHARM:A	PP-II	MC-I	OC-III		COLOGY-I	A: PP-II LAB B: MC-I LAB		
	II BPHARM:B	OC-III	COLOGY-I	COGNOSY-I		PP-II	C: COGNOSY-I LAB D: COLOGY-I LAB		
	III BPHARM:A	MC-III	BPPK	HDT		QA	A: COLOGY- I LAB B; MC-III LAB		
	III BPHARM:B	QA	HDT	HDT		MC-III	C: LIB / SPCRTS   D: HDT LAB		
	IV BPHARM:A	CS	BRM	PMM		SPP	GPAT	PROJECT	
	IV BPHARM:B	BRM	SPP	CS		PROJECT	GPAT	PROJECT	
FRIDAY	I BPHARM:A	PATHO	POC-I	CA	L U N C H	BIOCHEM	ES	HAP	TUTORIAL
	I BPHARM:B	BIOCHEM	POC-I	PATHO		TUTORIAL	POC-I	ES	LIB/SPORTS
	II BPHARM:A	COGNOSY-I	OC-III	MC-I		TUTORIAL [COLOGY]	OC-III LAB	PP-II LAB	OC-III LAB
	II BPHARM:B	MC-I	PP-II	COLOGY-I		COGNOSY-I	OC-III LAB	TUTORIAL	CLASS TEST

Avanthi Institute of Pharmaceutical Sciences



**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES**  
 (Approved by A.I.C.TE, PCI, New Delhi Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
 Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

	III BPHARM:A	COLOGY-III	HDT	BPPK		BIOTECH	QA LAB	HDT LAB	MC-III LAB
	III BPHARM:B	BPPK	QA	HDT		COLOGY-III	MC-III LAB	BIOTECH LAB	BPPK LAB
	IV BPHARM:A	BRM	CS	SPP		PROJECT	GPAT		
	IV BPHARM:B	SPP	PMM	BRM		CS	GPAT PROJECT		
<b>SATURDAY</b>	I BPHARM:A	CA	BIOCHEM	HAP	<b>L U N C H</b>	PATHO	POC-I	ES	LIB/SPORTS
	I BPHARM:B	HAP	PATHO	BIOCHEM		POC-I	CA	HAP	TUTO[OC]
	II BPHARM:A	OC-III	MC-I	PP-II		TUTORIAL [MC-I]	COGNOSY-I	COLOGY-I	LIB/SPORTS
	II BPHARM:B	PP-II	OC-III	COGNOSY-I		MC-I	OC-III	TUTORIAL	LIB/SPORTS
	III BPHARM:A	BIOTECH	MC-III	HDT		COLOGY-III	BIOTECH	QA	BPPK
	III BPHARM:B	COLOGY -III	BPPK	QA		MC-III	HDT	COLOGY-III	BIOTECH
	IV BPHARM:A	CS	PMM	BRM		PROJECT /LIB	GPAT/ PROJECT		LIB/SPORTS
	IV BPHARM:B	BRM	SPP	PMM		PROJECT /LIB	GPAT/ PROJECT		LIB/SPORTS



  
Principal

**PRINCIPAL**  
 Avanathi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## MASTER TIME TABLE AY: 2022-2023 M. PHARM SEMESTER-I

DAY/TIME	BRANCH	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	
MONDAY	CEUTICS	MPAT	DDS	RA	L U N C H	MP	DDS	LIB/ SEMINAR	
	TECH	MPAT	DDS	RA		MP	DDS	LIB/ SEMINAR	
	ANALYSIS	MPAT	FA	APA		PV	LIB/ SEMINAR	FA	
	COLOGY	MPAT	AP-I	CMB-I		PTSM-I	MPAT	LIB/ SEMINAR	
TUESDAY	CEUTICS	RA	MP	MPAT		DDS	MPAT	LIB/ SEMINAR	
	TECH	RA	MP	MPAT		DDS	MPAT	LIB/ SEMINAR	
	ANALYSIS	APA	PV	MPAT		FA	MPAT	LIB/ SEMINAR	
	COLOGY	CMB-I	PTSM-I	AP-I		MPAT	PTSM-I	LIB/ SEMINAR	
WEDNESDAY	CEUTICS	MPAT	MP	RA		MP	DDS	RA	
	TECH	MPAT	MP	RA		MP	DDS	RA	
	ANALYSIS	MPAT	PV	APA		CMB-I	AP-I	PTSM-I	
	COLOGY	MPAT	CMB-I	AP-I		FA	APA	PV	
THURSDAY	CEUTICS	SEMINAR/ASSIGNMENTS				SEMINAR/ASSIGNMENTS			
	TECH								
	ANALYSIS								
	COLOGY								
FRIDAY	CEUTICS	PRACTICAL-I				PRACTICAL-I			
	TECH								
	ANALYSIS								
	COLOGY								
SATURDAY	CEUTICS	PRACTICAL-II				PRACTICAL-II			
	TECH								
	ANALYSIS								
	COLOGY								



*[Signature]*  
Principal

Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt. - 531162



**MASTER TIME TABLE AY: 2022-2023**

**M.PHARM SEMESTER-II**

DAY/TIME	BRANCH	9:00-10:00	10:00-11:00	11:00-12:00	12:00-1:00	1:00-2:00	2:00-3:00	3:00-4:00	
MONDAY	CEUTICS	MP	FD	CADD	L  U  N   C  H	MP	BPPK	LIB/SEMINAR	
	TECH	MP	CADD	FD		MP	BPPK	LIB/SEMINAR	
	ANALYSIS	AIA	QCQA	MBAT		AIA	HCA	LIB/SEMINAR	
	COLOGY	AP-II	PTSM-II	PDD		CMB-II	AP-II	LIB/SEMINAR	
TUESDAY	CEUTICS	CADD	MP	BPPK		CADD	FD	BPPK	
	TECH	CADD	FD	BPPK		CADD	FD	BPPK	
	ANALYSIS	MBAT	AIA	QCQA		HCA	MBAT	QCQA	
	COLOGY	PDD	AP-II	PTSM-II		AP-II	CMB-II	PTSM-II	
WEDNESDAY	CEUTICS	FD	BPPK	CADD		LIB/SEMINAR	FD	MP	
	TECH	MP	BPPK	CADD		LIB/SEMINAR	FD	MP	
	ANALYSIS	QCQA	HCA	AIA		LIB/SEMINAR	HCA	MBAT	
	COLOGY	PTSM-II	PDD	CMB-I		LIB/SEMINAR	PDD	CMB-II	
THURSDAY	CEUTICS	SEMINAR/ASSIGNMENTS				SEMINAR/ASSIGNMENTS			
	TECH								
	ANALYSIS								
	COLOGY								
FRIDAY	CEUTICS	PRACTICAL-III				PRACTICAL-III			
	TECH								
	ANALYSIS								
	COLOGY								
SATURDAY	CEUTICS	PRACTICAL-IV				PRACTICAL-IV			
	TECH								
	ANALYSIS								
	COLOGY								



**Principal**





**PHARM.D MASTER TIME TABLE AY: 2022-2023**

DAY/ TIME	CLASS	9:30-10:30	10:30-11:20	11:20-12:10	12:10-1:00	1:00-1:50	1:50-2:40	2:40-3:30	3:30-4:10
MONDAY	I	PIC	MBC	POC	L U N C H	HAP	RB LAB/ LIB/ SPORTS		
	II	COG	PT-I	MB		COL-I	PT-1 LAB		
	III	COL-II	PF	BC		PJ	MC LAB		
	IV	CP	BRM	CT		PT-III	CP LAB		
	V	HOSPITAL				ROSTER			
TUESDAY	I	CEUTICS	POC	PIC	L U N C H	CEUTICS	CEUTICS LAB		
	II	MB	COL-1	PP		PT-I	COL-1	COP	TUTORIAL
	III	MC	PJ	COL-II		PT-II	PT-II LAB		
	IV	BPPK	CP	BRM		BPPK	HP LAB		
	V	HOSPITAL				ROSTER			
WEDNESDAY	I	POC	PIC	HAP	L U N C H	RM/RB	POC LAB		
	II	PT-I	PP	COG		COP	MB	PT-I	LIB/SPORTS
	III	MC	PT-II	PF		PA	PA LAB		
	IV	PT-III	BPPK	HP		CP	BPPK LAB		
	V	HOSPITAL				ROSTER			
THURSDAY	I	CEUTICS	POC	MBC		PIC	PIC LAB		
	II	HOSPITAL				ROSTER			





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

	III	PF	MC	PA	L U N C H	COL-II	PF LAB	
	IV	BPPK	PT-III	CT		HP	PT-III LAB	
	V	PROJECT	CR(TUTORIAL)	PKTDM		CR	PROJECT	CLERKSHIP
FRIDAY	I	MBC	RM/RB	HAP	L U N C H	RM/RB	HAP LAB	
	II	COL-I	PP	COP		COG	COG LAB	
	III	HOSPITAL				ROSTER		
	IV	HOSPITAL				ROSTER		
	V	CR	PKTDM	EM		CR	PKTDM (TUTORIAL)	CLERKSHIP
SATURDAY	I	HAP	RM/RB	CEUTICS	L U N C H	MBC	MBC LAB	
	II	COP	COG	PP		MB	MB LAB	
	III	PJ	PA	PT-II		PF	COL-II	
	IV	HOSPITAL				ROSTER		
	V	EM	CR	EM		PROJECT		CLERKSHIP



  
**Principal**

**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences



# **BIostatistics & Research Methodology (R08)**

## **COURSE FILE**

Prepared by

Mrs. Ch. Geetha,

Assistant Professor

Department of Pharmaceutics

(2022-2023)



## **AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES**

### **DEPARTMENT OF PHARMACEUTICS**

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.



  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### Course File Contents

1. Vision, Mission of the Institute
2. Program Educational Outcomes (PEOs)
3. Program Outcomes (POs)
4. Syllabus Copy
5. Roll list
6. Class Time tables and Individual Time tables
7. Lesson plan.
8. Teaching notes
9. Mid I Question paper, Scheme of evaluation and answer scripts
10. Mid II Question paper, Scheme of evaluation and answer scripts
11. Mid III Question paper, Scheme of evaluation and answer scripts
12. Internal and External marks
13. Result analysis
14. CO and PO attainment sheets
15. CO-PO-PSO mapping



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## VISION AND MISSION

### VISION:

To develop highly skilled professionals with ethics and human values.

### MISSION:

1. To impart quality education with exposure to real world training.
2. To produce competent and highly knowledgeable biostats and analysts with positive approach.
3. To build self confidence among students which is an imperative prerequisite to face the challenges in future.

### QUALITY POLICY:

Avanthi institute of pharmaceutical sciences emphasizes the ethical ideals to innovate advanced training by creating the best possible infrastructure through an engaging, activity-oriented teaching. It also uses the most updated information and biostatistical knowledge to enhance a biostatistical approach among the students, aiming for an effective and ambitious administration which is responsive in all the aspects.

### Program Educational Objectives (PEOs):

**PEO 1:** Graduates with knowledge in the fundamentals of basic science, English, biostatistical and experimental research procedures.

**PEO 2:** Graduates with professional attitude towards the diverse community.

**PEO 3:** Graduates with ability to pursue advanced education, biostatistical research knowledge for successful career.

**PEO 4:** Graduates are trained in all biostatistical aspects to show the professional and working abilities to the company development

### Program Outcomes (Pos)

1. **Statistics knowledge:** Apply the knowledge of biostatistics and research specialization to the solution of complex analytical problems.
2. **Statistical Analysis:** Identify, research literature, and statistics the complex dosing problems reaching substantiated conclusions using the complex data.

  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E., P.C.I., New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

3. **Design/development of report:** Design solutions for complex data problems and experimental design system components or processes that meet the specified needs with appropriate consideration for public health and safety, and the environmental consideration.
4. **Conduct investigation of complex data:** Use research-based knowledge and research methods including complex systems and experiments procedures to simplify data reports and provide valid conclusions.
5. **Modern Tool Usage:** Create, select, and apply appropriate techniques, resources, and modern analytical tools
6. **Environment and Sustainability:** Understand the impact of the professional analysis report solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
7. **Awareness of statistical tools:** To enable the learner to know and understand the basics of statistics, usage and reporting.
8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of statistical practice
9. **Individual and Team Work:** Functions effectively as individual and as a member or leader in diverse teams and in multi-disciplinary setting.
10. **Communication:** communicate effectively on complex dosing activities with the pharmaceutical community and with society .
11. **Project Management and Finance:** Demonstrate knowledge and understanding of the statistics and research principles and applying those to one's own work, as a member and leader in a team, to manage experiments in multidisciplinary environments.
12. **Life-Long Learning:** Recognize the need for , and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

## 1. Research Methodology

- a. Types of clinical study designs: Case studies, observational studies, interventional studies,
- b. Designing the methodology
- c. Sample size determination and Power of a study Determination of sample size for simple comparative experiments, determination of sample size to obtain a confidence interval of specified width, power of a study
- d. Report writing and presentation of data

## 2. Biostatistics

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences







# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## 2.1 a. Introduction

- b. Types of data distribution
- c. Measures describing the central tendency distributions- average, median, mode
- d. Measurement of the spread of data-range, variation of mean, standard deviation, variance, coefficient of variation, standard error of mean.

## 2.2 Data graphics

Construction and labelling of graphs, histogram, pie charts, scatter plots, semi logarithmic plots

## 2.3 Basics of testing hypothesis

- a. Null hypothesis, level of significance, power of test, P value, statistical estimation of confidence intervals.
- b. Level of significance (Parametric data)- students t test (paired and unpaired), chi square test, Analysis of Variance (one-way and two-way)
- c. Level of significance (non-parametric data)- Sign test, Wilcoxon's signed rank test, Wilcoxon rank sum test, Mann Whitney U test, Kruskal-Wallis test (one way ANOVA)
- d. Linear regression and correlation- Introduction, Pearson's and Spearman's correlation and correlation co-efficient.
- e. Introduction to statistical software: SPSS, Epi Info, SAS

## 2.4 Statistical methods in epidemiology

Incidence and prevalence, relative risk, attributable risk

## 3. Computer applications in pharmacy

Computer System in Hospital Pharmacy: Patterns of Computer use in Hospital Pharmacy – Patient record database management, Medication order entry – Drug labels and list – Intravenous solution and admixture, patient medication profiles, Inventory control, Management report & Statistics.

### Computer In Community Pharmacy

Computerizing the Prescription Dispensing process

Use of Computers for Pharmaceutical Care in community pharmacy

Accounting and General ledger system

Drug Information Retrieval & Storage : Introduction – Advantages of Computerized literature retrieval

Use of computerized retrieval



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES		
IV YEAR PHARM.D		
S.NO.	ROLL NO.	STUDENT NAME
1	19T51T0001	ALAJINGI SUSMITA
2	19T51T0002	BODDEPALLI RAKESH
3	19T51T0004	CHADARAM PRAGNATHA
4	19T51T0005	CHAPPA RAMYA
5	19T51T0006	CHERUKURI TANUJA LAKSHMI
6	19T51T0007	CHITIKI REDDI BHAGYASRI
7	19T51T0008	DOLL GLENDA ANNETTE
8	19T51T0009	KARUKOLA ANUSHA
9	19T51T0010	KOSURU CHANDINI
10	19T51T0011	MARGANA GASRUTHI
11	19T51T0012	USHASRI KANUMULA
12	19T51T0013	PATHIVADA DIVYA
13	19T51T0014	PENTAKOTA PRASANNA
14	19T51T0015	ANWESH DEEP PADHY
15	19T51T0016	RUPITI HARSHAVARDHINI
16	19T51T0017	SONIKA SHRUTI SRIPATHI
17	19T51T0018	KILLO RAMAKRISHNA
18	19T51T0019	SRIPADA VENKATA SRI ALEKHYA
19	19T51T0020	TENTU SHARMILA
20	19T51T0021	VADDADI MADHURI SMITH
21	19T51T0022	VANAPALLI SANDHYA RANI
22	19T51T0023	VANTAKU SYAM KUMAR
23	19T51T0024	PILLA SAI SUSHMITHA
24	19T51T0027	KARROTHU SYAMALA
25	18T51T0001	ALUGOLU VENKATA SIVA
26	17T51T0012	M KELVIN PAUL



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### Reference books:

- a. Pharmaceutical statistics- practical and clinical applications, Sanford Bolton 3rd edition, publisher Marcel Dekker Inc. New York.
- b. Drug Information- A Guide for Pharmacists, Patrick M Malone, Karen L Kier, John E Stanovich , 3rd edition, McGraw Hill Publications 2006

### E-Resources:

1. <https://pharmadost.info/biostatistics-pharmd-notes/>
2. <https://pharmdguru.com/category/biostatistics-and-research-methodology/>



  
**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**Individual Time Table**

**Class : IV Pharm D**

Class In Charge: Dr.B.Teja Sree								
DAY/ TIME	9:30- 10:30	10:3 – 11:20	11:20– 12:10	12:10- 1:00	1:00– 01:50	1:50– 2:40	2:40- 3:30	3:30-4:20
MON	CP	BRM	CT	L U N C H	PT- III	CP LAB		
TUE	BPPK	CP	BRM		BPPK	HP LAB		
WED	PT-III	BPPK	HP		CP	BPPK LAB		
THU	BRM	PT- III	CT		HP	PT- III LAB		
FRI		HOSPITAL ROSTER						
SAT		HOSPITAL ROSTER						

**PHARM D IV YEAR**

DAY/ TIME	9:30- 10:30	10:3 – 11:20	11:20– 12:10	12:10- 1:00	1:00– 01:50	1:50– 2:40	2:40- 3:30	3:30-4:20
MON		BRM		L U N C H				
TUE			BRM					
WED								
THU	BRM							
FRI		HOSPITAL ROSTER						
SAT		HOSPITAL ROSTER						



  
**Principal**  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV-Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist.) -531162.  
www.avanthipharma.ac.in, principal@avanthipharma.ac.in

**COURSE PLAN:-** One copy to be submitted to the HOD one week before the commencement of the semester

Course code	Course title	Class	Name of the Faculty	No. of students	Total Periods	
					Lectures	Tutorials
T4104	Biostatistics and Research Methodology	Pharm D 4th year	Mrs.Ch. Geetha Assistant Professor	27	115	00

Week No.	Lecture No.	Topic	Teaching Aid	Date
<b>Unit 1</b>	<b>Research Methodology: Introduction</b>			16-08-2021
Week 1	L 1	Types of clinical study designs: Introduction ,case studies	Chalk and Talk	17-08-2021
	L 2	Observational studies,	Chalk and Talk	23-08-2021
	L 3	Interventional studies,	Chalk and Talk	24-08-2021
	L 5	Designing the methodology	Chalk and Talk	26-08-2021
	L 6	Designing the methodology-Sample size determination and Power of a study : Introduction	Chalk and Talk	31-08-2021
Week 2	L 7	Determination of sample size for simple comparative experiments,	Chalk and Talk	06-09-2021
	L 8	Determination of sample size for simple comparative experiments,	Chalk and Talk	07-09-2021
	L 9	Determination of sample size to obtain a confidence interval of specified width	Power point	09-09-2021
	L 10	Determination of sample size to obtain a confidence interval of specified width	Chalk and Talk	13-09-2021
	L 11	Power of a study	Chalk and Talk	14-09-2021
	L 12	Power of a study	Chalk and Talk	16-09-2021
Week 3	L 13	Report writing	Power point	20-09-2021
	L 14	Report writing	Chalk and Talk	21-09-2021
	L 15	presentation of data	LCD	23-09-2021
	L 16	presentation of data	Chalk and Talk	27-09-2021
<b>Unit 2</b>	<b>Biostatistics : Introduction</b>			28-09-2021
	L 17	Types of data distribution	Chalk and Talk	30-09-2021



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV-Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist.) -531162.  
www.avanthipharma.ac.in, principal@avanthipharma.ac.in

	L 18	Types of data distribution	Power point	04-10-2021
Week 4	L 19	Types of data distribution	Chalk and Talk	05-10-2021
	L 20	Measures describing the central tendency distributions- Introduction	Chalk and Talk	07-10-2021
	L 21	Mean	Chalk and Talk	11-10-2021
	L 22	Mean: Exercise	Chalk and Talk	18-10-2021
	L 23	Mean: Exercise	Power point	21-10-2021
	L 24	Median	Chalk and Talk	25-10-2021
Week 5	L 25	Median :Exercise	Google meet	26-10-2021
	L 26	Mode	Chalk and Talk	28-10-2021
	L 27	Mode : Exercise	Chalk and Talk	09-11-2021
	L 28	Measurement of the spread of data Introduction	Power point	11-11-2021
	L 29	Range	Chalk and Talk	15-11-2021
	L 30	Range	Chalk and Talk	16-11-2021
Week 6	L 31	Variation of mean	Chalk and Talk	18-11-2021
	L 32	Variation of mean	Chalk and Talk	22-11-2021
	L 33	Variation of mean	Chalk and Talk	23-11-2021
	L 34	Standard deviation	Chalk and Talk	25-11-2021
	L 35	Standard deviation	Google meet	29-11-2021
	L 36	Variance	Chalk and Talk	30-11-2021
Week 7	L 37	Variance	Chalk and Talk	02-12-2021
	L 38	Coefficient of variation	Google meet	06-12-2021
	L 39	Coefficient of variation	Chalk and Talk	07-12-2021
	L 40	Standard error of mean	Chalk and Talk	09-12-2021
	L 41	Standard error of mean	Power point	13-12-2021
	L 42	Data graphics : Introduction	Chalk and Talk	14-12-2021
Week 8	L 43	Construction of graphs	Google meet	16-12-2021
	L 44	Labeling of graphs	Chalk and Talk	20-12-2021
	L 45	Construction of histogram	Chalk and Talk	21-12-2021
	L 46	Labeling of histogram	Chalk and Talk	23-12-2021

PRINCIPAL







# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV-Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist.) -531162.  
www.avanthipharma.ac.in, principal@avanthipharma.ac.in

	L 47	Construction of pie charts	Power point	27-12-2021
	L 48	Labeling of pie charts	Power point	28-12-2021
Week 9	L 49	Construction of scatter plots	Chalk and Talk	30-12-2021
	L 50	Labelling of scatter plots	Chalk and Talk	03-01-2022
	L 51	Construction of semi logarithmic plots	Chalk and Talk	04-01-2022
	L 52	Labeling of semilogarithmic plots	Chalk and Talk	06-01-2022
	L 53	Basics of testing hypothesis : Introduction	Chalk and Talk	10-01-2022
	L 54	Null hypothesis,	Chalk and Talk	11-01-2022
	L 55	Null hypothesis,	Chalk and Talk	20-01-2022
Week 10	L 56	Level of significance,	Google meet	31-01-2022
	L 57	Level of significance,	Chalk and Talk	01-02-2022
	L 58	Power of test	Chalk and Talk	03-02-2022
	L 59	Power of test	Power point	07-02-2022
	L 60	P value	Chalk and Talk	07-02-2022
	L 61	Statistical estimation of confidence intervals	Power point	08-02-2022
Week 11	L 62	Statistical estimation of confidence intervals	Chalk and Talk	08-02-2022
	L 63	Level of significance(Parametric data) : Introduction	Google meet	10-02-2022
	L 64	Students t test (paired )	Chalk and Talk	10-02-2022
	L 65	Students t test (unpaired )	Chalk and Talk	14-02-2022
	L 66	Chi Square test	Chalk and Talk	14-02-2022
	L 67	Chi Square test	Power point	15-02-2022
Week 12	L 68	Analysis of Variance (one-way)	Chalk and Talk	15-02-2022
	L 69	Analysis of Variance (two-way)	Chalk and Talk	17-02-2022
	L 70	Level of significance(Non-Parametric data) : Introduction	Chalk and Talk	21-02-2022
	L 71	Sign test	Power point	21-02-2022
	L 72	Sign test	Chalk and Talk	22-02-2022
	L 73	Wilcoxon's signed rank test	Google meet	22-02-2022
	L 74	Wilcoxon's signed rank test	Chalk and Talk	24-02-2022



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV-Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist.) -531162.  
www.avanthipharma.ac.in, principal@avanthipharma.ac.in

Week 13	L 75	Wilcoxon rank sum test,	Chalk and Talk	24-02-2022
	L 76	Wilcoxon rank sum test,	Power point	28-02-2022
	L 77	Mann Whitney U test	Chalk and Talk	28-02-2022
	L 78	Mann Whitney U test	Chalk and Talk	01-03-2022
Week 14	L 79	Kruskal-Wallis test (One way ANOVA)	Chalk and Talk	01-03-2022
	L 80	Kruskal-Wallis test (One way ANOVA)	Chalk and Talk	03-03-2022
	L 81	Linear regression and correlation : Introduction	Google meet	03-03-2022
	L 82	Pearson's Correlation	Chalk and Talk	07-03-2022
	L 83	Pearson's Correlation	Chalk and Talk	07-03-2022
	L 84	Spearman's correlation	Google meet	08-03-2022
Week 15	L 85	Spearman's correlation	Chalk and Talk	08-03-2022
	L 86	Correlation co-efficient.	Power point	10-03-2022
	L 87	Correlation co-efficient.	Chalk and Talk	10-03-2022
	L 88	Introduction to statistical software: Introduction	Chalk and Talk	14-03-2022
	L 89	SPSS	Power point	14-03-2022
	L 90	SPSS	Chalk and Talk	15-03-2022
Week 16	L 91	EPI INFO	Chalk and Talk	15-03-2022
	L 92	EPI INFO	Power point	17-03-2022
	L 93	SAS	Chalk and Talk	17-03-2022
	L 94	SAS	Chalk and Talk	21-03-2022
	L 95	Statistical methods in epidemiology : Introduction	Chalk and Talk	21-03-2022
	L 96	Incidence and prevalence	Google meet	22-03-2022
Week 17	L 97	Incidence and prevalence	Chalk and Talk	22-03-2022
	L 98	Relative risk	Chalk and Talk	24-03-2022
	L 99	Relative risk	Chalk and Talk	24-03-2022
	L 100	Attributable risk	Google meet	28-03-2022
	L 101	Attributable risk	Chalk and Talk	28-03-2022
	L 102	Computer applications in pharmacy	Chalk and Talk	29-03-2022



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV-Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist.) -531162.  
www.avanthipharma.ac.in, principal@avanthipharma.ac.in

		: Introduction		
Week 18	L 103	Computer System in Hospital Pharmacy: Introduction	Chalk and Talk	29-03-2022
	L 104	Patterns of Computer use in Hospital Pharmacy – Patient record database management	Chalk and Talk	31-03-2022
	L 105	Medication order entry – Drug labels and list – Intravenous solution and admixture	Power point	31-03-2022
	L 106	Patient medication profiles,	Chalk and Talk	04-04-2022
	L 107	Inventory control	Chalk and Talk	04-04-2022
	L 108	Management report & Statistics.	Chalk and Talk	05-04-2022
Week 19	L 109	Computer In Community Pharmacy: Introduction	Google meet	05-04-2022
	L 110	Computerizing the Prescription Dispensing process	Chalk and Talk	07-04-2022
	L 111	Use of Computers for Pharmaceutical Care in community pharmacy	Chalk and Talk	07-04-2022
	L 112	Accounting and General ledger system	Power point	11-04-2022
	L 113	Drug Information Retrieval & Storage: Introduction	Chalk and Talk	11-04-2022
Week 20	L 114	Advantages of Computerized Literature Retrieval	Chalk and Talk	12-04-2022
	L 115	Use of Computerized Retrieval	LCD	12-04-2022



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## CHAPTER I

Clinical study design is the formulation of trials and experiments, as well as observational studies in medical, clinical and other types of research (e.g., epidemiological) involving human beings.

Intervention studies (clinical trials) are experimental research studies that compare the effectiveness of medical treatments, management strategies, prevention strategies, and other medical or public health interventions.

Interventional study designs, also called experimental study designs, are those where the researcher intervenes at some point throughout the study. The most common and strongest interventional study design is a randomized controlled trial, however, there are other interventional study designs, including pre-post study design, non-randomized controlled trials, and quasi-experiments. Experimental studies are used to evaluate study questions related to either therapeutic agents or prevention. Therapeutic agents can include prophylactic agents, treatments, surgical approaches, or diagnostic tests. Prevention can include changes to protective equipment, engineering controls, management, policy or any element that should be evaluated as to a potential cause of disease or injury.

A pre-post study

A pre-post study measures the occurrence of an outcome before and again after a particular intervention is implemented. A good example is comparing deaths from motor vehicle crashes before and after the enforcement of a seat-belt law. Pre-post studies may be single arm, one group measured before the intervention and again after the intervention, or multiple arms, where there is a comparison between groups.

Non-randomized trials

Non-randomized trials are interventional study designs that compare a group where an intervention was performed with a group where there was no intervention. These are convenient study designs that are most often performed prospectively and can suggest possible relationships between the intervention and the outcome.

Randomized controlled trials

Randomized controlled trials (RCTs) are the most common type of interventional study, and can have many modifications. These trials take a homogenous group of study participants and randomly divide them into two separate groups. If the randomization is successful then these two groups should be the same in all respects, both measured confounders and

Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

unmeasured factors. The intervention is then implemented in one group and not the other and comparisons of intervention efficacy between the two groups are analysed. Theoretically, the only difference between the two groups through the entire study is the intervention.

### Crossover Randomized controlled trials

A crossover RCT is a type of interventional study design where study participants intentionally “crossover” to the other treatment arm. A crossover RCT begins the same as a traditional RCT, however, after the end of the first treatment phase, each participant is re-allocated to the other treatment arm. There is often a wash-out period in between treatment periods. This design has much strength, including demonstrating reversibility, compensating for unsuccessful randomization, and improving study efficiency by not using time to recruit subjects.

In a clinical research trial, a clinical endpoint generally refers to occurrence of a disease, symptom, sign or laboratory abnormality that constitutes one of the target outcomes of the trial, but may also refer to any such disease or sign that strongly motivates the withdrawal of that individual.

An observational study is a study in which a researcher simply observes behavior in a systematic manner without influencing or interfering with the behavior.

The researcher would record the behavior that he or she observes. There may be rating scales that the researcher would use when observing the behaviour.

Observational studies can involve naturalistic observation or laboratory observation. Naturalistic observation would involve observing behaviours in the natural environment. Laboratory observation involves observing behaviours in a research laboratory.

There are three main types of observational study designs that are distinguished by the objective of the research study, how subjects are sampled, and the timeline of data collection. In evaluating and critically appraising observational studies, it is important for readers to consider if the study design was appropriate for the research question and if the methodology used was consistent with the study design. A comparison of experimental and observational study designs.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## Cross-sectional studies

A cross-sectional study is an observational study in which exposure and outcome are determined simultaneously for each subject. It is often described as taking a “snapshot” of a group of individuals. Cross-sectional studies are most appropriate for screening hypotheses because they require a relatively shorter time commitment and fewer resources to conduct.

## Cohort studies

The identifying feature of a cohort study design is that the subjects are followed over time. Cohort studies begin with individuals who are exposed and not exposed to a factor and then evaluate the subsequent development of an outcome. Cohort studies may be concurrent or retrospective, the distinction being when, relative to the current time, the subjects are identified.

## Case-control studies

Case-control studies begin with individuals who have the outcome (“cases”) and compare them to individuals who do not have the outcome (“controls”) according to past history of exposure to a factor.

## OBJECTIVES OF CASE STUDY

The case study has the following four main objectives:

- Clinical purpose, (dealing with a patient).
- Diagnostic purpose, (educational situation to provide the remedial instruction to poor students).
- Fact-findings about psychological or educational problems.
- Supplementing other information. It may be a follow up work. Phases of Case Study.

## A Case Study is Conducted into Three Phases

- Retrospective phase refers to the past records of the case completely which is used in diagnosing the case.
- Prospective phase refers to the present status of the case, which is helpful in understanding the case. The suggestions and remediation can be offered to the case.
- Conspective phase refers to the future development and improvement of the case which is also employed to examine the effects of the remediation given to the case.



  
**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## TYPES OF CASE STUDY

**Six types of case studies are conducted which are as follows:**

1. A group or a community case study,
2. Casual comparative studies,
3. Activity analysis.
4. Content or document analysis,
5. A follow-up study, and
6. Trend studies.

### 1. Community Studies

The community study is a careful description and analysis of a group of people living together in a particular geographic location in a corporative way. The community study deals with such elements of the community as location, appearance, prevailing economic activity, climate and natural sources, historical development, how the people live, the social structure, goals and life values, an evaluation of the social institutions within the community that meet the human needs etc. Such studies are case studies, with the community serving as the case under investigation.

### 2. Casual Comparative Studies

Another type of study seeks to find the answers to the problems through the analysis of casual relationship. What factors seem to be associated with certain occurrences, conditions or types of behaviour? By the methodology of descriptive research, the relative importance of these factors may be investigated.

### 3. Activity Analysis

The analysis of the activities or processes that an individual is called upon to perform is important, both in industry and in various types of social agencies. This process of analysis is appropriate in any field of work and at all levels of responsibility. In social system the roles of superintendent, the principal, the teacher and the custodian have been carefully analyzed to discover what these individuals do and need to be able to do.

### 4. Content or Document Analysis

Content analysis, sometimes known as document analysis, deals with the systematic examination of current records or documents as sources of data. In documentary analysis,



PRINCIPAL



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

the following may be used as sources of data: official records and reports, printed forms, text-books, reference books, letters, autobiographies diaries, pictures, films and cartoons etc. But in using documentary sources, one must bear in mind the fact that data appearing in print are not necessarily trustworthy. The evaluation of documents used in descriptive research must be subjected to the same type of criticism employed by the historian.

This content or document analysis should serve a useful purpose in research, adding important knowledge to a field to study or yielding information that is helpful in evaluating and improving social or educational practices.

### 5. A Follow-up Study

A follow-up study investigates individuals who have left an institution after having completed a programme, a treatment or a course of study, to know what has been the impact of the institutions and its programme upon them. By examining their status or seeking their opinions, one may get some idea of the adequacy or inadequacy of the institutes programme. Studies of this type enable an institution to evaluate various aspects of its programme in the light of actual results.

### 6. Trend Studies

The trend or predictive study is an interesting application of the descriptive method. In essence, it is based upon a longitudinal consideration of recorded data, indicating what has been happening in the past, what does the present situation reveal and on the basis of these data, what will be likely to happen in the future.

The research problem having been formulated in clear cut terms, the researcher will be required to prepare a research design, i.e., he will have to state the conceptual structure within which research would be conducted. The preparation of such a design facilitates research to be as efficient as possible yielding maximal information. In other words, the function of research design is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money. But how all these can be achieved depends mainly on the research purpose. Research purposes may be grouped into four categories, viz., (i) Exploration, (ii) Description, (iii) Diagnosis, and (iv) Experimentation. A flexible research design which provides opportunity for considering many different aspects of a problem is considered appropriate if the purpose of the research study is that of exploration.



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

But when the purpose happens to be an accurate description of a situation or of an association between variables, the suitable design will be one that minimises bias and maximises the reliability of the data collected and analysed.

There are several research designs, such as, experimental and non-experimental hypothesis testing. Experimental designs can be either informal designs (such as before-and-after without control, after-only with control, before-and-after with control) or formal designs (such as completely randomized design, randomized block design, Latin square design, simple and complex factorial designs), out of which the researcher must select one for his own project.

The preparation of the research design, appropriate for a particular research problem, involves usually the consideration of the following:

- (i) the means of obtaining the information;
- (ii) the availability and skills of the researcher and his staff (if any);
- (iii) explanation of the way in which selected means of obtaining information will be organised and the reasoning leading to the selection;
- (iv) the time available for research; and (v) the cost factor relating to research, i.e., the finance available for the purpose

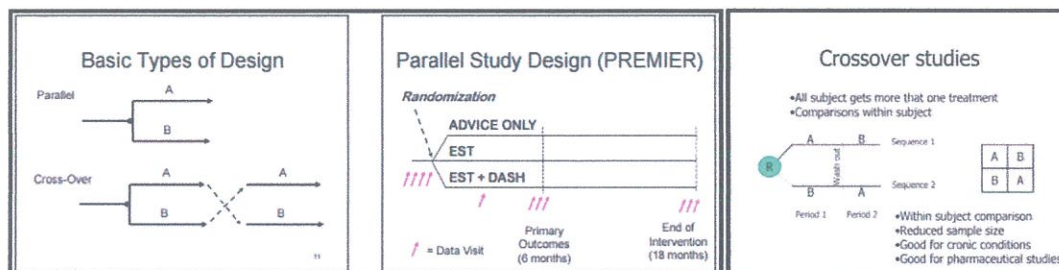
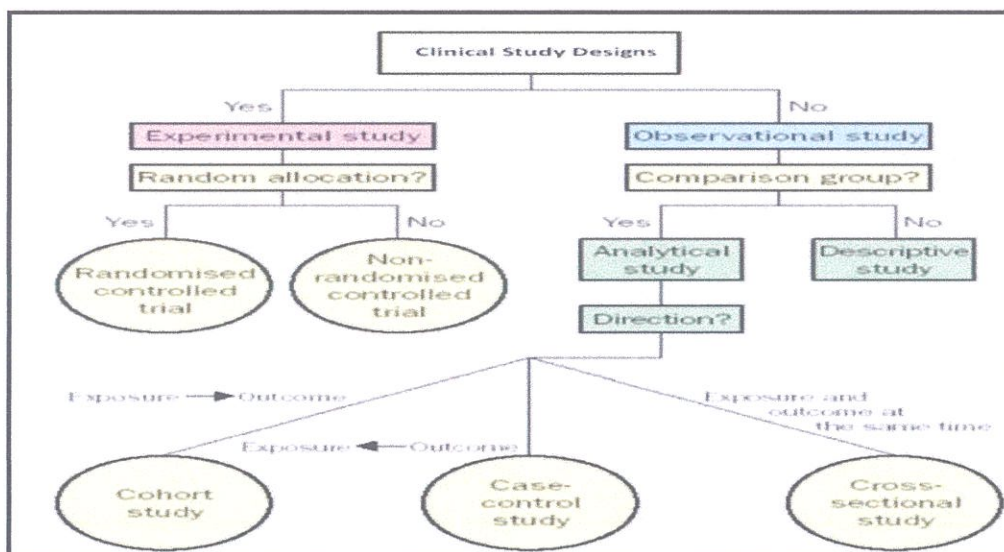
All the items under consideration in any field of inquiry constitute a 'universe' or 'population'. A complete enumeration of all the items in the 'population' is known as a census inquiry. It can be presumed that in such an inquiry when all the items are covered no element of chance is left and highest accuracy is obtained. But in practice this may not be true. Even the slightest element of bias in such an inquiry will get larger and larger as the number of observations increases. Moreover, there is no way of checking the element of bias or its extent except through a resurvey or use of sample checks. Besides, this type of inquiry involves a great deal of time, money and energy. Not only this, census inquiry is not possible in practice under many circumstances. For instance, blood testing is done only on sample basis. Hence, quite often we select only a few items from the universe for our study purposes. The items so selected constitute what is technically called a sample.

The researcher must decide the way of selecting a sample or what is popularly known as the sample design. In other words, a sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given population. Thus, the plan to select 12 of a city's 200 drugstores in a certain way constitutes a sample design.



can be either probability samples or non-probability samples. With probability samples each element has a known probability of being included in the sample but the non-probability samples do not allow the researcher to determine this probability. Probability samples are those based on simple random sampling, systematic sampling, stratified sampling, cluster/area sampling whereas non-probability samples are those based on convenience sampling, judgment sampling and quota sampling techniques. The important sample designs is as follows:

(i) Deliberate Sampling; (ii) Simple random sampling; (iii) Systematic sampling (iv) stratified sampling; (v) Quata Sampling (vi) Cluster sampling or area sampling (vii) Multi-stage sampling; (viii) Sequential Sampling.





**Writing of report must be done with great care keeping in view the following:**

1) The layout of the report should be as follows: (i) the preliminary pages; (ii) the main text, and (iii) the end matter.

In its preliminary pages the report should carry title and date followed by

## Sample Size Determination

The estimation approach to determining sample size addresses the question: "How accurate do you want your estimate to be?" In this case we are estimating the difference in means. This approach requires us to specify how large a difference we are interested in detecting, say  $B$  for the Bound on the margin of error, and then to specify how certain we want to be that we can detect a difference that large. Recall that when we assume equal sample sizes of  $n$ , a confidence interval for  $\mu_1 - \mu_2$  is given by

$$\left\{ \bar{Y}_1 - \bar{Y}_2 \pm t(1 - \alpha/2; df) \cdot s \cdot \sqrt{\frac{2}{n}} \right\}$$

Where  $n$  is the sample size for each group, and  $df = n + n - 2 = 2(n - 1)$  and  $s$  is the pooled standard deviation. Therefore, we first specify  $B$  and then solve this equation:

$$B = t(1 - \alpha/2; df) \cdot s \cdot \sqrt{\frac{2}{n}}$$

for  $n$ . Therefore,

$$n = \left[ t(1 - \alpha/2; df) \cdot s \cdot \frac{\sqrt{2}}{B} \right]^2 = \left[ \frac{t^2(1 - \alpha/2; df) \cdot s^2 \cdot 2}{B^2} \right]$$

Since in practice, we don't know what  $s$  will be, prior to collecting the data, we will need a guess estimate of  $\sigma$  to substitute into this equation. To do this by hand and we use  $z$  rather than  $t$  since we don't know the  $df$  if we don't know the sample size  $n$  - the computer will iteratively update the d.f. as it computes the sample size, giving a slightly larger sample size when  $n$  is small.

So we need to have an estimate of  $\sigma^2$ , a desired margin of error bound  $B$ , that we want to detect, and a confidence level  $1 - \alpha$ . With this we can determine sample size in this comparative type of experiment. We may or may not have direct control over  $\sigma^2$ , but by using different experimental designs we do have some control over this and we will address this later in this course. In most cases an estimate of  $\sigma^2$  is needed in order to determine the sample size.

One special extension of this method is when we have a binomial situation. In this case where we are estimating proportions rather than some quantitative mean level, we know that the worst-case variance,  $p(1-p)$ , is where  $p$  (the true proportion) is equal to 0.5 and then we would have an approximate sample size formula that is simpler, namely  $n = 2/B^2$  for  $\alpha = 0.05$ .

acknowledgements and foreword. Then there should be a table of contents followed by a list of tables and list of graphs and charts, if any, given in the report.

**The main text of the report should have the following parts:**

(a) Introduction: It should contain a clear statement of the objective of the research and an explanation of the methodology adopted in accomplishing the research. The scope of the study along with various limitations should as well be stated in this part.

(b) Summary of findings: After introduction there would appear a statement of findings and recommendations in non-technical language. If the findings are extensive, they should be summarised.

(c) Main report: The main body of the report should be presented in logical sequence and broken-down into readily identifiable sections.





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

(d) Conclusion: Towards the end of the main text, researcher should again put down the results of his research clearly and precisely. In fact, it is the final summing up.

At the end of the report, appendices should be enlisted in respect of all technical data. Bibliography, i.e., list of books, journals, reports, etc., consulted, should also be given in the end. Index should also be given specially in a published research report.

2. Report should be written in a concise and objective style in simple language avoiding vague expressions such as 'it seems,' 'there may be', and the like.
3. Charts and illustrations in the main report should be used only if they present the information more clearly and forcibly.
4. Calculated 'confidence limits' must be mentioned and the various constraints experienced in conducting research operations may as well be stated.

**Cohort** studies are a type of medical research used to investigate the causes of disease, establishing links between risk factors and health outcomes. **Cohort** studies are usually forward-looking - that is, they are "prospective" studies, or planned in advance and carried out over a future period of time.

A cohort study is a quasi-experiment used in medicine, nursing, psychology, social science, actuarial science, business analytics, and ecology. For instance: in medicine, it is an analysis of risk factors and follows a group of people who typically do not have a given disease, and uses correlations to determine the absolute risk of subject contraction. It is one type of clinical study design and should be compared with a cross-sectional study. Cohort studies are largely about the life histories of segments of populations, and the individual people who constitute these segments.

### Retrospective cohort study

A retrospective cohort study, also called a historic cohort study, is a longitudinal cohort study that studies a cohort of individuals that share a common exposure factor to determine its influence on the development of a disease, and are compared to another group of equivalent individuals that were not exposed to that.

### Prospective cohort study

A prospective cohort study watches for outcomes, such as the development of a disease, during the study period and relates this to other factors such as suspected risk or protection



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

factor(s). The study usually involves taking a cohort of subjects and watching them over a long period.

The use of cohorts is often mandatory as a randomised controlled trial may be unethical; for example, you cannot deliberately expose people to cigarette smoke or asbestos. Thus research on risk factors relies heavily on cohort studies. As cohort studies measure potential causes before the outcome has occurred the study can demonstrate that these “causes” preceded the outcome, thereby avoiding the debate as to which is cause and which is effect.

**Establishing the Need for a Clinical Trial.**

This is the preliminary and the most important step to reach to the decision of performing a clinical trial depending upon the scientific question for which answers are desired. However, the decision to perform a clinical trial should be made after considering the magnitude of the problem for which clinical trial is needed; potential evidence available to suggest that newer alternative will definitely add to the existing knowledge; extent of anticipated benefits in terms of well-being/survival rate/cure rate/side effects; availability of a simple approach to perform the same; and ethically justifiable.

### **Why A Protocol Is Needed?**

In general, all the randomized clinical trials essentially require a protocol to explain the rationale, adopted method, measures to ensure the safety of study participants, proposed statistical analysis, information about research funders, and organizational/administrative details right from the time of trial inception till reporting of the results. Thus, transparent, detailed and clearly written protocols remain an indispensable element to perform a clinical trial as it enables timely and comprehensive assessment of the trial. However, in most of the protocol discrepancies (viz. designation of primary outcomes or sample size calculations or role of sponsor and investigator, etc.) have been observed which seriously questions the reliability of the clinical trial results. Thus, this article attempts to cover all the elements of a protocol which should be taken into consideration before starting the trial.

### **Protocol and Its Elements**

Protocol refers to a document which not only explains the background and the rationale for the trial, but even describes the objective(s), methodology (viz. study design, duration, number of subjects, inclusion and exclusion criteria, study variables, operational definitions, ethical considerations, statistical analysis, etc.) and organization of a trial. In short, protocol





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

is the written mechanism that describes the design and implementation of a clinical trial. Thus, there are two macro-elements of a protocol-clinical trial development-knowledge and science, and clinical trial conduct-execution and project management.

## CHAPTER 2

Central tendency refers to and locates the center of the distribution of values & Dispersion is the amount of spread of data about the center of a data set.

Measures of central tendency represents an entire group of scores. A measure of central tendency is a value at the center or middle of a data set. Measure of central tendency include mean, median, and mode.

Central tendency refers to and locates the center of the distribution of values. Mean, mode, and median are the most commonly used indices in describing the central tendency of a data set. If a data set is symmetric, then both the median and the mean of the data set coincide with each other.

**Arithmetic Mean (or Average)** - Arithmetic mean is the average of a numerical set and is found by dividing the sum of a set of numbers by the total number of members in the set. A set of data can be ungrouped data and grouped data.

The **arithmetic mean** is a mathematical representation of the typical value of a series of numbers, computed as the sum of all the numbers in the series divided by the count of all numbers in the series. **Arithmetic mean** is commonly referred to as "average" or simply as "**mean**" and it is denoted by  $\bar{x}$ .

$$\bar{x} = \frac{\sum x_i}{n} \quad \text{and for grouped data} \quad \bar{x} = \frac{\sum x_i f_i}{N}$$

For Ungroup data :

**Median** - The value of a numerical set that equally divides the number of the values that are larger and smaller is the median. Prior to calculating the median of an ungrouped data, the data should be altered in an ascending order. The middle number in a given sequence of numbers, taken as the average of the two middle numbers when the sequence has an even number of numbers:

4 is the median of 1, 3, 4, 8, 9.

$$M = L + \frac{\frac{N}{2} - cf}{f} \times h \quad \text{for Grouped Data}$$



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

**Mode** - The value of a numerical set that appears with the greatest frequency is known as the mode.

A **statistical** term that refers to the most frequently occurring number found in a set of numbers. The **mode** is found by collecting and organizing the data in order to count the frequency of each result. The result with the highest occurrences is the **mode** of the set.

Mode is a number that occurs most frequently in the data set. On a histogram it represents the highest bar in a bar chart or histogram. You can, therefore, sometimes consider the mode as being the most popular option.

For ungrouped data: highest frequency and

$$\text{For grouped data : } M = L + \left( \frac{f_1 - f_0}{2f_1 - f_0 - f_2} \right) \times h$$

Measures of variation or variability is a statistic that describes how different scores are from the mean--how they are spread out or dispersed. Basically, variability is a measure of how each score in a group of scores differs from the mean of that set of scores. These include range, standard deviation, and variance.

Variation or Dispersion is the amount of spread of data about the center of the distribution. Range, quartile deviation, mean deviation and standard deviation are the most commonly used measures of dispersion.

The range is simply the highest value minus the lowest value. But range does not provide a sufficient picture about the dispersion.  $\text{Range} = U - L$

Interquartile range is an extension of the range that considers quartiles within a data set. Quartiles of a data set are three points that divide the data set into four parts. The three values are first quartile or  $Q_1$  which mainly represent the initial 25% of the data set, second quartile (or median) or  $Q_2$ , which represents the initial 50% of the data set and third quartile or  $Q_3$ , which represents the initial 75% of the data set. Interquartile range is the difference between  $Q_3$  and  $Q_1$ . The interquartile range summarizes the spread or variation of values in a data set especially around the median. However, like range it provides incomplete information about the data.

$$Q_1 = L + \frac{\frac{N}{4} - cf}{f} \times h \quad Q_3 = L + \frac{\frac{3N}{4} - cf}{f} \times h$$

Inter quartile range =  $Q_3 - Q_1$

Semi-Inter quartile range or quartile deviation =  $\frac{Q_3 - Q_1}{2}$

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

The variance and standard deviation describe how far or close the numbers or observations of a data set lie from the mean (or average). Variance is the measure of the average distance between each of a set of data points and their mean value; equal to the sum of the squares of the deviation from the mean value. Standard deviation though calculated as the square root of the variance is the **absolute** value calculated to indicate the extent of deviation from the average of the data set.

$$\text{Variance } V = \frac{\sum (x - \bar{x})^2}{n} \text{ for Ungrouped data } V = \frac{\sum f(x - \bar{x})^2}{N} \text{ for Grouped Data}$$

To calculate the standard deviation, first the deviations of data values from the mean are calculated. The root square mean of deviations is called the standard deviation.

$$\text{Standard deviation} = \sigma = \sqrt{V}$$

The **coefficient of variation** is a measure of spread that describes the amount of variability relative to the mean.

Coefficient of variation is a relative measure to calculate and compare two different settings that has two separate means and standard deviations and is calculated as the standard deviation divided by the mean and the whole multiplied by 100. Thus, CV measures the amount of variation in data groups that have different means.

$$Cov = \frac{\sigma}{\bar{x}} \times 100$$

The variance and standard deviation describe how far or close the numbers or observations of a data set lie from the mean (or average). Variance is the measure of the average distance between each of a set of data points and their mean value; equal to the sum of the squares of the deviation from the mean value. Standard deviation though calculated as the square root of the variance is the **absolute** value calculated to indicate the extent of deviation from the average of the data set.

$$\text{Variance } V = \frac{\sum (x - \bar{x})^2}{n} \text{ for Ungrouped data } V = \frac{\sum f(x - \bar{x})^2}{N} \text{ for Grouped Data}$$

Standard deviation though calculated as the square root of the variance is the **absolute** value calculated to indicate the extent of deviation from the average of the data set. To calculate the standard deviation, first the deviations of data values from the mean are calculated. The root square mean of deviations is called the standard deviation.



Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



$$\sigma = \sqrt{\frac{\sum f(x - \bar{x})^2}{N}}$$

The variance and standard deviation describe how far or close the numbers or observations of a data set lie from the mean (or average). Variance is the measure of the average distance between each of a set of data points and their mean value; equal to the sum of the squares of the deviation from the mean value. Standard deviation though calculated as the square root of the variance is the **absolute** value calculated to indicate the extent of deviation from the average of the data set.

$$\text{Variance } V = \frac{\sum (x - \bar{x})^2}{n} \text{ for Ungrouped data } V = \frac{\sum f(x - \bar{x})^2}{N} \text{ for Grouped Data}$$

The standard error is a measure of the variability of a statistic. It is an estimate of the standard deviation of a sampling distribution.

In statistics, a central tendency (or measure of central tendency) is a central or typical **value** for a probability distribution. It may also be called a center or location of the distribution. Colloquially, **measures of central tendency** are often called averages.

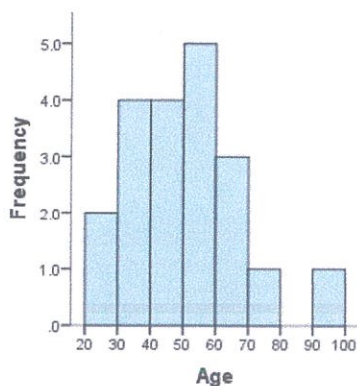
**Mean, Median & Mode Calculation.** The mean of a data set illustrates an average. To find the mean, add all of the numbers in a data set and then divide by total number of instances in the given data set. The mean would be significantly affected if one of the numbers in a data set is an outlier.

Mean, median, and mode are the **three measures of central tendency**. The mean and median can only be used for numerical data; however the mean is more sensitive to outliers than the median. The mode can be used with both numerical and nominal data.

## CHAPTER 3

Histograms are plots of continuous data and are often used to represent frequency distributions, where the y-axis shows the number of times a particular measurement or value was obtained. For this reason, they are often called frequency histograms.

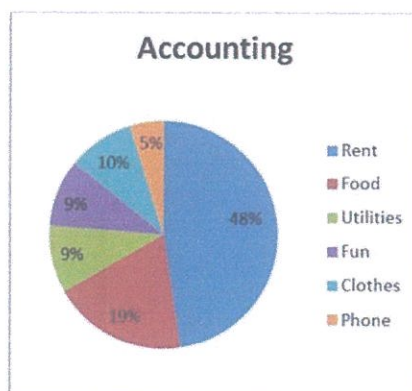




Important features of this type of graph include:

- The data are numerical and continuous (e.g. height or weight) so the bars touch. (A column graph from Excel can be made into a histogram).
- The x-axis usually records the class interval. The y-axis usually records the number of individuals in each class interval (frequency).

Pie Graphs can be used instead of bar graphs, generally in cases where there are six or fewer categories involved. A pie chart compares parts to a whole. As such it shows a percentage distribution. The entire pie represents the total data set and each segment of the pie is a particular category within the whole. So, to use a pie chart, the data you are measuring must depict a ratio or percentage relationship. You must always use the same unit of measure within a pie chart. Otherwise your numbers will mean nothing.



Features of pie graphs include:

- Pie charts are a visual way of displaying data that might otherwise be given in a small table.



*Principal*  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences

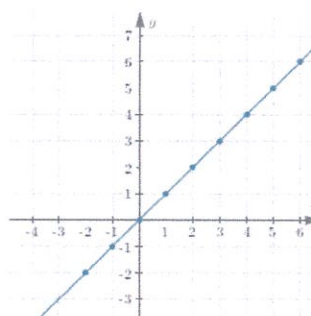


- Pie charts are useful for displaying data that are classified into nominal or ordinal categories. Nominal data are categorised according to descriptive or qualitative information such as county of birth or type of pet owned. Ordinal data are similar but the different categories can also be ranked, for example in a survey people may be asked to say whether they classed something as very poor, poor, fair, good, very good.
- Pie charts are generally used to show percentage or proportional data and usually the percentage represented by each category is provided next to the corresponding slice of pie.
- Pie charts are good for displaying data for around 6 categories or fewer. When there are more categories it is difficult for the eye to distinguish between the relative sizes of the different sectors and so the chart becomes difficult to interpret.

In a **semilogarithmic graph**, one axis has a logarithmic scale and the other axis has a linear scale. In the following set of axes, the vertical scale is **logarithmic** (equal scale between powers of 10) and the horizontal scale is **linear** (even spaces between numbers). There are

## a. $y = x$ on Linear Axes

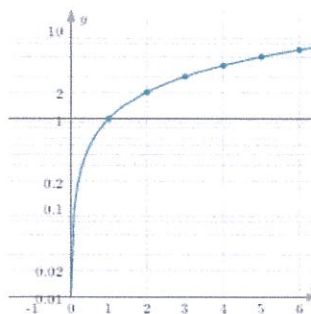
On ordinary linear axes, the graph of  $y = x$  is a straight line, passing through  $(-2, -2)$ ,  $(-1, -1)$ ,  $(0, 0)$ ,  $(1, 1)$ ,  $(2, 2)$ , etc.



Graph of  $y = x$  on semilogarithmic axes.

## b. $y = x$ on Semi-logarithmic Axes (vertical axis logarithmic, horizontal axis linear)

On semi-logarithmic axes, the graph of  $y = x$  is a curve, not a straight line. It still passes through  $(1, 1)$ ,  $(2, 2)$ ,  $(3, 3)$ , etc, but you'll notice there are no negative values for  $y$  (and so in this case, no negative values for  $x$  either) since we can't find the log of a negative number.



Graph of  $y = x$  on semilogarithmic (log-lin) axes.

I've marked the points  $(3, 3)$ ,  $(4, 4)$ ,  $(5, 5)$ ,  $(6, 6)$  on the curve.

**PRINCIPAL**



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E., P.C.I., New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

no negative numbers on the y-axis, since we can only find the logarithm of positive numbers.

Proper construction and labeling of graphs are crucial elements in graphical data representation. The design and actual construction of graphs are not in themselves difficult. The preparation of a good graph, however, requires careful thought and competent technical skills. One needs not only a knowledge of statistical principles, but also, in particular, computer and drafting competency. There are no firm rules for preparing good graphical presentations. Mostly, we rely on experience and a few guidelines. Both books and research papers have addressed the need for a more scientific guide to optimal graphics that, after all, is measured by how well the graph communicates the intended messages(s) to the individuals who are intended to read and interpret the graphs. Still, no rules will cover all situations. One must be clear that no matter how well a graph or chart is conceived, if the draftsmanship and execution is poor, the graph will fail to achieve its purpose.

A “good” graph or chart should be as simple as possible, yet clearly transmit its intended message. Superfluous notation, confusing lines or curves, and inappropriate draftsmanship (lettering, etc.) that can distract the reader are signs of a poorly constructed graph.

Proper construction and labeling of the typical rectilinear graph should include the following considerations:

- A title should be given. The title should be brief and to the point, enabling the reader to understand the purpose of the graph without having to resort to reading the text. The title can be placed below or above the graph.
- The axes should be clearly delineated and labeled. In general, the zero (0) points of both axes should be clearly indicated. The ordinate (the Y axis) is usually labeled with the description parallel to the Y axis. Both the ordinate and abscissa (X axis) should be each appropriately labeled and subdivided in units of equal width (of course, the X and Y axes almost always have different subdivisions).
- The numerical values assigned to the axes should be appropriately spaced so as to nicely cover the extent of the graph. This can easily be accomplished by trial and error and a little manipulation. The scales and proportions should be constructed to present a fair picture of the results and should not be exaggerated so to prejudice the interpretation. Sometimes, it may be necessary to skip or omit some of the data to achieve this objective. In these cases,

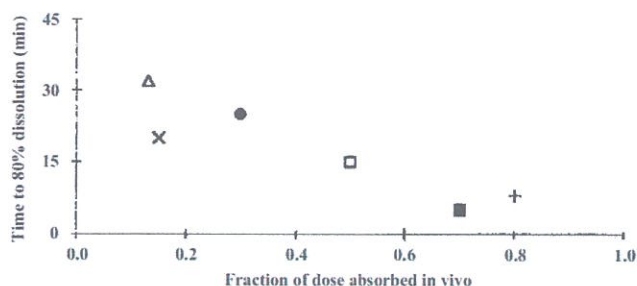




the use of a “broken line” is recommended to clearly indicate the range of data not included in the graph.

- d) If appropriate, a key explaining the symbols used in the graph should be used.
- e) In situations where the graph is derived from laboratory data, inclusion of the source of the data (name, laboratory notebook number, and page number, for example) is recommended.

The scatter plots (also called correlation diagrams or scatter diagrams) at this time. This type of plot or diagram is commonly used when presenting results of experiments. Data are collected in pairs (X and Y) with the objective of demonstrating a trend or relationship (or lack of relationship) between the X and Y variables. Usually, we are interested in showing a linear relationship between the variables (i.e., a straight line). For example, one may be interested in demonstrating a relationship (or correlation) between time to 80% dissolution of various tablet formulations of a particular drug and the fraction of the dose absorbed when human subjects take the various tablets. The data plotted pictorially that as dissolution increases (i.e., the time to 80% dissolution decreases) in vivo absorption increases. Scatter plots involve data pairs, X and Y, both of which are variable. In this example, dissolution time and fraction absorbed are both random variables.



Scatter plot showing the correlation of dissolution time and in vivo absorption of six tablet formulations.  
△, formulation A; ×, formulation B; ●, formulation C; □, formulation D; ■, formulation E; +, formulation F.

## CHAPTER 4

The parametric test is the hypothesis test which provides generalisations for making statements about the mean of the parent population. A t-test based on Student's t-statistic, which is often used in this regard. The t-statistic rests on the underlying assumption that there is the normal distribution of variable and the mean is known or assumed to be known.





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

The population variance is calculated for the sample. It is assumed that the variables of interest, in the population are measured on an interval scale.

A parametric statistical test is one that makes assumptions about the parameters (defining properties) of the population distribution(s) from which one's data are drawn, while a **non-parametric test** is one that makes no such assumptions.

In parametric statistics it is assumed that the data has come from a type of probability distribution and makes inferences about the parameters of the distribution. In general, parametric methods make more assumptions than nonparametric methods. If those extra assumptions are correct, parametric methods can produce more accurate and precise estimates. For this reason they are described as having more statistical power. However, if assumptions made in the parametric analysis are incorrect then these methods can be very misleading. The concept of robustness refers to the likelihood of getting a misleading result, and parametric methods are less robust than non-parametric alternatives. In selection of method there is a trade-off to be made of simplicity and power versus robustness. Which is more appropriate depends on the specifics of the phenomenon being studied.

- A statistical test, in which specific assumptions are made about the population parameter is known as the parametric test.
- In the parametric test, the test statistic is based on distribution.
- In the parametric test, it is assumed that the measurement of variables of interest is done on interval or ratio level.
- In general, the measure of central tendency in the parametric test is mean,
- In the parametric test, there is complete information about the population.
- The applicability of parametric test is for variables only.
- For measuring the degree of association between two quantitative variables, Pearson's coefficient of correlation is used in the parametric test.

The nonparametric test is defined as the hypothesis test which is not based on underlying assumptions, i.e. it does not require population's distribution to be denoted by specific parameters. The test is mainly based on differences in medians. Hence, it is alternately known as the distribution-free test. The test assumes that the variables are measured on a nominal or ordinal level. It is used when the independent variables are non-metric.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences (V), Bhogapuram Mandal  
Cherukupally, Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

A **nonparametric test** is a hypothesis test that does not require the population's distribution to be characterized by certain parameters. However, **nonparametric tests** are not completely free of assumptions about your data. For instance, **nonparametric tests** require the data to be an independent random sample. **Nonparametric** statistics refer to a statistical method wherein the data is not required to fit a normal distribution. **Nonparametric** statistics uses data that is often ordinal, **meaning** it **does** not rely on numbers, but rather a ranking or order of sorts.

Non-parametric statistics techniques do not rely on data belonging to any particular distribution. Sometimes these are called distribution-free methods, which do not rely on assumptions that the data are drawn from a given probability distribution. Sometimes in a complex system, individual variables are assumed to be parametric but not the connection between variables. Examples here include nonparametric regression and non-parametric hierarchical Bayesian models.

- A statistical test used in the case of non-metric independent variables is called nonparametric test.
- The test statistic is arbitrary in the case of the nonparametric test.
- The variables of interest are measured on nominal or ordinal scale.
- The measure of central tendency in the case of the nonparametric test is median.
- In the nonparametric test, there is no information about the population.
- Nonparametric test applies to both variables and attributes.
- Spearman's rank correlation is used in the nonparametric test.

Hypothesis test as the formal procedures that statisticians use to test whether a hypothesis can be accepted or not. A **hypothesis** is an assumption about something. Hypothesis testing is about testing to see whether the stated hypothesis is acceptable or not. During our hypothesis testing, we want to gather as much data as we can so that we can prove our hypothesis one way or another.

**There is a proper four-step method in performing a proper hypothesis test:**

- Write the hypothesis
- Create an analysis plan
- Analyze the data



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- Interpret the result

## Hypothesis

The first step is that of writing the hypothesis. You actually have two hypotheses to write. One is called the **null hypothesis**. This is the hypothesis based on chance. Think of this as the hypothesis that states how you would expect things to work without any external factors to change it. The other hypothesis is called the **alternative hypothesis**. This is the hypothesis that shows a change from the null hypothesis that is caused by something.

In hypothesis testing, we just test to see if our data fits our alternative hypothesis or if it fits the null hypothesis. We don't worry about what is causing our data to shift from the null hypothesis if it does. Keep in mind, when writing your null hypothesis and alternative hypothesis, they must be written in such a way so that if the null hypothesis is false, then the alternative hypothesis is true and vice versa.

## Analysis Plan

The second step is to create an analysis plan. This involves deciding how to read your results to know whether your null hypothesis is true or your alternative hypothesis is true. Usually, this involves analyzing just one single test statistic.

There are two ways to read your results: P-value method and the region of acceptance method. The **P-value** is the probability of observing the desired statistic. If this P-value is less than the significance level, then the null hypothesis is not valid. The significance level is the probability of making the mistake of saying that the null hypothesis is not valid when it actually is true. The **region of acceptance** is a chosen range of values that results in the null hypothesis being stated as valid.

## Data Analysis

The third step is that of analyzing the data. It is the putting step two into action. It is in this step that the data is analyzed and either a P-value is found, or the data's region is found.

## Interpretation

The fourth step involves interpreting the results. It is in this step that the data is compared to the region of acceptance or the significance level. If the P-value is less than the significance



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

level, then the null hypothesis is not valid. If the data is within the region of acceptance, then the null hypothesis is valid.

Correlation and regression are statistical methods that are commonly used in the medical literature to compare two or more variables. Although frequently confused, they are quite different. Correlation measures the association between two variables and quantifies the strength of their relationship. Correlation evaluates only the existing data. Regression uses the existing data to define a mathematical equation which can be used to predict the value of one variable based on the value of one or more other variables and can therefore be used to extrapolate between the existing data. The regression equation can therefore be used to predict the outcome of observations not previously seen or tested.

**Correlation** is a bivariate analysis that measures the strengths of association between two variables. In statistics, the value of the correlation coefficient varies between +1 and -1. When the value of the correlation coefficient lies around  $\pm 1$ , then it is said to be a perfect degree of association between the two variables. As the correlation coefficient value goes towards 0, the relationship between the two variables will be weaker. Usually, in statistics, we measure three types of correlations: Pearson correlation, Kendall rank correlation and Spearman correlation.

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{n \sigma_x \sigma_y} = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}} = \frac{\sum XY}{\sqrt{\sum X^2 \sum Y^2}}$$

Carl Pearson's coefficient of correlation (r) is widely used in statistics to measure the degree of the relationship between linear related variables. Spearman's Rank correlation coefficient is used to identify and test the strength of a relationship between two sets of data. It is often used as a statistical method to aid with either proving or disproving a hypothesis e.g. the depth of a river does not progressively increase the further from the river bank. The formula used to calculate Spearman's Rank is shown below.

$$r = 1 - \frac{6 \sum d^2}{n^3 - n}$$

NB. Sometimes  $n^3 - n$  is written as  $n(n^2 - 1)$ . Both mean the same thing.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

The most commonly used techniques for investigating the relationship between two quantitative variables are correlation and linear regression. Correlation quantifies the

#### Student's t-test: Comparison of two means

Among the most commonly used statistical **significance tests** applied to small data sets (populations samples) is the series of Student's tests. One of these tests is used for the comparison of two means, which is commonly applied to many cases. Typical examples are:

##### General aspects of significance tests

The outcome of these tests is the **acceptance** or **rejection** of the **null hypothesis ( $H_0$ )**. The null hypothesis generally states that: "Any differences, discrepancies, or suspiciously outlying results are purely **due to random** and **not systematic errors**". The **alternative hypothesis ( $H_a$ )** states exactly the opposite.

The null hypothesis for the aforementioned examples is:

**The means are the same**, i.e. in **Example 1**: both samples contain the same percentage of the analyte; in **Example 2**: both methods provide the same analytical results. The differences observed (if any) are purely due to random errors.

An erroneous rejection of  $H_0$  (even though it is true) constitutes a **Type 1 error**, whereas an erroneous acceptance of  $H_0$  (even though it is false) constitutes a **Type 2 error**.

All significance tests provide results within a predefined **confidence level % (CL%)**. Confidence levels commonly used are 90%, 95% and 99%, with most usual (at least in the field of chemical analysis) the 95%.

A CL 95% means that: In case of rejecting  $H_0$ , we are **95% or more** certain that we did the right thing. In other words, we risk a probability of **no more** than  $(100-95)/100 = 0.05$  for a **Type 1 error**.

We can decrease or increase the confidence level of a significance test, but one has to consider the following pitfalls:

(a) By decreasing CL say to 90% (making thus the rejection of  $H_0$  easier) the probability of **Type 1 error** obviously increases.

(b) By increasing CL say to 99% (making thus the rejection of  $H_0$  harder) the probability of **Type 2 error** increases.

A CL 95% is generally considered as a fair compromise between these two different risks.

##### Student's t-test for the comparison of two means

This test (as described below) assumes: (a) A normal (gaussian) distribution for the populations of the random errors, (b) there is no significant difference between the standard deviations of both population samples.

The two means and the corresponding standard deviations are calculated by using the following equations ( $n_A$  and  $n_B$  are the number of measurements in data set A and data set B, respectively):

$$\bar{x}_A = \frac{\sum_{i=1}^{n_A} x_i}{n_A} \quad \bar{x}_B = \frac{\sum_{i=1}^{n_B} x_i}{n_B}$$

$$s_A = \sqrt{\frac{\sum_{i=1}^{n_A} (\bar{x}_A - x_i)^2}{n_A - 1}} \quad s_B = \sqrt{\frac{\sum_{i=1}^{n_B} (\bar{x}_B - x_i)^2}{n_B - 1}}$$

strength of the linear relationship between a pair of variables, whereas regression expresses the relationship in the form of an equation.

#### Type I error ( $\alpha$ error)

When the null hypothesis is true and you reject it, you make a type I error. The probability of making a type I error is  $\alpha$ , which is the level of significance you set for your hypothesis test. An  $\alpha$  of 0.05 indicates that you are willing to accept a 5% chance that you are wrong when you reject the null hypothesis. To lower this risk, you must use a lower value for  $\alpha$ . However, using a lower value for alpha means that you will be less likely to detect a true difference if one really exists.



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## Type II error ( $\beta$ error)

When the null hypothesis is false and you fail to reject it, you make a type II error. The probability of making a type II error is  $\beta$ , which depends on the power of the test. You can decrease your risk of committing a type II error by ensuring your test has enough power. You can do this by ensuring your sample size is large enough to detect a practical difference

Decision	Null Hypothesis	
	True	False
Fail to reject	Correct Decision (probability = $1 - \alpha$ )	Type II Error - fail to reject the null when it is false (probability = $\beta$ )
Reject	Type I Error - rejecting the null when it is true (probability = $\alpha$ )	Correct Decision (probability = $1 - \beta$ )

when one truly exists. The probability of rejecting the null hypothesis when it is false is equal to  $1 - \beta$ . This value is the power of the test.

## CHAPTER 5

Epidemiology is the study and analysis of the patterns, causes, and effects of health and disease conditions in defined populations. It is the cornerstone of public health, and shapes policy decisions and evidence-based practice by identifying risk factors for disease and targets for preventive healthcare. Epidemiologists help with study design, collection, and statistical analysis of data, amend interpretation and dissemination of results (including peer review and occasional systematic review). Epidemiology has helped develop methodology used in clinical research, public health studies, and, to a lesser extent, basic research in the biological sciences.

### Two types of markers

1. **Phenotypic markers:** The phenotypic markers include cell wall specific proteins, polysaccharides. The phenotyping markers are identified by following methods:
  - a) Serotyping, b) Bacteriophage typing, c) Bacteriocin typing, d) Biotyping, e) Antibigram typing



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

2. **Genotypic markers:** The gene structure of the microorganism is a genotypic marker. The followings are the methods of genotyping:

- a) G+C ratio, b) Plasmid profiling, c) Restriction endonuclease pattern, d) Polymerase chain reaction of specific genes, e) Ribotyping, f) DNA hybridization

**Incidence Rate** - A prospective study is inherent in the definition of risk. Follow a group of persons without the outcome for a certain period and see in how many the outcome develops. A popular measure of risk is **incidence**. Risk is generally stated per person whereas incidence as percent or per thousand or even per million if it is very small. Both however express the same phenomenon. Both are based on new cases arising in a prefixed period of time. However, as already mentioned, risk has connotation for future. On the other hand, incidence is factual – based on empirical evidence.

**Prevalence rate** - Opposed to incidence that relates to onset, cross-sectional surveys or descriptive studies give **prevalence** that measures the magnitude of presence of disease. Prevalence is an appropriate measure for chronic conditions and not for acute disorders. Note that prevalence counts all existing cases at a *point of time* whereas incidence counts new cases arising in a *period of times* such as per month or per year. Incidence is the inflow and prevalence is the stock. It is easy to imagine that larger the duration of disease, higher is the backlog and more is the prevalence if outflow in terms of remissions and deaths is not equally rapid. In the case of stable rates for extended times,

$$\text{Prevalence} = \text{Incidence} \times \text{Average duration of disease.}$$

Incidence is difficult to obtain because it requires a prospective study. Prevalence can be easily obtained by a cross-sectional study.

**Relative risk** - Ratio of risk of an outcome such as disease in one group (say, the exposed group) to that in any other group (generally the control group – the unexposed group) is called the relative risk (or risk ratio). If relative risk (RR) of HIV infection in persons with STD versus those without STD is 6.5, it says that the persons with STD are 6.5 times as likely to contract the infection as are persons without STD—other factors remaining the same. A prospective study is required to calculate RR, and that could be very expensive.

**Attributable risk** – The difference between the risk in exposed subjects and unexposed subjects is called attributable risk. If the risk of lung cancer among smokers is 10% and in nonsmokers of same age-gender is 1.2%, the risk attributable to smoking is (7.8%)





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E., P.C.I., New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

6.4%. This can also be understood as **risk difference**. For this to be valid, it is necessary that the groups are similar with respect to all factors except the antecedent under review. That is, there is no other factor that can alter the risk.

Or

### **Relative risk (RR), odds ratio (OR)**

RR = ratio of incidence of disease in exposed individuals to the incidence of disease in non-exposed individuals (from a cohort/prospective study)

- i. If  $RR > 1$ , there is a positive association
- ii. If  $RR < 1$ , there is a negative association

OR = ratio of the odds that cases were exposed to the odds that the controls were exposed (from a case control/retrospective study) – is an estimate of the RR

- iii. Interpretation is the same as the RR

### **Attributable risk (AR)/fraction (AF)**

AR = the amount of disease incidence that can be attributed to a specific exposure

- Difference in incidence of disease between exposed and non-exposed individuals
- Incidence in non-exposed = background risk
- Amount of risk that can be prevented

AF = the proportion of disease incidence that can be attributed to a specific exposure (among those who were exposed)

- AR divided by incidence in the exposed X 100%

## CHAPTER 6

Computers are used within pharmacies to facilitate communication. From email to other Internet-based messaging systems, online communication allows pharmacists and other pharmacy staff to keep in contact both within their own organization and within the professional community. Some pharmacy companies have their own Intranet systems for internal communications over the Internet.

### **Prescription Processing**

Prescription processing is invariably one of the main activities going on within a pharmacy on a day-to-day basis, and computers are used to make this process more reliable and efficient. Both the customer service side of pharmacy operation and the dispensing aspect are today carried out through the use of computing systems. Pharmacy computers also handle customer service activities such as sales and cash handling within the retail operation.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### Information

Having access to the Web via pharmacy computers is something that has enhanced the ability of pharmacists to carry out their duties to a higher standard. As well as giving the pharmacy staff access to the vast store of information that is available on the Internet, including those on specialist pharmacy resources, the Internet connects pharmacists to their peers on a global scale. Professional communities for pharmacists operate on-line, creating an atmosphere that is conducive to professional development.

### Databases

Computer databases for information about medicines, and medical treatment in general, are used within pharmacies. These database systems allow pharmacy staff to find out information about any potential conflicts or health-care problems in a prescribed treatment, as well as information about the details of any particular medicine the pharmacist needs to know more about. This information may include ingredients and potential effects as well as research and scientific data.

### Error Prevention

Pharmacy computer systems can help to prevent errors in medication, potentially saving lives and generally preserving the health of patients. As well as checking medicines and combinations of medicines, these systems can in some cases check on patient information. The availability of such systems varies across the different geographical areas, but in some cases pharmacy computers are able to check on prescribed medicines with specific reference to a patient and their overall health-care picture.

### Retriever of Data's using the computer system.

Computer is an electronic device consisting of various components like key board, CPU (Central Processing Unit), VDU (Visual Display Unit or Monitor), printer and mouse etc. Most activities follow the basic principle of Input-Process-Output (I-P-O cycle). This can be best illustrated by an example of registration in hospitals. A person who wishes to see a senior doctor has to fill a request slip. This slip contains the relevant data, i.e., name, age, sex, etc. The operator then feeds this data from the request slip into the computer. The process in this case includes examining the availability of senior doctor and determining whether the data suits to the patient or not. As a result of this process, some information is



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

output. The output may be in the form of a printed proforma. if the senior doctor is available or otherwise a message may be by the commutator turning down the request.

Computers are used in pharmacies to maintain accessible, legible and up-to-date medication records. They help in keeping overall patient care by maintaining their records, consumption of drugs, registration numbers and detailed records of accounts and purchase section. Even for retail pharmacist, computers have been of valuable assistance in the prescription processing, It includes display of computer information about patient and drug, its adverse drug reaction, causation, duplication of orders, labeling conditions etc.

### Following are the other applications in hospital and pharmacy

- Calculation of monthly gross income
- Generating pay slips
- Updating the employee information
- Placement of supply order
- Keeping track of total payment and amount due to supplier
- Checking the quality and quantity of hospital supplies recorded and
- identifying any discrepancies Recording purchases for accounting purposes.

### The most common system feature is ability to generate

- Drug order labels
- Maintain Patient Profile
- Generating drug use review data
- Maintaining a drug formulary
- Updating drug Price
- Transferring Patients drug charges to the billing department
- To have some inventory control function
- Food and drug interaction

### Pattern of computer used in hospital pharmacy

- Hospital Pharmacy is very slow to adopt computers
- Only about 60% of Pharmacies are computerized to any extent
- Institutional Pharmacy Manager may be wary about the computerization

Avanthi Institute of Pharmaceutical Sciences



  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- Because Hospital Pharmacy is a more difficult and complex operation than the retail pharmacy
- Retail Pharmacies dispense prescription in more or less the same way
- Hospital pharmacy dept. distributes different types of drug products and giving different types of services
- Institutional Pharmacist are also aware that many computer systems have performed in less than satisfactory manner
- One survey revealed that only about 69% of hospital pharmacies were fully satisfied with their computer system
- Nearly 2/3<sup>rd</sup> of hospital pharmacies believed that their computer system. Because it has improved some pharmacy operations such as billing, quality of drug therapy in the hospital
- Each having its own information requirements
- Therefore considerable room for improvement is required
- A Hospital Pharmacy computer assure that the pharmacy's Patient record database is continually updated to reflect the current status of patient
- Updating has to done by accessing information from admitting department database to determine recent admission discharge and patient transfer (ADT)
- Computer system should be capable of producing a current roster of patients, by identifying Name, Age, sex, Room number and Hospital service Unit
- Computer system must be capable of displaying
  - a. Present diagnoses
  - b. Other diseases present
  - c. Allergies
  - d. Weight
  - e. Height
  - f. Physician
  - g. Special Note about patient
- Medication order Entry
- Rapid processing of drug orders is an essential function of computer system
- Typically orders are entered at a terminal by technical person
- Formatted data entry screen should allow easy entry and Retrieval of orders



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- A Pharmacist should be able to retrieve order for review or verification prior to administration to patient
- All drug order should contain at least the following data elements
  - a. Physician
  - b. Drug code
  - c. Drug generic name and strength
  - d. Route of administration
  - e. Dosage administration schedule
  - f. Start date
  - g. Stop date
  - h. Order status: Conditional, Active, Discontinued
  - i. Pharmacist verification code

Computers are used in pharmacies to maintain accessible, legible and up-to-date medication records. They help in keeping overall patient care by maintaining their records, consumption of drugs, registration numbers and detailed records of accounts and purchase section. Even for retail pharmacist, computers have been of valuable assistance in the prescription processing, It includes display of computer information about patient and drug, its adverse drug reaction, causation, duplication of orders, labeling conditions etc.

### Following are the other applications in hospital and retail pharmacy

- Calculation of monthly gross income
- Generating pay slips
- Updating the employee information
- Placement of supply order
- Keeping track of total payment and amount due to supplier
- Checking the quality and quantity of hospital supplies recorded and
- Identifying any discrepancies recording purchases for accounting purposes.

A number of computer programs have been developed to assist physicians in dosing and scheduling drug. But there are certain drugs, which are extremely sensitive to certain patients. For such patient's physicians use computer programs forecast drug levels and to choose the amounts and schedule of drug doses that will achieve target level. Similarly



PRINCIPAL



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

'HELP' is a system, which identifies abnormal chemistry levels, concurrent diseases and other related patient conditions.

The most important advantage is time saving in conducting literature searches. A pharmacist may require several hours to research a particular therapeutic question from a literature search covering about 10 years of articles. It can be done in minutes and the computer search is more pleasant.

Only few seconds are required to broaden a computer search from a specific drug to entire therapeutic class, but manually it is a tedious job to search in the 'INDEX MEDICUS'.

The computerised information retrieval has following advantages over the manual search.

- (i) It is time saving and pleasant.
- (ii) It is more thorough and timely than manual search.

To operate the information retrieval system, the equipments needed include a microcomputer, a printer, a telephone line and a modem.

For information retrieval, the choice of a database is also very important. The databases may be

- (a) Bibliographic database,
- (b) Journal information and
- (c) Textbook material.

Generally, bibliographic database is adopted, as usually there is a medical library nearby from where one can get the articles. The databases are medicine oriented like MEDLINE, or pharmacy oriented, like International Pharmaceutical. Abstract may be chosen. Some on-

Database	Produced by	Data
1. Medline	National Library of Medicine (NLM).	Around 3000 Biomedical journals dating back to 1966.
2. Toxicology Data Bank (TDB)	< t _	Toxicological data.
3. International Pharmaceutical Abstracts	American Society of Hospital Pharmacists	More than 600 publications from 1970 are covered.
4. Biosis	Bioscience Information Service	Biological Abstracts

line Databases of the medical and pharmaceutical literature is shown are





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Hospital administration computer helps in rapid data storage and retrieval, particularly when the data stored is subjected to frequent changes and when group of items based on the stored data need to be retrieved. Admission of M-patients and their discharge from a hospital require data, which gets changed every minute, e.g., admission of in-patient ties up resources like clinical and nursing staff, a bed, operation theatre, Intensive care unit, pharmacy department, radiological services etc.

Hence decision to admit a new patient is not a simple one. Even the availability of a suitable bed is difficult to determine in male and female ward, isolation ward etc. A prediction must be made that a suitable bed will be available at future date because the estimation is over optimistic, then patients who are called in, may be turned away at the last minute. If the prediction is over pessimistic expensive resources lie idle and the waiting period for treatment is extended.

Once the patient gets admitted, computer records and stores information like clinical information, catering information, diagnosis, sex, medication etc. It helps in providing detailed information about medical and paramedical staff including their duty chart. It helps the senior personnel to keep a check on ward-by-ward loading of nursing staff and to allocate additional help whenever required.

### **Advantage of computerized medication order entry.**

#### **Patients**

- Patients would not be prescribed allergic drugs and contraindicated drugs even accidentally.
- Orders get executed immediately and without fail.

#### **Doctors**

- An error of prescribing a contraindicated drug would never occur even unknowingly.
- Saves time by accelerating the doctors' process of prescriptions and eliminating duplication.

#### **Pharmacists**

- No guess work needed to understand the illegible handwritten prescriptions.
- Immediate receipt of doctors' orders.

#### **Hospital**

- Possibility of litigation expenses arising from medication errors and dispensing of wrong medication prescription is eliminated.

Or



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## Medication order Entry

- Rapid processing of drug orders is an essential function of computer system
- Typically orders are entered at a terminal by technical person
- Formatted data entry screen should allow easy entry and Retrieval of orders
- A Pharmacist should be able to retrieve order for review or verification prior to administration to patient
- All drug order should contain at least the following data elements
  - a. Physician
  - b. Drug code
  - c. Drug generic name and strength
  - d. Route of administration
  - e. Dosage administration schedule
  - f. Start date
  - g. Stop date
  - h. Order status: Conditional, Active, Discontinued
  - i. Pharmacist verification code

Computers have invaded in every walk of life and almost all commercial organization and business firms have undergone significant computerization with no exception of community pharmacy establishment. At present community pharmacy use computer for selective pharmaceutical purposes. While there are several possible purposes. Following is a list of majority of community pharmacy functions that could be computerized.

- a. **Clerical:** Preparation of prescription levels. Providing a receipt for patient, Generation of hard copy record of transaction. Calculation of total prescription cost. Maintenance of perpetual record of inventory record. Accumulation of suggested orders based on suggested order quantity. Automatically order required inventory via electronic transmission. Calculation and storing of annual withholding statements.
- b. **Managerial:** Preparation of daily sales report. Generation of complete sales analysis as required for a day, week, month, year and to date for number of prescriptions handled and amount in cash. Estimation of profit and financial ratio analysis. Production of drug usage reports. Calculation of gross margin, reported in all manner of details. Calculate number of prescriptions handled per unit time, to help in staff scheduling. Printing of billing a payment summary.



  
PRINCIPAL





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- c. **Professional:** Building a patient profile. Storing of information on drug and other allergies to warn about possible problems. Retrieval of current drug regimen for review. Updating of patient information in file. Printing of drug–drug and drug–food interactions. Maintaining of physicians file including specialty, designation, address, home office hours, etc.
- d. **Clinical support:**
- Patient medication profile – Patient education profile
  - Consulting pharmacist activities – Drug utilization monitoring

In pharmacy operations, inventory control is referred to the stock of pharmaceutical products retained to meet future demand. Inventory represents the largest current asset, as well as liquid asset in pharmacy practice and its value continues to rise because of the growth in variety and cost of pharmaceutical products. In addition to the negative impacts on financial outcomes from the pharmacy's business perspective, inventory mismanagement could have deleterious corollaries on patient safety. Such outcomes can be attributed by the availability of expired, counterfeit, substandard, or spoiled products; unavailability of essential products; unclaimed prescriptions; and not updating formularies. To enhance patient safety, it is recommended to conduct stock reviews on weekly basis to check the quantities, and on monthly basis to search for expired products. This can also be accomplished by utilizing software systems that alert the pharmacist when reaching a critical threshold amount or a near-expiry date of stocked products.

Computers play vital role in material planning, purchasing, inventory control and forecasting. Inventory control is very essential because it maintains the balance between stock-in-hand and excessive capital investment. Techniques such as ABC analysis and EDO can be easily programmed. It will eliminate the tedious and time-consuming task of calculations. Computers are used to detect the items, which had attained minimum order level. It then prepares a list and purchase orders for further supplies. Generally there are two systems for inventory control.

Prescription processing is invariably one of the main activities going on within a pharmacy on a day-to-day basis, and computers are used to make this process more reliable and efficient. Both the customer service side of pharmacy operation and the dispensing aspect are today carried out through the use of computing systems. Pharmacy computers also handle customer service activities such as sales and cash handling within the retail operation.



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

The pharmacy technician obtain the medication order from the nursing station of the physician enters the order into a computer system and prepare the product for dispensing (product selection, labelling and billing). Then the pharmacist performs the final check of the product and the whole process. There is video, image and audio links the original prescription for the dispensed drug. There is a possibility of the patient to be counselled by the pharmacy through the video link integrated into the telepharmacy system.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Subject Code : T4104

## IV Pharm.D Mid-I Examination

Subject Name: Biostatistics and Research Methodology

Time :

Date:

Max. Marks: 30

Answer any 3 questions

Question Paper	Questions								Bloom's Taxonomy Level	Course Outcome	Marks
1	a. Explain in detail about the application of biostatistics b. Write a note on different measures of central tendency								Remembering (L1) Remembering (L1)	CO1	10
2	a. Explain in detail about the standard deviation b. Calculate mean, median, mode and standard deviation for the given data								Remembering (L1)	CO2	10
	Age in years	10-20	20-30	30-40	40-50	50-60	60-70	70-80			
	No. of persons	6	8	12	22	12	8	6			
	c. Explain range and coefficient of variations										
3	a. Write in detail about types, significance and methods of determination of correlation coefficient. b. Calculate correlation coefficient and regression coefficient for the given data between time and drug concentration									CO3	10
	Time (hr.)										
	Drug conc. (g/ml)	6	8	12	22	12	8	6			
4	a. Explain in-detail about regression coefficient b. Write a note on frequency distribution c. Write the difference between correlation coefficient and regression coefficient									CO4	10
5	a. Explain in detail about methods of clinical designs.									CO5	10



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## MID 1 KEY

1Ans: a) Biostatistics, also known as biometry or biometrics, is a branch of statistics that involves the application of statistical methods to biological and health-related data. It plays a crucial role in various areas of biology, medicine, and public health. Here are some key applications of biostatistics:

**Clinical Trials:** Biostatistics is extensively used in the design, conduct, analysis, and interpretation of clinical trials. It helps researchers determine the sample size, randomization methods, and statistical tests necessary to draw valid conclusions about the effectiveness and safety of new treatments or interventions.

**Epidemiology:** Biostatistics is fundamental in epidemiological studies, which investigate the distribution and determinants of health-related events in populations. It aids in analyzing disease patterns, identifying risk factors, estimating disease prevalence, and assessing the impact of public health interventions.

**Genetic Studies:** In genetics and genomics research, biostatistics is employed to analyze and interpret data related to inheritance patterns, population genetics, linkage analysis, and association studies. It helps researchers understand the genetic basis of diseases and traits.

**Public Health Surveillance:** Biostatistics plays a crucial role in public health surveillance by analyzing data related to disease incidence, prevalence, and distribution. This information is vital for planning and implementing public health interventions.

**Bioinformatics:** In the field of bioinformatics, biostatistics is used to analyze large-scale biological data, such as genomic and proteomic data. It helps in identifying patterns, relationships, and meaningful insights from complex biological datasets.

**Quality Control in Healthcare:** Biostatistical methods are employed to monitor and improve the quality of healthcare services. This includes assessing patient outcomes, hospital performance, and the effectiveness of medical procedures.

**Environmental Health:** Biostatistics is used to analyze data related to environmental factors and their impact on human health. It helps in identifying associations between environmental exposures and health outcomes.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

**Health Economics:** Biostatistics is applied in health economics to analyze cost-effectiveness and cost-benefit analyses of healthcare interventions. It helps policymakers make informed decisions about resource allocation in the healthcare sector.

**Diagnostic Test Evaluation:** Biostatistics is used to assess the accuracy and reliability of diagnostic tests by calculating sensitivity, specificity, predictive values, and likelihood ratios.

**Survival Analysis:** In studies related to diseases and treatments, survival analysis is often employed to analyze the time until an event of interest (such as death or recurrence) occurs. Biostatistical methods help estimate survival probabilities and compare survival curves.

These applications highlight the diverse and critical role that biostatistics plays in advancing our understanding of biological processes, improving healthcare outcomes, and informing public health policies.

*b) The most common measures of central tendency are the arithmetic mean, the median and the mode. A central tendency can be calculated for either a finite set of values or for a theoretical distribution, such as the normal distribution.*

The central tendency of a distribution is typically contrasted with its dispersion or variability; dispersion and central tendency are the often characterized properties of distributions. Analysts may judge whether data has a strong or a weak central tendency based on its dispersion.

The following may be applied to one-dimensional data. Depending on the circumstances, it may be appropriate to transform the data before calculating a central tendency. Examples are squaring the values or taking logarithms. Whether a transformation is appropriate and what it should be, depend heavily on the data being analyzed.

**Arithmetic mean (or simply, mean)** – the sum of all measurements divided by the number of observations in the data set.

**Median** – the middle value that separates the higher half from the lower half of the data set. The median and the mode are the only measures of central tendency that can be used for ordinal data, in which values are ranked relative to each other but are not measured absolutely.



  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

**Mode** – the most frequent value in the data set. This is the only central tendency measure that can be used with nominal data, which have purely qualitative category assignments.

**Geometric mean** – the nth root of the product of the data values, where there are n of these. This measure is valid only for data that are measured absolutely on a strictly positive scale.

**Harmonic mean** – the reciprocal of the arithmetic mean of the reciprocals of the data values. This measure too is valid only for data that are measured absolutely on a strictly positive scale.

**Weighted arithmetic mean** – An arithmetic mean that incorporates weighting to certain data elements.

2Ans: a) Standard deviation is a statistical measure that quantifies the amount of variation or dispersion in a set of data points. It provides a way to express how spread out the values in a data set are, indicating the degree of deviation or dispersion from the mean (average) value. In other words, standard deviation helps to understand the extent to which individual data points deviate from the overall average.

### Calculation:

The standard deviation ( $\sigma$  or SD) is calculated using the following formula:

$$\sigma = \sqrt{N \sum_{i=1}^N (x_i - \bar{x})^2}$$

### Where:

N is the number of data points in the sample.

$x_i$  represents each individual data point

$\bar{x}$  is the mean of the data set

### Interpretation:

A small standard deviation indicates that data points tend to be close to the mean, suggesting low variability.

A large standard deviation indicates that data points are spread out over a wider range, suggesting high variability.



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### Properties of Standard Deviation:

**Non-Negativity:** Standard deviation is always non-negative since it involves squaring the deviations from the mean.

**Zero Standard Deviation:** If all data points are identical, the standard deviation is zero, indicating no variability.

**Units of Measurement:** The standard deviation is in the same units as the original data, making it easy to interpret in the context of the data set.

**Sensitive to Outliers:** Standard deviation is sensitive to extreme values (outliers) in the data set, and a few outliers can significantly affect its value.

### Use Cases:

**Risk Assessment:** In finance, standard deviation is used to measure the volatility or risk associated with an investment portfolio.

**Quality Control:** Standard deviation is employed in quality control to assess the variability of manufacturing processes and ensure consistency.

**Biostatistics:** In medical research, standard deviation is used to measure the variability of biological data, such as blood pressure measurements.

**Education:** Standard deviation is used in educational assessment to analyze the variability in test scores within a group of students.

b)

3Ans a) Correlation and regression are statistical methods that are commonly used in the medical literature to compare two or more variables. Although frequently confused, they are quite different. Correlation measures the association between two variables and quantifies the strength of their relationship. Correlation evaluates only the existing data. Regression uses the existing data to define a mathematical equation which can be used to predict the value of one variable based on the value of one or more other variables and can therefore be used to extrapolate between the existing data. The regression equation can therefore be used to predict the outcome of observations not previously seen or tested.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

*Correlation* is a bivariate analysis that measures the strengths of association between two variables. In statistics, the value of the correlation coefficient varies between +1 and -1. When the value of the correlation coefficient lies around  $\pm 1$ , then it is said to be a perfect degree of association between the two variables. As the correlation coefficient value goes towards 0, the relationship between the two variables will be weaker. Usually, in statistics, we measure three types of correlations: Pearson correlation, Kendall rank correlation and Spearman correlation.

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{n \sigma_x \sigma_y} = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}} = \frac{\sum XY}{\sqrt{\sum X^2 \sum Y^2}}$$

Carl Pearson's coefficient of correlation (r) is widely used in statistics to measure the degree of the relationship between linear related variables.

Spearman's Rank correlation coefficient is used to identify and test the strength of a relationship between two sets of data. It is often used as a statistical method to aid with either proving or disproving a hypothesis e.g. the depth of a river does not progressively increase the further from the river bank. The formula used to calculate Spearman's Rank is shown below.

$$r = 1 - \frac{6 \sum d^2}{n^3 - n}$$

NB. Sometimes  $n^3 - n$  is written as  $n(n^2 - 1)$ . Both mean the same thing.

The most commonly used techniques for investigating the relationship between two quantitative variables are correlation and linear regression. Correlation quantifies the strength of the linear relationship between a pair of variables, whereas regression expresses the relationship in the form of an equation.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



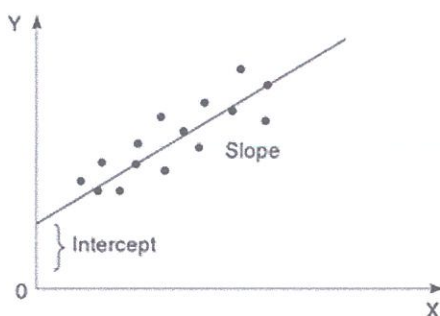
b) 4Ans a)

## Regression

Regression is predicting the average value of one variable which is dependent versus another variable which is independent. This is first given by Francis Galton. The simple linear regression is given by the following equation:

$$y = \alpha + \beta x$$

where  $\alpha$  = Y-intercept;  $\beta$  = slope of the line;  $y$  = dependent variable;  $x$  = independent variable.



Regression plot

The relationship between the  $X$  and  $Y$  is a straight line that shows the linear relationship.

**Regression** uses the existing data to define a mathematical equation which can be used to predict the value of one variable based on the value of one or more other variables and can therefore be used to extrapolate between the existing data. The regression equation can therefore be used to predict the outcome of observations not previously seen or tested.

**Regression analysis** mathematically describes the dependence of the  $Y$  variable on the  $X$  variable and constructs an equation which can be used to predict any value of  $Y$  for any value of  $X$ . It is more specific and provides more information than does correlation. Unlike correlation, however, regression is not scale independent and the derived regression equation depends on the units of each variable involved. As with correlation, regression assumes that each of the variables is normally distributed with equal variance. In addition to deriving the regression equation, regression analysis also draws a **line of best fit** through the data points of the scattergram. These "regression lines" may be linear, in which case the relationship between the variables fits a straight line, or nonlinear, in which case a polynomial equation is used to describe the relationship.



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Regression (also known as **simple regression**, **linear regression**, or **least squares regression**) fits a straight line equation of the following form to the data:  $Y = a + bX$  where Y is the dependent variable, X is the single independent variable, a is the Y-intercept of the regression line, and b is the slope of the line (also known as the **regression coefficient**).

b) A frequency distribution is a tabular or graphical representation of a dataset that shows the frequency or count of each unique value or range of values. It provides a systematic way to organize and summarize data, making it easier to understand the distribution of values and identify patterns. Frequency distributions are commonly used in statistics, data analysis, and research to present a concise overview of the dataset's characteristics.

### Components of a Frequency Distribution:

#### Class Intervals or Categories:

For continuous data, the values are often grouped into intervals or categories, known as class intervals.

For discrete data, each unique value represents a separate category.

#### Frequency:

The frequency of a class interval or category is the number of data points falling within that range or having that specific value.

#### Cumulative Frequency:

Cumulative frequency is the running total of frequencies as you move through the classes from the lowest to the highest.

Steps to Create a Frequency Distribution:

#### Determine the Range:

Find the range of the dataset (difference between the maximum and minimum values).

#### Decide on the Number of Classes:

Choose an appropriate number of class intervals. Too few classes may oversimplify the distribution, while too many can make it difficult to discern patterns.

#### Calculate the Class Width:

Divide the range by the number of classes to determine the class width (for continuous data).

#### Create the Class Intervals:



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Define the class intervals based on the calculated width. Ensure that each data point falls into one and only one interval.

## **Tally and Count Frequencies:**

Tally the occurrences or count the frequencies of data points within each class interval.

## **Calculate Cumulative Frequencies:**

Optionally, calculate cumulative frequencies to show the running total as you move through the classes.

## **Types of Frequency Distributions:**

### **Simple Frequency Distribution:**

Lists each class interval along with its corresponding frequency.

### **Grouped Frequency Distribution:**

Used for large datasets where data is grouped into intervals to simplify presentation.

### **Cumulative Frequency Distribution:**

Shows the cumulative total of frequencies up to a certain class.

### **Relative Frequency Distribution:**

Presents the proportion or percentage of data points within each class relative to the total.

## **Importance of Frequency Distributions:**

### **Data Summarization:**

Provides a concise summary of the dataset, making it easier to comprehend.

### **Pattern Recognition:**

Reveals patterns, trends, and central tendencies within the data.

### **Comparison:**

Allows for the comparison of different datasets or different parts of the same dataset.

### **Statistical Analysis:**

Essential for various statistical calculations and hypothesis testing.

Frequency distributions are a fundamental tool in descriptive statistics, aiding in the exploration and communication of data characteristics. Whether presented in tabular or graphical form, frequency distributions facilitate a clearer understanding of the distribution of values within a dataset.



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

c)

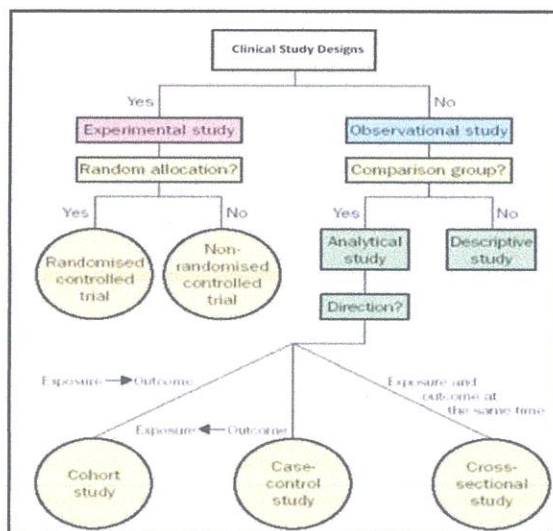
S.No	Correlation	Regression
1	Correlation is the relationship between two or more variables, which vary with the other in the same or the opposite direction	Regression means going back and it is a mathematical measure showing the average relationship between two variables
2	Both the variables X and Y are random variables	Both the variables may be random variables
3	It finds out the degree of relationship between two variables and not the cause and effect relationship.	It indicates the cause and effect relationship between the variables and establishes functional relationship.
4	It is used for testing and verifying the relation between two variables and gives limited information	Besides verification it is used for the prediction of one value, in relation to the other given value.
5	The coefficient of correlation is a relative measure. The range of relationship lies between -1 and +1	Regression coefficient is an absolute figure. If we know the value of the independent variable, we can find the value of the dependent variable
6	There may be spurious correlation between two variables.	In regression there is no such spurious regression
7	It has limited application, because it is confined only to linear relationship between the variables	It has wider application, as it studies linear and nonlinear relationship between the variables
8	It is not very useful for further mathematical treatment.	It is widely used for further mathematical treatment



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





5Ans:

**Clinical study design** is the formulation of trials and experiments, as well as observational **studies** in medical, clinical and other types of research (e.g., epidemiological) involving human beings.

**Intervention studies** (clinical trials) are experimental research **studies** that compare the effectiveness of medical treatments, management strategies, prevention strategies, and other medical or public health **interventions**.

Interventional study designs, also called experimental study designs, are those where the researcher intervenes at some point throughout the study. The most common and strongest interventional study design is a randomized controlled trial, however, there are other interventional study designs, including pre-post study design, non-randomized controlled trials, and quasi-experiments. Experimental studies are used to evaluate study questions related to either therapeutic agents or prevention. Therapeutic agents can include prophylactic agents, treatments, surgical approaches, or diagnostic tests. Prevention can include changes to protective equipment, engineering controls, management, policy or any element that should be evaluated as to a potential cause of disease or injury.

### A pre-post study

A pre-post study measures the occurrence of an outcome before and again after a particular intervention is implemented. A good example is comparing deaths from motor vehicle crashes before and after the enforcement of a seat-belt law. Pre-post studies may be single



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

arm, one group measured before the intervention and again after the intervention, or multiple arms, where there is a comparison between groups.

### Non-randomized trials

Non-randomized trials are interventional study designs that compare a group where an intervention was performed with a group where there was no intervention. These are convenient study designs that are most often performed prospectively and can suggest possible relationships between the intervention and the outcome.

### Randomized controlled trials

Randomized controlled trials (RCTs) are the most common type of interventional study, and can have many modifications. These trials take a homogenous group of study participants and randomly divide them into two separate groups. If the randomization is successful then these two groups should be the same in all respects, both measured confounders and unmeasured factors. The intervention is then implemented in one group and not the other and comparisons of intervention efficacy between the two groups are analysed. Theoretically, the only difference between the two groups through the entire study is the intervention.

### Crossover Randomized controlled trials

A crossover RCT is a type of interventional study design where study participants intentionally “crossover” to the other treatment arm. A crossover RCT begins the same as a traditional RCT, however, after the end of the first treatment phase, each participant is re-allocated to the other treatment arm. There is often a wash-out period in between treatment periods. This design has much strength, including demonstrating reversibility, compensating for unsuccessful randomization, and improving study efficiency by not using time to recruit subjects.

In **aclinical** research trial, **aclinical endpoint** generally refers to occurrence of a disease, symptom, sign or laboratory abnormality that constitutes one of the target outcomes of the trial, but may also refer to any such disease or sign that strongly motivates the withdrawal of that individual



  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# ASSIGNMENT

Subject : - BIOSTATISTICS AND RESEARCH METHODOLOGY

Topic : - CLINICAL STUDY DESIGNS

Submitted By : -

R. HARSHA VARDHINI

4<sup>th</sup> Pharm - D

19TSIT0016



*Harsha*  
PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

# CLINICAL STUDY DESIGN

## Introduction:

A study design is a scientific method that a researcher follows to assess the association between an exposure and an outcome.

It depends on the subjects that are selected, observed, followed and studied. In clinical research, there are two broad categories of study designs, mainly Observational & experimental.

## Clinical Study designs:

Clinical study design is the formulation of trials and experiments, as well as observational studies in medical, clinical and other types of research involving human beings.

→ The goal of clinical study is to assess the safety, efficacy, and/or the mechanism of action of an investigational medicinal product or procedure, or new drug or device that is in development but potentially not yet approved by a health authority.

→ It can also be to investigate a drug, device or procedure that has already been approved but is still in need of further investigation typically with respect to long term effects or cost-effectiveness.

## Types of Clinical Study Designs:

### Clinical Studies

#### Descriptive

1. Case reports
2. Case series

#### Experiment

##### Randomized

1. Placebo control
2. No-treatment control
3. Historical control
4. Active control

##### Non-Randomized Individual

↓  
Group Assembled on Basis of  
↓  
Both  
↓  
Cross-Sectional  
↓  
Outcome  
Case control

#### Explanatory

#### Observation

#### Aggregate



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



### Descriptive Studies:

The researcher simply records the observations and co-relates the events observed with possible reason. These may be presented as case reports where only certain individual patients with distinguished clinical characteristics are included in study. The patient is observed and evaluated for possible outcome. The results are exposed as success or failure of treatment.

### Case Reports:

- These are published after clinician notice a problem with exposure drug.
- A case report can be strengthened by ADR related to drug concentration in body.

These are useful for raising hypothesis of drug effects in a case report one cannot know if patient reported adverse outcome due to drug or disease.

### Advantages:

1. They serve as mechanism for clinicians, investigators & others regarding drugs products effects.
2. It prompts clinicians to be aware of potential problems & to report other such occurrences.

Disadvantages: Case reports are weakest form of evidence for causation

Case Series: Case series are group or cluster of case reports that may be generated by single clinician, group of clinicians, hospitals, pharmaceutical company. When series are reported, case can be compared to note the similarities between them so that syndrome is present or not is identified.

Advantages - They are useful for quantifying the incidence of an adverse reaction.



Disadvantages - In the absence of a control group, one cannot be certain which features in ~~development~~ <sup>history</sup> of patients are unique to exposure or outcome.

Population Study: Population study is a study group of individuals from population who share a common characteristics such as age, sex or health condition.

### EXPLANATORY STUDIES:

Experiment  $\begin{cases} \rightarrow \text{Randomized} \\ \rightarrow \text{Non-Randomised} \end{cases}$

Experimental studies are of two types:

1. Randomized controlled trial
2. Non-Randomized [Non-Experimental trials]

### Methods:

#### Simple Randomisation:

- With 2 treatment groups - Control vs treatment where, head - control. trail - treatment.
- The side of the coin determined the assignment.

#### Block randomisation:

- Ensure the number of participants equally distributed in each group.

#### Stratified Randomisation:

100 participants  $\begin{cases} \rightarrow 50 \text{ men} \begin{cases} \rightarrow 25 \text{ men get drug} \\ \rightarrow 25 \text{ men get Placebo} \end{cases} \\ \rightarrow 50 \text{ women} \begin{cases} \rightarrow 25 \text{ women get drug} \\ \rightarrow 25 \text{ women get placebo} \end{cases} \end{cases}$

Randomize separately within each stratum.

#### Minimized Randomisation:

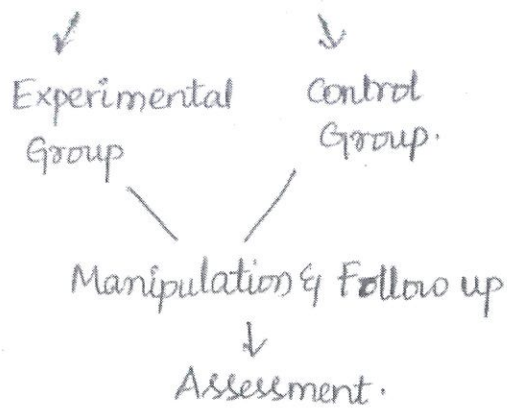
Select suitable population → select suitable sample → make necessary Exclusions  
↓  
not eligible who don't wish to give cons

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

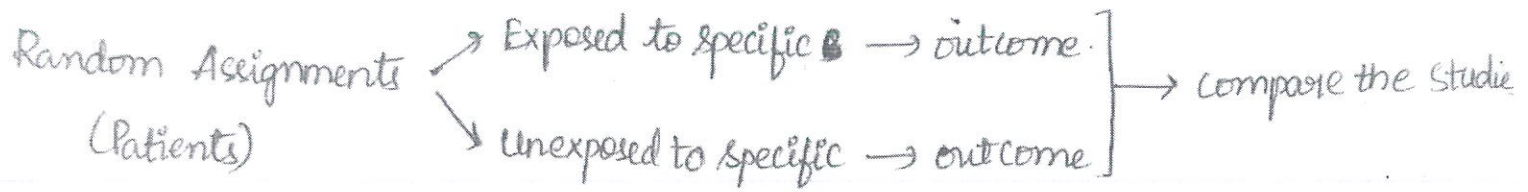
↓  
Randomize



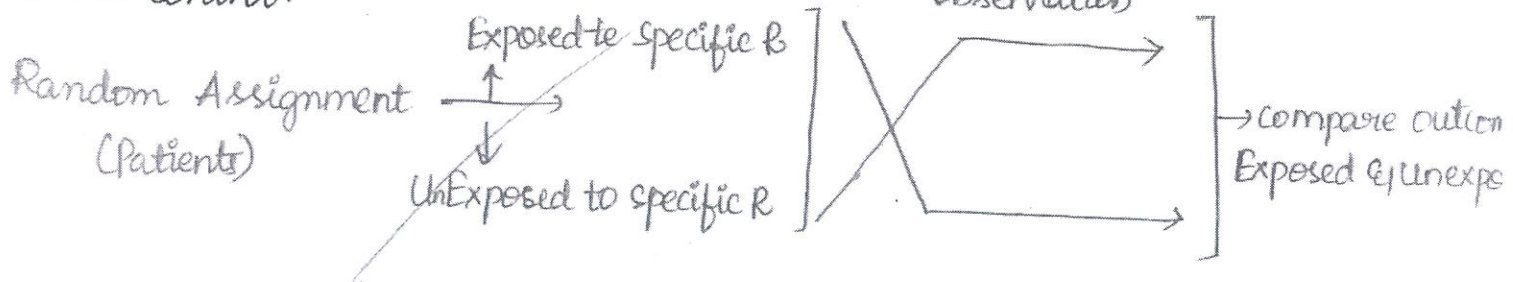


## Designs used in Experimental Studies:

### Parallel Design:



### Cross control:



## Advantages of Experimental Studies:

1. Exposure is under control of investigator
2. Randomization
3. Blinding elimination Bias.
4. Control on time span.
5. Confounding factors can be controlled.
6. Best method to study casual relationship.

## Selected Concepts:

1. Control group
2. Randomization
3. Admissibility category criteria.
4. Outcome ascertainment.
5. Ethics.



*Handwritten signature*  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

## Non-Randomized trials:

Clinical trial - we apply therapeutic interventions to sick individuals  
(Chemotherapy trials)

Field trials - we apply preventive interventions to healthy individuals  
(Vaccine trials)

Community trials - we apply interventions to aggregate units.

## Uses:

1. When Randomised controlled trials is not possible on ethical administrative grounds.

2. When diseases frequency is low and natural history is long.

3. When cost and logistic is limited.

## Types:

1. Uncontrolled trials

2. Natural Experiments

3. Before & After comparison studies.

## OBSERVATIONAL:

In observational study the subject to be observed chooses whether to include in study or not. Errors occur based upon the differences in profile of subjects, different age, family history of disease, cause & severity - may not be defined.

Principal

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Aggregate observational studies

Individual observational studies



Aggregate Observational Studies: Pandemic and epidemic studies on communicable diseases & their treatments are generally carried out as aggregate observational studies.

Ex: Occurrence & effective treatment of Malaria & relapse in particular geographical area.

Individual observational studies: In this patients/subjects are individually observed and they are assembled in groups on basis of outcome or exposure or Both.

These are classified as -  
Case control  
Cohort  
Cross-sectional

i) Cohort: A study design that identifies & selects two groups of patients out of a population of interest.

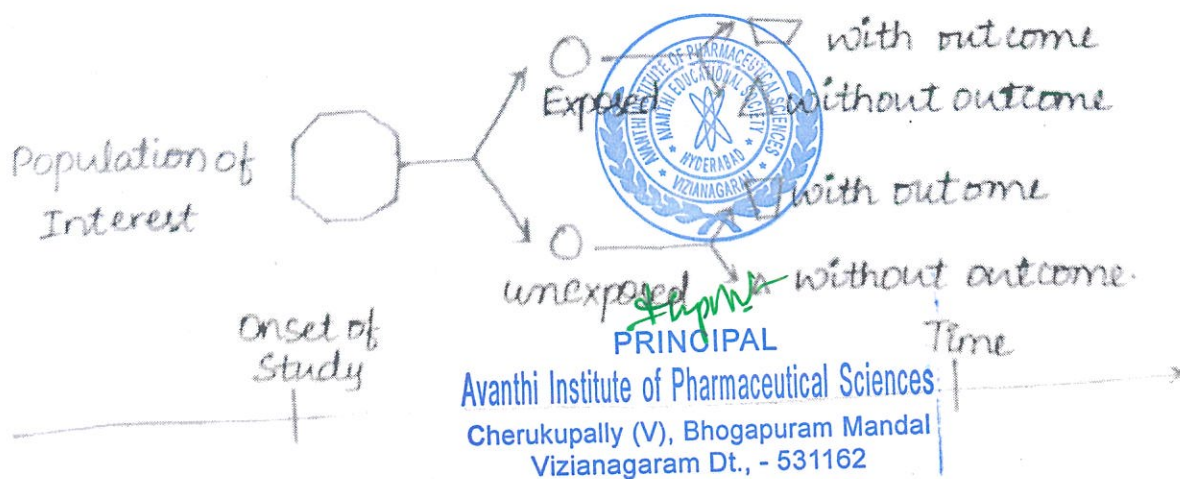
→ These two groups of patients are placed as one cohort who are exposed to an intervention & another cohort who are not exposed to an intervention.

→ They are followed then over a time to see development of outcomes.

→ Cohort studies provide highest level of evidence, that can be obtained from observational studies regarding exposure and outcome relationship.

→ In this sample is based on exposure of interest and evaluation is done.

COHORT STUDY DIAGRAM



## Stages of Cohort Study:

A cohort study starts with selection of group of participants from same population - is known as Cohort.

- The participants must be identical, have common characteristics except for their exposure ~~status~~.
- Participants divided into 1<sup>st</sup> group-Exposure group, 2<sup>nd</sup> group free of Exposure.

## Types of cohort studies:

- Prospective - The two groups of cohort are followed over a time to track development of new disease.

Ex: In prospective cohort study researchers compared four different groups of women to investigate which group were more likely to develop PTSD ~~symp~~ symptoms after a birthing event.

- Retrospective - Information or data is collected from past clinical records and the outcome of interest is investigated.

Ex: In this researchers used previously collected data to investigate whether there was association between birth experience & subsequent maternal care - giving attitudes and behaviour over a 12 month period.

## Advantages:

1. Can more clearly show time of exposure & development of outcome because the subjects are without the disease at baseline.
2. Allow evaluation of more than one outcome.
3. Allow for calculation of incidence.

## Disadvantages:

1. Can be expensive and time consuming because of large number of people.
2. May not be good for rare diseases.

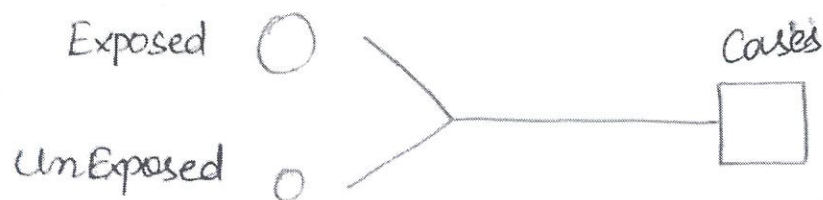


*Signature*  
PRINCIPAL

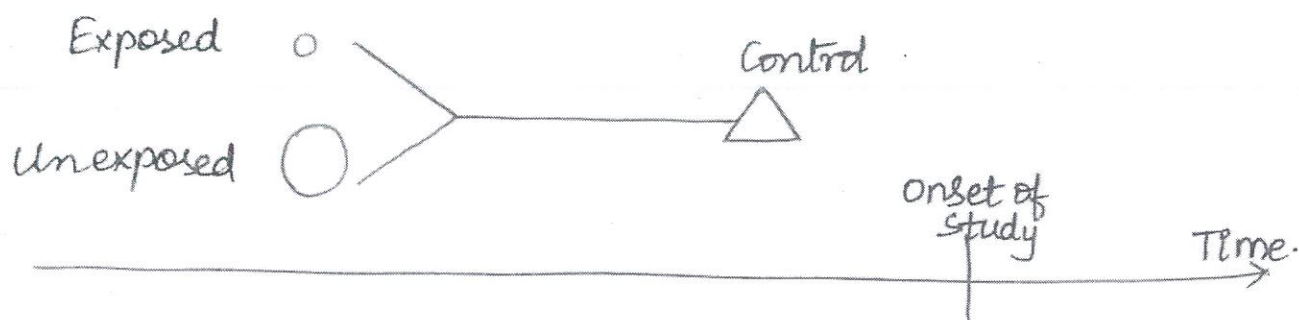
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



- ii) Case-Control Study: A study design - the investigator identifies & selects patients who have outcome of interest and also patients with outcome of interest and also to identify exposures. Case-control studies are retrospective.



CASE - CONTROL  
STUDY

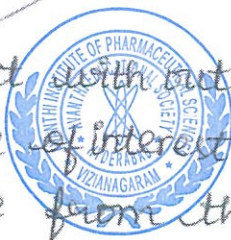


- Subjects with outcome of interest are cases
- Subjects without outcome of interest are controls.

- After finding cases & controls, they had exposure of interest or not is determined.
- Case control studies do not answer whether an exposure is associated with an outcome.
- These studies only determine whether subject with outcome of interest was more or less likely to have exposure of interest compared to controls, which makes level of evidence from this study design lower than cohort studies.

#### Advantages:

1. Less expensive
2. Easier to do and take less time compared to most prospective studies.
3. Can be useful to obtaining data which is difficult to obtain due to nature of Population being studied.



*thym*  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

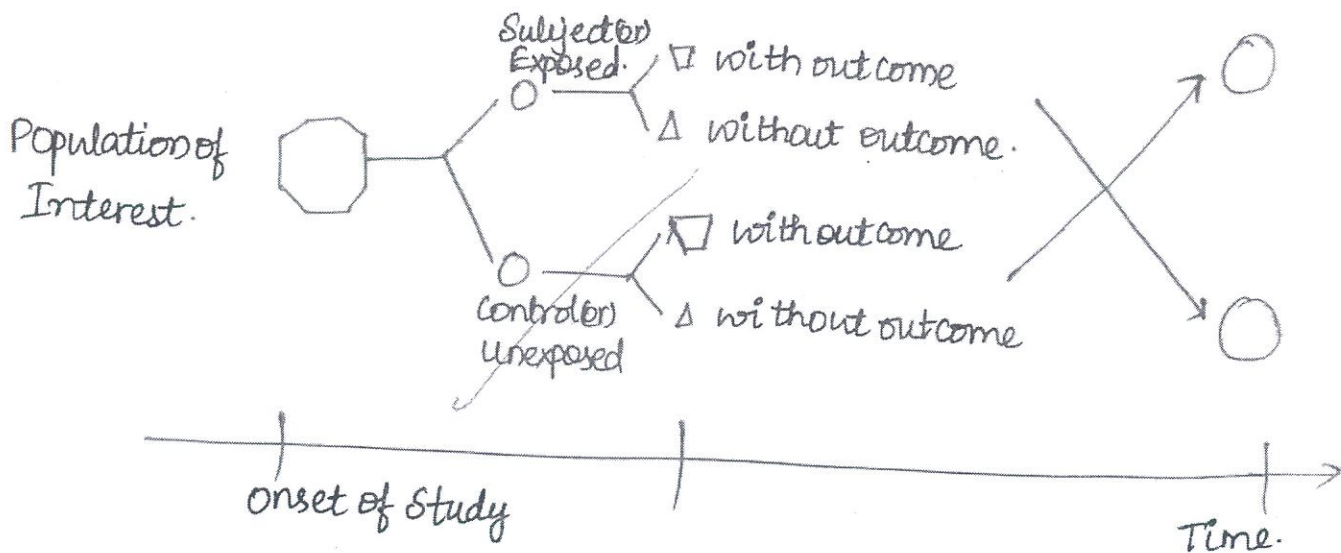
### Disadvantages:

1. Potential recall bias.
2. Subject to selection bias.
3. Generally donot allow investigators to calculate an incidence or absolute risk.

(iii) Cross-Over Study: A study design where all patients from population of interest are two groups. One group who gets exposed to intervention, second group who doesnot get its exposed.

→ After a period of time, an evaluation of outcome is done patient from both groups undergo a period of washout so that effect from initial group intervention has been removed.

→ Once this is done, subject will cross-over to other group process starts.



### Advantages:

1. Reduced influence as patients serve as their own controls.
2. Reduced variability in outcome being measured.
3. Smaller sample sizes required.
4. Having opportunity to receive both treatments.

### Disadvantages:

1. Cannot be done when subjects can only receive one treatment.
2. May take longer than randomized clinical trial since patients have



*Principal*  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

In clinical trials, a **surrogate endpoint** (or marker) is a measure of effect of a specific treatment that may correlate with a real clinical endpoint but does not necessarily have a guaranteed relationship.

**An observational study is a study in which a researcher simply observes behavior in a systematic manner without influencing or interfering with the behavior.** The researcher would record the behavior that he or she observes. There may be rating scales that the researcher would use when observing the behavior.

Observational studies can involve naturalistic observation or laboratory observation. Naturalistic observation would involve observing behaviors in the natural environment. Laboratory observation involves observing behaviors in a research laboratory.

There are three main types of observational study designs that are distinguished by the objective of the research study, how subjects are sampled, and the timeline of data collection. In evaluating and critically appraising observational studies, it is important for readers to consider if the study design was appropriate for the research question and if the methodology used was consistent with the study design. A comparison of experimental and observational study designs.

## Cross-sectional studies

A cross-sectional study is an observational study in which exposure and outcome are determined simultaneously for each subject. It is often described as taking a “snapshot” of a group of individuals. Cross-sectional studies are most appropriate for screening hypotheses because they require a relatively shorter time commitment and fewer resources to conduct.

## Cohort studies

The identifying feature of a cohort study design is that the subjects are followed over time. Cohort studies begin with individuals who are exposed and not exposed to a factor and then evaluate the subsequent development of an outcome. Cohort studies may be concurrent or retrospective, the distinction being when, relative to the current time, the subjects are identified.

## Case-control studies



  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

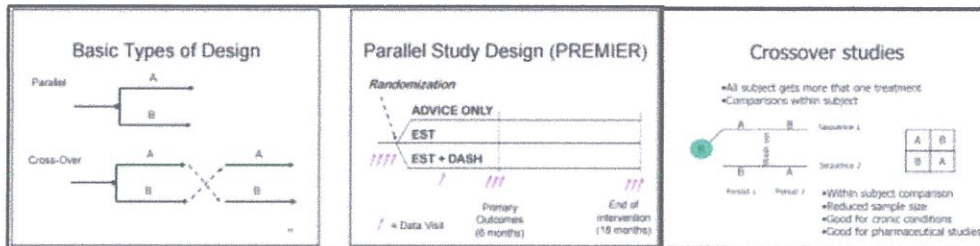


## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Case-control studies begin with individuals who have the outcome (“cases”) and compare them to individuals who do not have the outcome (“controls”) according to past history of exposure to a factor.



**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Subject Code: T4104

IV Pharm.D Mid-II Examination

Subject Name: Biostatistics and Research Methodology

Time:

Date:

Max. Marks: 30

Answer any 3 questions

Question Paper	Questions	Bloom's Taxonomy Level	Course Outcome	Marks																											
1	a. Explain in-detail about Null hypothesis and alternative hypothesis b. How do you determine sample size from the population ?	Remembering (L1) Remembering (L1)	CO1	10																											
2	a. Explain in-detail about t-test. b. Serum digoxin levels were determined for 9 healthy males following rapid iv administration of the drug. The measurements were taken after 4h administration of drug and again after 8h. Is the difference in digoxin concentration at end of 4h and 8h statistically significant ? <table border="1"><tr><td>After 4h</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr><tr><td>After 8h</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td><td>1</td></tr></table>	After 4h	1	1	1	1	1	1	1	1	1	After 8h	1	1	1	1	1	1	1	1	1	Remembering (L1) Evaluating (L5)	CO2	10							
After 4h	1	1	1	1	1	1	1	1	1																						
After 8h	1	1	1	1	1	1	1	1	1																						
3	a. Explain in detail about Two - Way ANOVA b. The rate of release of drug from three controlled formulations of diclofenac sodium after 2h are given in the following table. Is there any difference between release kinetics of 3 formulations ? (One way ANOVA ) <table border="1"><tr><td>Formulation A</td><td>4</td><td>5</td><td>4</td><td>6</td><td>5</td><td>6</td><td>4</td><td>6</td></tr><tr><td>Formulation B</td><td>3</td><td>3</td><td>4</td><td>4</td><td>5</td><td>2</td><td>4</td><td></td></tr><tr><td>Formulation C</td><td>5</td><td>6</td><td>6</td><td>6</td><td>4</td><td>4</td><td>5</td><td>4</td></tr></table>	Formulation A	4	5	4	6	5	6	4	6	Formulation B	3	3	4	4	5	2	4		Formulation C	5	6	6	6	4	4	5	4	Remembering (L1) Evaluating (L5)	CO3	10
Formulation A	4	5	4	6	5	6	4	6																							
Formulation B	3	3	4	4	5	2	4																								
Formulation C	5	6	6	6	4	4	5	4																							
4	a. Explain in - detail about report writing b. Write a note on designing the methodology	Remembering (L1) Remembering (L1)	CO4	10																											
5	Explain in - detail about epidemiology statistics	Remembering (L1)	CO5	10																											



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### Schema for evaluation for Mid 2:

1. a. Explain in-detail about Null hypothesis and alternative hypothesis - 4M
2. b. How do you determine sample size from the population ? - 6M
3. A.Explainin-detailaboutt-test.-5M
4. b. Serum digoxin levels were determined for 9 healthy males following rapid iv administration of the drug. The measurements were taken after 4h administration od drug and again after 8h. Is the difference in digoxin concentration at end of 4h and 8h statistically significant? - 5M

After 4h	1	1	1	1	1	1	1	1	1
After 8h	1	1	1	1	1	1	1	1	1

5. a. Explain in detail about Two - Way ANOVA - 5M
- b. The rate of release of drug from three controlled formulations of diclofenac sodium after 2h is given in the following table. Is there any difference between release kinetics of 3 formulations? (One way ANOVA ) - 5M

Formulation A	4	5	4	6	5	6	4	6
Formulation B	3	3	4	4	5	2	4	-
Formulation C	5	6	6	6	4	4	5	4

6. a. Explain in - detail about report writing - 5M
- b. Write a note on designing the methodology - 5M
7. Explain in - detail about epidemiology statistics - 10M



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





### MID 2 KEY

1Ans: a) The null hypothesis ( $H_0$ ) is a hypothesis which the researcher tries to disprove, reject or nullify. The 'null' often refers to the common view of something, while the alternative hypothesis is what the researcher really thinks is the cause of a phenomenon.

The **general procedure** for null hypothesis testing is as follows:

#### State the null and alternative hypotheses

- Specify  $\alpha$  and the sample size
- Select an appropriate statistical test
- Collect data (note that the previous steps should be done prior to collecting data)
- Compute the test statistic based on the sample data
- Determine the p-value associated with the statistic
- Decide whether to reject the null hypothesis by comparing the p-value to  $\alpha$  (i.e. reject the null hypothesis if  $p < \alpha$ )

#### Sample Size Determination

The estimation approach to determining sample size addresses the question: "How accurate do you want your estimate to be?" In this case we are estimating the difference in means. This approach requires us to specify how large a difference we are interested in detecting, say  $B$  for the Bound on the margin of error, and then to specify how certain we want to be that we can detect a difference that large. Recall that when we assume equal sample sizes of  $n$ , a confidence interval for  $\mu_1 - \mu_2$  is given by:

$$\left\{ \bar{Y}_1 - \bar{Y}_2 \pm t(1 - \alpha/2; df) \cdot s \cdot \sqrt{\frac{2}{n}} \right\}$$

Where  $n$  is the sample size for each group, and  $df = n + n - 2 = 2(n - 1)$  and  $s$  is the pooled standard deviation. Therefore, we first specify  $B$  and then solve this equation:

$$B = t(1 - \alpha/2; df) \cdot s \cdot \sqrt{\frac{2}{n}}$$

for  $n$ . Therefore,

$$n = \left[ t(1 - \alpha/2; df) \cdot s \cdot \frac{\sqrt{2}}{B} \right]^2 = \left[ \frac{t^2(1 - \alpha/2; df) \cdot s^2 \cdot 2}{B^2} \right]$$

Since in practice, we don't know what  $s$  will be, prior to collecting the data, we will need a guesstimate of  $\sigma$  to substitute into this equation. To do this by hand and we use  $z$  rather than  $t$  since we don't know the  $df$  if we don't know the sample size  $n$  - the computer will iteratively update the  $df$  as it computes the sample size, giving a slightly larger sample size when  $n$  is small.

So we need to have an estimate of  $\sigma^2$ , a desired margin of error bound  $B$ , that we want to detect, and a confidence level  $1 - \alpha$ . With this we can determine sample size in this comparative type of experiment. We may or may not have direct control over  $\sigma^2$ , but by using different experimental designs we do have some control over this and we will address this later in this course. In most cases an estimate of  $\sigma^2$  is needed in order to determine the sample size.

One special extension of this method is when we have a binomial situation. In this case where we are estimating proportions rather than some quantitative mean level, we know that the worst-case variance,  $p(1-p)$ , is where  $p$  (the true proportion) is equal to 0.5 and then we would have an approximate sample size formula that is simpler, namely  $n = 2/B^2$  for  $\alpha = 0.05$ .

b)



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

2Ans: a)

**Student's t-test: Comparison of two means**

Among the most commonly used statistical **significance tests** applied to small data sets (populations samples) is the series of Student's tests. One of these tests is used for the comparison of two means, which is commonly applied to many cases. Typical examples are:

**General aspects of significance tests**

The outcome of these tests is the **acceptance** or **rejection** of the **null hypothesis ( $H_0$ )**. The null hypothesis generally states that: "Any differences, discrepancies, or suspiciously outlying results are purely **due to random** and **not systematic errors**". The **alternative hypothesis ( $H_a$ )** states exactly the opposite.

The null hypothesis for the aforementioned examples is:

**The means are the same**, i.e. in **Example 1**: both samples contain the same percentage of the analyte; in **Example 2**: both methods provide the same analytical results. The differences observed (if any) are purely due to random errors.

An erroneous rejection of  $H_0$  (even though it is true) constitutes a **Type 1 error**, whereas an erroneous acceptance of  $H_0$  (even though it is false) constitutes a **Type 2 error**.

All significance tests provide results within a predefined **confidence level % (CL%)**. Confidence levels commonly used are 90%, 95% and 99%, with most usual (at least in the field of chemical analysis) the 95%.

A CL 95% means that: In case of rejecting  $H_0$ , we are **95% or more** certain that we did the right thing. In other words, we risk a probability of **no more** than  $(100-95)/100 = 0.05$  for a **Type 1 error**.

We can decrease or increase the confidence level of a significance test, but one has to consider the following pitfalls:

(a) By decreasing CL say to 90% (making thus the rejection of  $H_0$  easier) the probability of **Type 1 error** obviously increases.

(b) By increasing CL say to 99% (making thus the rejection of  $H_0$  harder) the probability of **Type 2 error** increases.

A CL 95% is generally considered as a fair compromise between these two different risks.

**Student's t-test for the comparison of two means**

This test (as described below) assumes: (a) A normal (gaussian) distribution for the populations of the random errors, (b) there is no significant difference between the standard deviations of both population samples.

The two means and the corresponding standard deviations are calculated by using the following equations ( $n_A$  and  $n_B$  are the number of measurements in data set A and data set B, respectively):

$$\bar{x}_A = \sum_{i=1}^{n_A} x_i / n_A \quad \bar{x}_B = \sum_{i=1}^{n_B} x_i / n_B$$

$$s_A = \sqrt{\frac{\sum_{i=1}^{n_A} (\bar{x}_A - x_i)^2}{n_A - 1}} \quad s_B = \sqrt{\frac{\sum_{i=1}^{n_B} (\bar{x}_B - x_i)^2}{n_B - 1}}$$

b)

3Ans: a) The point of conducting an experiment is to find a significant effect between the stimuli being tested. To do this various statistical tests are used. In a psychology experiment an independent variable and dependant variable are the stimuli being manipulated and the behaviour being measured. Statistical tests are carried out to confirm if the behaviour occurring is more than chance.

The t-test compares the means between 2 samples and is simple to conduct, but if there is more than 2 conditions in an experiment a ANOVA is required. The fact the ANOVA can test more than one treatment is a major advantage over other statistical analysis. ANOVA's use an *F-ratio* as its significance statistic which is variance because it is impossible to calculate the sample means difference with more than two samples.



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal

Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

The ANOVA is an important test because it enables us to see for example how effective two different types of treatment are and how durable they are. Effectively a ANOVA can tell us how well a treatment work, how long it lasts and how budget friendly it will be an example being intensive early behavioural intervention (EIBI) for autistic children which lasts a long time with a lot hour, has amazing results but costs a lot of money. The ANOVA is able to tell us if another therapy can do the same task in shorter amount of time and therefor costing less and making the treatment more accessible. Conducting this test would also help establish concurrent validity for the therapy against EIBI. The F-ratio tells the researcher how big of a difference there is between the conditions and the effect is more than just chance.

### Testing of the Assumptions

- The population in which samples are drawn should be normally distributed.
- Independence of cases: the sample cases should be independent of each other.
- Homogeneity of variance: Homogeneity means that the variance among the groups should be approximately equal.

These assumptions can be tested using statistical software (like Intellectus Statistics!). The assumption of homogeneity of variance can be tested using tests such as Levene's test or the Brown-Forsythe Test. Normality of the distribution of the scores can be tested using plots, the values of skewness and kurtosis, or using tests such as Shapiro-Wilk or Kolmogorov-Smirnov. The assumption of independence can be determined from the design of the study.

It is important to note that ANOVA is not robust to violations to the assumption of independence. This is to say, that even if you violate the assumptions of homogeneity or normality, you can conduct the test and basically trust the findings. However, violations to independence assumption one cannot trust those ANOVA results. In general, with violations of homogeneity the study can probably carry on if you have equal sized groups. With violations of normality, continuing with the ANOVA should be ok if you have a large sample size and equal sized groups.

b)

4Ans: a) Writing of report must be done with great care keeping in view the following:

1) The layout of the report should be as follows: (i) the preliminary pages; (ii) the main text, and (iii) the end matter.

In its preliminary pages the report should carry title and date followed by acknowledgements and foreword. Then there should be a table of contents followed by a list of tables and list of

Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

graphs and charts, if any, given in the report.

**The main text of the report should have the following parts:**

(a) Introduction: It should contain a clear statement of the objective of the research and an explanation of the methodology adopted in accomplishing the research. The scope of the study along with various limitations should as well be stated in this part.

(b) Summary of findings: After introduction there would appear a statement of findings and recommendations in non-technical language. If the findings are extensive, they should be summarised.

(c) Main report: The main body of the report should be presented in logical sequence and broken-down into readily identifiable sections.

(d) Conclusion: Towards the end of the main text, researcher should again put down the results of his research clearly and precisely. In fact, it is the final summing up.

At the end of the report, appendices should be enlisted in respect of all technical data. Bibliography, i.e., list of books, journals, reports, etc., consulted, should also be given in the end. Index should also be given specially in a published research report.

2. Report should be written in a concise and objective style in simple language avoiding vague expressions such as 'it seems,' 'there may be', and the like.

3. Charts and illustrations in the main report should be used only if they present the information more clearly and forcibly.

4. Calculated 'confidence limits' must be mentioned and the various constraints experienced in conducting research operations may as well be stated.

b) The research problem having been formulated in clear cut terms, the researcher will be required to prepare a research design, i.e., he will have to state the conceptual structure within which research would be conducted. The preparation of such a design facilitates research to be as efficient as possible yielding maximal information. In other words, the function of research design is to provide for the collection of relevant evidence with minimal expenditure of effort, time and money. But how all these can be achieved depends mainly on the research purpose. Research purposes may be grouped into four categories, viz., (i) Exploration, (ii) Description, (iii) Diagnosis, and (iv) Experimentation. A flexible research design which provides opportunity for considering many different aspects of a problem is considered appropriate if the purpose of the research study is that of exploration. But when the purpose happens to be an accurate description of a situation or of an association between variables, the suitable design will be one that minimises bias and maximises the reliability of the data collected, and







## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

analysed.

There are several research designs, such as, experimental and non-experimental hypothesis testing. Experimental designs can be either informal designs (such as before-and-after without control, after-only with control, before-and-after with control) or formal designs (such as completely randomized design, randomized block design, Latin square design, simple and complex factorial designs), out of which the researcher must select one for his own project.

The preparation of the research design, appropriate for a particular research problem, involves usually the consideration of the following:

- (i) the means of obtaining the information;
- (ii) the availability and skills of the researcher and his staff (if any);
- (iii) explanation of the way in which selected means of obtaining information will be organised and the reasoning leading to the selection;
- (iv) the time available for research; and (v) the cost factor relating to research, i.e., the finance available for the purpose

All the items under consideration in any field of inquiry constitute a 'universe' or 'population'. A complete enumeration of all the items in the 'population' is known as a census inquiry. It can be presumed that in such an inquiry when all the items are covered no element of chance is left and highest accuracy is obtained. But in practice this may not be true. Even the slightest element of bias in such an inquiry will get larger and larger as the number of observations increases. Moreover, there is no way of checking the element of bias or its extent except through a resurvey or use of sample checks. Besides, this type of inquiry involves a great deal of time, money and energy. Not only this, census inquiry is not possible in practice under many circumstances. For instance, blood testing is done only on sample basis. Hence, quite often we select only a few items from the universe for our study purposes. The items so selected constitute what is technically called a sample.

The researcher must decide the way of selecting a sample or what is popularly known as the sample design. In other words, a sample design is a definite plan determined before any data are actually collected for obtaining a sample from a given population. Thus, the plan to select 12 of a city's 200 drugstores in a certain way constitutes a sample design. Samples can be either probability samples or non-probability samples. With probability samples each element has a known probability of being included in the sample but the non-probability samples do not allow the researcher to determine this probability. Probability samples are those based on



Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

simple random sampling, systematic sampling, stratified sampling, cluster/area sampling whereas non-probability samples are those based on convenience sampling, judgment sampling and quota sampling techniques. The important sample designs is as follows:

(i) Deliberate Sampling; (ii) Simple random sampling; (iii) Systematic sampling (iv) stratified sampling; (v) Quata Sampling (vi) Cluster sampling or area sampling (vii) Multi-stage sampling; (viii) Sequential Sampling.

5Ans: **Epidemiology** is the study and analysis of the *patterns, causes*, and effects of *health and disease conditions* in defined *populations*. It is the cornerstone of *public health*, and shapes policy decisions and *evidence-based practice* by identifying *risk factors* for disease and targets for *preventive healthcare*. Epidemiologists help with study design, collection, and *statistical analysis* of data, amend interpretation and dissemination of results (including *peer review* and occasional *systematic review*). Epidemiology has helped develop *methodology* used in *clinical research*, *public health studies*, and, to a lesser extent, *basic research* in the biological sciences.

**Incidence Rate** - A prospective study is inherent in the definition of risk. Follow a group of persons without the outcome for a certain period and see in how many the outcome develops. A popular measure of risk is **incidence**. Risk is generally stated per person whereas incidence as percent or per thousand or even per million if it is very small. Both however express the same phenomenon. Both are based on new cases arising in a prefixed period of time. However, as already mentioned, risk has connotation for future. On the other hand, incidence is factual – based on empirical evidence.

**Prevalence rate** - Opposed to incidence that relates to onset, cross-sectional surveys or descriptive studies give **prevalence** that measures the magnitude of presence of disease. Prevalence is an appropriate measure for chronic conditions and not for acute disorders. Note that prevalence counts all existing cases at a point of time whereas incidence counts new cases arising in a period of time such as per month or per year. Incidence is the inflow and prevalence is the stock. It is easy to imagine that larger the duration of disease, higher is the backlog and more is the prevalence if outflow in terms of remissions and deaths is not equally rapid. In the case of stable rates for extended times,

$$\text{Prevalence} = \text{Incidence} \times \text{Average duration of disease.}$$

Incidence is difficult to obtain because it requires a prospective study. Prevalence can be easily obtained by a cross-sectional study.

**Relative risk** - Ratio of risk of an outcome such as disease in one group (say, the exposed



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences



group) to that in any other group (generally the control group – the unexposed group) is called the relative risk (or risk ratio). If relative risk (RR) of HIV infection in persons with STD versus those without STD is 6.5, it says that the persons with STD are 6.5 times as likely to contract the infection as are persons without STD—other factors remaining the same. A prospective study is required to calculate RR, and that could be very expensive.

**Attributable risk** – The difference between the risk in exposed subjects and unexposed subjects is called attributable risk. If the risk of lung cancer among smokers is 7.6% and in nonsmokers of same age-gender is 1.2%, the risk attributable to smoking is  $(7.6 - 1.2 =) 6.4\%$ . This can also be understood as **risk difference**. For this to be valid, it is necessary that the groups are similar with respect to all factors except the antecedent under review. That is, there is no other factor that can alter the risk.

### **Relative risk (RR), odds ratio (OR)**

RR = ratio of incidence of disease in exposed individuals to the incidence of disease in non-exposed individuals (from a cohort/prospective study)

- i. If  $RR > 1$ , there is a positive association
- ii. If  $RR < 1$ , there is a negative association

OR = ratio of the odds that cases were exposed to the odds that the controls were exposed (from a case control/retrospective study) – is an estimate of the RR

Interpretation is the same as the RR

### **Attributable risk (AR)/fraction (AF)**

AR = the amount of disease incidence that can be attributed to a specific exposure

- Difference in incidence of disease between exposed and non-exposed individuals
- Incidence in non-exposed = background risk
- Amount of risk that can be prevented

AF = the proportion of disease incidence that can be attributed to a specific exposure (among those who were exposed)

- AR divided by incidence in the exposed  $\times 100\%$



  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Science  
Cherukupally (V), Bhogapuram Manda  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

Cherukupally (V), Near Tagarapuvalasa Bridge, Vizianagaram (Dist.) A.P. - 531162.

(Approved by AICTE, PCI & Govt. of A.P. Affiliated to JNTUK, Kakinada)

## SUBJECTIVE TEST

ESTD : 2005

JNTUK Reg. No. : 19T51T0023

Date

: 3/11/22

Student Name : V. Syam Kumar

Year : 4th year

Sem

: MTD-6

Branch

: B. Pharm / Pharm D. / Pharm D. (P.B) / M. Pharm

Specialization : Pharm-D

Time

: 25

Subject Name : Biostatistics & Research methodology

Total Marks

: 25

Marks Secured :

Invigilators Signature :

*[Signature]*

1: b) central tendency :- measures of central tendency includes mean, median & mode.

\* mean :- It is the average value obtained by from the all observations in a series

→ It is of 3 types Arithmetic mean, Geometric mean & Harmonic mean.

→ Arithmetic mean :- It is the summation of all observations divided by the total n. of observations for ungrouped data

$$\text{mean} = \frac{\sum x}{N}$$

→ For grouped continuous data

$$\text{mean} = A + \frac{\sum fd}{N} \times i$$

$$i = \frac{d}{2} = \frac{m - A}{f}$$

A = Assumed mean

i = width of c.



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V) Bhogapuram Mandal



→ for grouped continuous data

$$M = \frac{\sum f x^0}{N}$$

\* merits of mean :-

- easy to calculate
- It is easy to understand.
- Algebraic treatment was done with the values

\* Demerits

- Does not applicable for extreme values
- In some times the value must be appear in digits on that time it is difficult to measure.

Median :- It is the centered value of the series of all observations.

→ In a series of data all the observations are present median is lies at center as  $< x >$  character

Stic observations

for ungrouped Data :-

→ Arrange the data in Asc/Descending order.

→ If n of observations are odd then

$$\text{Median} = \left( \frac{n+1}{2} \right)^{\text{th}} \text{obs}$$

for grouped continuous data ;

→ First calculate the cumulative frequency.

$$\text{Median} = \left( \frac{n}{2} \right)$$

$$n = \sum f \text{ or } \text{no. of observation.}$$

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





For Grouped continuous data:-

$$\text{median} = l + \frac{\frac{n}{2} - cf}{f} \times i$$

$l$  → lower limit of modal class

$n$  →  $\Sigma f$

$cf$  → cf before modal class

$f$  → freq. of modal class

merits

→ It is used to calculate the values which are not done by the mean

→ simple & doesn't have complication present.

Demerits

→ Doesnot involve all the observations

→ Arrange data in Asc/descn order.

mode:

→ It is the most repeated value or highest value of all observations

→ For ungrouped data mode = most repeated value / highest value

→ For Grouped continuous data

$$\text{mode} = l + \frac{f_m - f_1}{2f_m - f_1 - f_2} \times i$$

$l$  → lower limit of modal class

$f_m$  → Freq. of modal class

$i$  → width of class

→ For grouped discrete data:-

• First 6 columns are to be drawn

• In 1st column original freq. are taken.

• In 2nd column Add ② frequencies of first column

• In 3rd column leave 1st series Add  $\frac{1}{2}$

• In 4th column  $\frac{3}{3}$  are taken

• In 5th column

left 1st

• In 6th column

left first ②

PRINCIPAL

Academy Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal

Vizianagaram Dt. 531162



→ Analysis table is drawn to predict the mode value

### Merits

- It is easy to calculate & considered.
- mathematical calculations are easily observed.

### Demerits

- Algebraic expression was done.
- Basic problem is to be doesn't consider all values.

②

C:- Range :- It is the difference b/w highest & lowest value or vice versa.

$$\text{Range} = H - L$$

→ It is one type of distance deviation measure.

Coefficient of variation :-

It is ~~represented~~ obtained by the variance Percent  $\times 100$ .

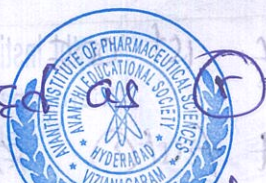
$$\text{Coefficient of variation} = \frac{\text{SD}}{\text{mean}} \times 100$$

③

a) co-relation co-efficient is the relationship b/w the two variables which vary in value in the distribution of data

→

Represented as



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



→ correlation coefficient explains about the relationship  
between two <sup>random</sup> variables

types of correlation coefficient

Based on degree of variability → 5 types  
Based on N of variables used → 3 types

Perfect +ve co-relation  $r = +1$

Perfect -ve co-relation  $r = -1$

Absolute zero co-relation  $r = 0$

~~Perfect~~ moderate +ve co-relation  $r = +1 \rightarrow 0$

moderate -ve co-relation  $r = -1 \rightarrow 0$

Based on number of variables.

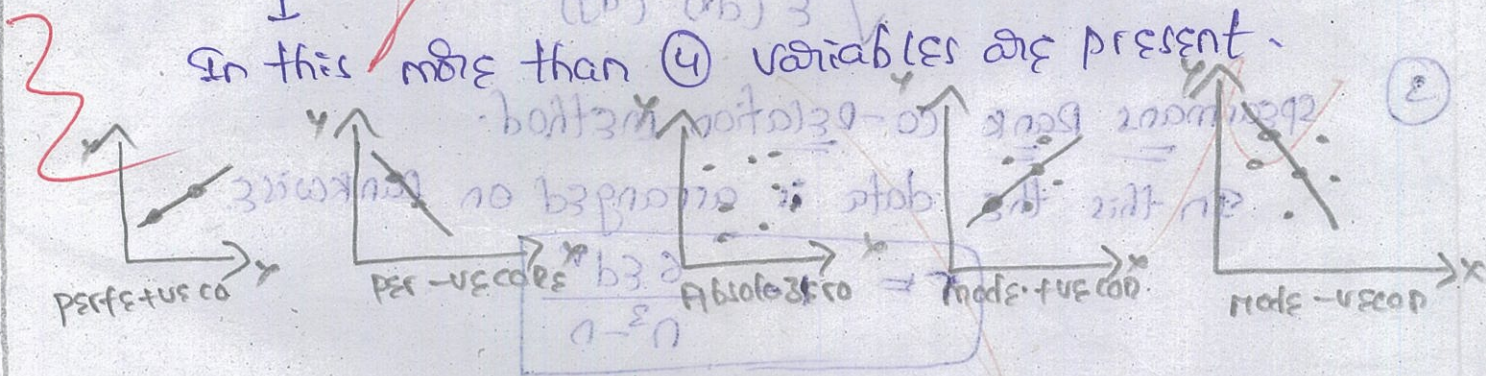
simple variable :- two variables are present

partial :- 3 variables are present, take 2 variables  
put one variable as constant.

multiple :-

$$r_{12.3} = \frac{r_{12} - r_{13} \cdot r_{23}}{\sqrt{1 - r_{13}^2} \cdot \sqrt{1 - r_{23}^2}}$$

In this more than 4 variables are present.



significance :-

→ correlation coefficient used for the estimation of the relationship between two variables.

→ Applicable for the linear progressions  
→ Tell about degree of relationship between two variables



PRINCIPAL  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## \* Methods to Determine Correlation.

### ① Graphical Geometrical method.

→ In this the variables are taken on x & y Axis then draw the dots on the graph.

→ Combining all the dots upturn one line.

→ observe if, (i) value is +1 (ii) -1 (iii) zero

→ If (i) value is +1 perfect +ve correlation

→ If (ii) value is -1 perfect -ve correlation

→ If (iii) value is 0 Absolute zero correlation.

### ② Karl-Pearson model of correlation coefficient.

→ (i) formula was first discovered by Karl Pearson

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \cdot \sum (y - \bar{y})^2}}$$

$$r = \frac{\sum dx \cdot dy}{\sqrt{\sum (dx)^2 \cdot \sum (dy)^2}}$$

### ③ Spearman's Rank co-correlation method.

In this the data is arranged on Rankwise.

$$r = 1 - \frac{6 \sum d^2}{n^2 - n}$$

### ④ Kendall's correlation coefficient method. (T)

→ If it is not an parameter, represent as (T)



(b) co-relation coefficient (r)  
Regression coefficient (byx)

$$r = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sqrt{\sum (x - \bar{x})^2 \sum (y - \bar{y})^2}}$$

x	x - $\bar{x}$	(x - $\bar{x}$ ) <sup>2</sup>	y	(y - $\bar{y}$ )	(y - $\bar{y}$ ) <sup>2</sup>	(x - $\bar{x}$ ) · (y - $\bar{y}$ )
0.5	-2.08	4.32	0.39	0.15	0.022	-0.312
1	-1.58	2.49	0.34	0.1	0.01	-0.158
2	-0.58	0.33	0.27	0.03	0.0009	-0.017
3	0.42	0.17	0.2	-0.04	0.0016	0.016
4	1.42	2.01	0.16	-0.08	0.0064	0.11
5	2.42	5.85	0.1	-0.14	0.0196	0.33

$$\bar{x} = \frac{15.5}{6} = 2.58$$

$$\bar{y} = \frac{1.46}{6} = 0.24$$

$$\sum (x - \bar{x})^2 = 15.17$$

$$\sum (y - \bar{y})^2 = 0.410$$

$$\sum (x - \bar{x})(y - \bar{y}) = -0.441$$

$$r = \frac{-0.441}{\sqrt{15.17 \times 0.410}}$$

$$= \frac{-0.441}{\sqrt{6.21}}$$

$$= \frac{-0.441}{2.49}$$

$$r = -0.17$$



PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Regression coefficient.

$$b_{yx} = r \frac{\sigma_y}{\sigma_x}$$

$$= 0.17 \frac{\sqrt{\frac{\sum (y - \bar{y})^2}{n-1}}}{\sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}}$$

$$(\bar{y} - \bar{y}) \cdot (\bar{x} - \bar{x}) = \sqrt{\frac{0.410}{5}}$$

$$= \sqrt{0.082}$$

$$= 0.28$$

$$SD_x = \sqrt{\frac{\sum (x - \bar{x})^2}{n-1}}$$

$$= \sqrt{\frac{15.12}{5}}$$

$$= 3.03$$

$$b_{yx} = 0.015$$

$$r = \sqrt{b_{yx} \cdot b_{xy}}$$

$$r = b_{yx} \cdot b_{xy}$$

$$b_{xy} = \frac{b_{yx}}{r}$$

$$= \frac{0.015}{0.02}$$

$$= 0.75$$



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## ② a) Standard Deviation :-

→ It is the AVERAGE of root <sup>means</sup> square of the ~~mean~~ data.

$$SD = \sqrt{\frac{\sum (x - \bar{x})^2}{N}}$$

→ for small <sup>no. of</sup> observations N value is  $N-1$

→ for large no. of observations N value is  $(N)$

→ A small SD tells about the large variation in the data, vice versa.

→ It is used for the measure of the error in the observations

for ungrouped data:

$$SD = \sqrt{\frac{\sum d^2}{n} - \left(\frac{\sum d}{n}\right)^2}$$

$d = x - A$   
 $n = \sum f$

$$SD = \sqrt{\frac{\sum d^2}{n-1}}$$

$$d = x - \bar{x}$$

$n = \text{no. of observations}$

for grouped Discrete data:

$$SD = \sqrt{\frac{\sum f d^2}{n} - \left(\frac{\sum f d}{n}\right)^2}$$

$$d = x - A$$

$$n = \sum f$$

$$SD = \sqrt{\frac{\sum f d^2}{n-1}}$$

for grouped continuous data

$$SD = \sqrt{\frac{\sum f d^2}{n} - \left(\frac{\sum f d}{n}\right)^2} \times c$$



→ sd used for the measurement of the error from the total observation.

→ It is easy to calculate & observed.

→ sd shows the small deviations i.e. big variation was observed.

(2) b) Age in years

Age in years	N. of persons	cf	$d = \frac{MR - A}{c}$	$\frac{fd}{N}$
10 - 20	6	6	$d = \frac{15 - 22}{10} = -0.7$	<del>-4.2</del>
20 - 30	8	14	0.3	2.4
30 - 40	12	26	0.4	4.8
40 - 50	22	48	2.3	5.06
50 - 60	12	60	3.3	39.6
60 - 70	8	68	6.5	52
70 - 80	6	74	7.5	45
	<u>cf = 74</u>			<u>148</u>

→ Given data is grouped continuous data.

→ mean, median, mode, sd

mean :

$$m = A + \frac{\sum fd}{N} \times i$$

median :

$$m = l + \frac{\frac{N}{2} - cf}{f} \times i$$

mode :

$$m = l + \frac{f_m - f_1}{f_m - f_1 + f_m - f_2} \times i$$

PRINCIPAL

Institute of Pharmaceutical Sciences



mean

~~mean~~

M = ~~A + E + D~~ prob work on 1340018 of mean

median

$$m = l + \frac{\frac{n}{2} - cf}{f} \times i$$

$$= 40 + \frac{\frac{24}{2} - 26}{22} \times 10$$

$$= 40 + \frac{12 - 26}{22} \times 10$$

$$= 40 + \frac{10}{22}$$

$$= 40 + 5 = \underline{\underline{45}}$$

mode

$$m = l + \frac{\frac{f_m - f_1}{2f_m - f_1 - f_2}}{f_m - f_1 - f_2} \times i$$

$$= 40 + \frac{22 - 12}{2(22) - 12 - 12} \times 10$$

$$= 40 + \frac{10}{44 - 24}$$

$$= 40 + \frac{10}{20}$$

$$= \underline{\underline{45}}$$



mean for grouped continuous data

$$m = A + \frac{\sum fd}{n} \times \frac{p - q}{p - q + l} + l = m$$

$$= 22 + \frac{148}{74} \times 10$$

$$= 22 + 31.4$$

$$= 53.4$$

$$= 53.4$$

$$SD = \sqrt{\frac{\sum 0.5d^2}{n} - \left( \frac{\sum fd}{n} \right)^2 \times 10}$$

$$= 1.6$$



PRINCIPAL

Avanti Institute of Pharmaceutical Sciences





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

Cherukupally (V), Near Tagarapuvalasa Bridge, Vizianagaram (Dist.) A.P. - 531162.

(Approved by AICTE, PCI & Govt. of A.P. Affiliated to JNTUK, Kakinada)

## SUBJECTIVE TEST

ESTD : 2005

JNTUK Reg. No. : 19T51T0023

Student Name : V. Syam Kumar Year :

Branch : B. Pharm / Pharm D. / Pharm D. (P.B) / M. Pharm

Specialization : Time

Subject Name : Biostatistics & Research methodology Total Marks

Marks Secured :

Date

Sem

Time

Invigilators Signature :

: 16/2/23

: 1st-2

22

22

30

a) T-test

:- It is a one type of non-parametric test

→ In the parametric test mean, median, mode are calculated on the basis of given data

→ whenever the sample size is less than 30, t-test is followed.

→ t-test is for single mean, two different means & paired t-test.

un-paired t-test :-

→ Set the null & Alternative hypothesis

→  $H_0 = \mu = \mu_0$

→  $H_1 = \mu \neq \mu_0$

→ Set the los value 5% (0.05)

→ Judge it is one tailed / two tailed

→ calculate the degrees of freedom  $df = n - 1$

→  $T_{\text{calculated}} = \frac{\mu - \mu_0}{SE}$

→ Standard error =  $\frac{s}{\sqrt{n}}$

→  $T_{\text{tabulated}} = df \times \alpha$

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



→ If  $t_{\text{cal}} > t_{\text{tab}}$  Accept Alternative hypothesis.

eg: weight of tablets.

Unpaired t-test (2-samples)

→ set the null & Alternative hypothesis values

→  $H_0 = \mu_1 = \mu_2$  Accept null hypothesis

→  $H_1 = \mu_1 \neq \mu_2$  Accept Alternative hypothesis

→ set  $\alpha$  value (5%)

→ it is one tailed / two tailed judge

→ calculate the degrees of freedom  $df = n_1 + n_2 - 1$

→  $t_{\text{cal}} = \frac{\mu_1 - \mu_2}{SE}$

→ standard error =  $\sigma \left( \sqrt{\frac{1}{n_1} + \frac{1}{n_2}} \right)$

→ calculate t-tab value  $t_{\text{tab}} = \alpha, df$

→ If  $t_{\text{cal}} > t_{\text{tab}}$  Accept Alternative hypothesis.

eg: effect of temp & pressure.

Paired-t test :-

→ it is performed when there is a comparison exist b/w

② groups

→ eg: placebo & drug effect.

→ set null & Alternative hypothesis

→ Null hypothesis  $\mu_1 - \mu_2 = 0$

$\mu_1 = \mu_2$

→ Alternative hypothesis  $\mu_1 - \mu_2 \neq 0$

$\mu_1 \neq \mu_2$

→ set  $\alpha$  value

→ predict it is one tailed & ② tailed.

→ calculate the degrees of freedom

$df = n - 1$



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Chandrababu Naidu Bhogapuram Mandal  
Vizianagaram Dt., - 531 021

$$\rightarrow T_{calc} = \frac{\mu_1 - \mu_2}{SE}$$

$$\rightarrow \text{Standard error} = \frac{SD}{\sqrt{n}}$$

$\rightarrow T_{tabu}$  is obtained by multiplication of df  $\times \alpha$

$\rightarrow$  If  $t_{calc} > t_{tab}$  Accept null hypothesis.

② b)

Given data.	After uh.
1.0	1.0
1.3	1.3
0.9	0.7
1.0	1.0
1.0	0.9
0.9	0.8
1.3	1.0
1.1	1.0
1.0	1.0

$\rightarrow$  Given data is for paired t-test

$\rightarrow$  In paired t-test first arrange the null & Alternative hypothesis

$\rightarrow$  Null hypothesis  $H_0 = \mu_1 = \mu_2 = 0$   $\mu_1 = \mu_2$

there is no difference exist b/w sample & population mean.

$\rightarrow$  Alternative hypothesis  $H_1 = \mu_1 \neq \mu_2$  there is a difference exist b/w sample & population mean.

$\rightarrow$  Set the loss value

$$\alpha = 0.05$$





→ It is a two-tailed parametric test

→ calculate the test value from the data:

$$t_{\text{cal}} = \frac{\mu_1 - \mu_2}{SE}$$

$$t_{\text{cal}} = \frac{1.05 - 0.9}{SE}$$

→ Standard error =  $\frac{SD}{\sqrt{n}}$

$$SD = \sqrt{\frac{\sum d^2}{n} - \left(\frac{\sum d}{n}\right)^2}$$

$$= \sqrt{\frac{\sum ur^2}{9} - \left(\frac{\sum ur}{9}\right)^2}$$

$$= 0.9$$

→  $t_{\text{cal}} = \frac{1.05 - 0.9}{SE} = \frac{1.05 - 0.9}{0.9}$

→  $t_{\text{tabulated}} = df \times \alpha$

→ degrees of freedom  $n - 1 = 9 - 1 = 8$

$$\alpha = 0.05$$

→  $t_{\text{tab}} = 0.05 \times 8 = 0.4$

→  $t_{\text{tab}} = 0.4$

→  $t_{\text{cal}} = 1.11$

→  $t_{\text{cal}} > t_{\text{tab}}$  Accept the null hypothesis.



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

⑤ epidemiology statistics

① Incidence :- It is defined as the occurrence of a particular disease / disorder in a particular period of time in a population.

→ Incidence of disease is in week, year, month is to be said by the incidence.

$$\text{Incidence} = \frac{\text{Prevalence at that time.}}{\text{population effect specific period}}$$

→ Incidence occurred in the malaria, fever.

→ Incidence of disease & any other are occurred during the specific period of time.

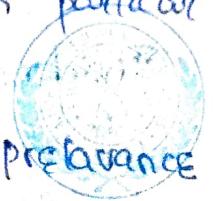
→ occurring of the disease / disorder in the one to another location.

② Prevalence

→ it is of ② types   
 { Periodic prevalence   
 point prevalence.

\* Periodic prevalence → It is the occurring of the disease in particular periodic time.

$$\text{Periodic prevalence} = \frac{\text{Effecting of people in part-period}}{\text{population effect that specific period.}}$$





→ Periodic prevalence is up to certain period of time, then the weeks, months / years

→ Periodic prevalence tells about the how the disease is occurred on them.

\* Point prevalence :- It is the particular point of time the incidence occur is the point prevalence

eg: At 5 AM 18th march 2015 (It is a prevalent var)

$$\text{Point prevalence} = \frac{\text{Incidence of the population} \times 1000}{\text{population effect that specific period}}$$

→ point prevalence tells about the particular point of the time.

③ Relative Risk :- It is the ratio of the prevalence occurred in one population to prevalence occurred in another population.

→ It is the incidence of prevalent in one to the another one.

$$\text{Relative Risk} = \frac{\text{Incidence in one population} \times 1000}{\text{Incidence in another population}}$$

④ Attributive Risk :- It is the difference b/w the population to assess the incidence in a non relative manner.



3) b) one way Anova :-

- It is used to predict the treatments in the samples
- on the bases of the  $\text{Q value}$  to identify the Anova by  $F$  value.

### Procedure

- set the null & Alternative Hypothesis
- sample mean & population mean are equal then accept the null hypothesis, if not accept after - native hypothesis
- set the  $\text{los value}$ . 5% 1.96
- $V_{\text{statist}} = \frac{MST}{MSE}$
- $V_{\text{table}} = \text{ref}$
- Sum of the values are arranged & then squares of the sum are to be taken.

Form

A	4	5	4	6	5	6	4	6	40	1600
B	3	3	4	4	5	2	4		25	625
C	5	6	6	6	4	4	5	4	40	1600
									<u>105</u>	<u>3825</u>
	16	25	16	36	25	36	16	36		
	9	9	16	16	25	4	16			
	25	36	36	36	16					



$$\text{correction factor} = \frac{q^v}{n} = \frac{105}{23} = \underline{\underline{4.565}}$$

$$\text{Total sum of squares} = \sum x^v - CF$$

$$= 446 - 4.565 = 441.44$$

$$\text{sum of squares treatment} = \frac{\sum x^v}{n} - CF = 473.565$$

$$\begin{aligned} \text{sum of Error} &= TSS - SST \\ &= 441.44 - 473.565 = 32.12 \end{aligned}$$

→ calculation of the degree of freedom.

$$\begin{aligned} \text{For treatments} &= n - 1 \\ &= 3 - 1 = 2 \end{aligned}$$

$$\text{For errors} = 23 - 3 = 20$$

$$\begin{aligned} \text{degrees of freedom} &= n - 1 \\ &= 23 - 1 = \underline{\underline{22}} \end{aligned}$$

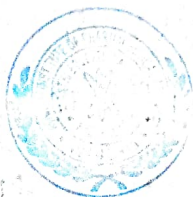
$$\rightarrow MST = \frac{SST}{2} = 236.5$$

$$\rightarrow MSE = \frac{SSE}{20} = 1.606$$

$$\begin{aligned} \rightarrow F_{cal} &= \frac{MST}{MSE} = \frac{236.5}{1.606} \\ &= \underline{\underline{1.47}} \end{aligned}$$

$$\rightarrow F_{tabulated} = 1.96 (0.05\%)$$

$$\rightarrow F_{cal} > F_{tab} \text{ Accept } H_0$$



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Chogapuram Mandal  
Vizianagaram Dt., - 531162

③ Two way ANOVA!

a) Set the null & Alternative hypothesis.

→  $\mu = \mu_0$  Accept the null hypothesis

→  $\mu \neq \mu_0$  Accept the Alternative hypothesis

→ Set the loc value.

→ To the treatments table are to be drawn regarding to their series

→ Grand total is to be calculated.

→ Correction factor =  $\frac{\text{Grand total}^2}{n}$

→  $TSS = \sum x^2 - CF$

→  $SST = \frac{\sum x^2}{n} - CF$

→  $SSE = TSS - SST$

→  $F_{cal} = \frac{MST}{MSE}$

2 →  $MST = \frac{SST}{k-1}$

→  $MSE = \frac{SSE}{n-k}$

→  $F_{cal} > F_{tab}$  Accept the null hypothesis.

→  $F_{cal} < F_{tab}$  Reject the null hypothesis



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### Retriever of Data's using the computer system.

Computer is an electronic device consisting of various components like key board, CPU (Central Processing Unit), VDU (Visual Display Unit or Monitor), printer and mouse etc. Most activities follow the basic principle of Input-Process-Output (I-P-O cycle). This can be best illustrated by an example of registration in hospitals. A person who wishes to see a senior doctor has to fill a request slip. This slip contains the relevant data, i.e., name, age, sex, etc. The operator then feeds this data from the request slip into the computer. The process in this case includes examining the availability of senior doctor and determining whether the data suits to the patient or not. As a result of this process, some information is output. The output may be in the form of a printed proforma. If the senior doctor is available or otherwise a message may be by the computer turning down the request.

3Ans) a) Computers are used in pharmacies to maintain accessible, legible and up-to-date medication records. They help in keeping overall patient care by maintaining their records, consumption of drugs, registration numbers and detailed records of accounts and purchase section. Even for retail pharmacist, computers have been of valuable assistance in the prescription processing. It includes display of computer information about patient and drug, its adverse drug reaction, causation, duplication of orders, labeling conditions etc.

### Following are the other applications in hospital and pharmacy

- Calculation of monthly gross income
- Generating pay slips
- Updating the employee information
- Placement of supply order
- Keeping track of total payment and amount due to supplier
- Checking the quality and quantity of hospital supplies recorded and
- identifying any discrepancies Recording purchases for accounting purposes.

### The most common system feature is ability to generate

- Drug order labels
- Maintain Patient Profile
- Generating drug use review data
- Maintaining a drug formulary



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

- Updating drug Price
- Transferring Patients drug charges to the billing department
- To have some inventory control function
- Food and drug interaction

### Pattern of computer used in hospital pharmacy

- Hospital Pharmacy is very slow to adopt computers
- Only about 60% of Pharmacies are computerized to any extent
- Institutional Pharmacy Manager may be wary about the computerization
- Because Hospital Pharmacy is a more difficult and complex operation than the retail pharmacy
- Retail Pharmacies dispense prescription in more or less the same way
- Hospital pharmacy dept. distributes different types of drug products and giving different types of services
- Institutional Pharmacist are also aware that many computer systems have performed in less than satisfactory manner
- One survey revealed that only about 69% of hospital pharmacies were fully satisfied with their computer system
- Nearly 2/3<sup>rd</sup> of hospital pharmacies believed that their computer system. Because it has improved some pharmacy operations such as billing, quality of drug therapy in the hospital
- Each having its own information requirements
- Therefore considerable room for improvement is required

b) Computers have invaded in every walk of life and almost all commercial organization and business firms have undergone significant computerization with no exception of community pharmacy establishment. At present community pharmacy use computer for selective pharmaceutical purposes. While there are several possible purposes. Following is a list of majority of community pharmacy functions that could be computerized.

- a. **Clerical:** Preparation of prescription levels. Providing a receipt for patient, Generation of hard copy record of transaction. Calculation of total prescription cost. Maintenance of perpetual record of inventory record. Accumulation of suggested orders based on

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences



Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

suggested order quantity. Automatically order required inventory via electronic transmission. Calculation and storing of annual withholding statements.

- b. **Managerial:** Preparation of daily sales report. Generation of complete sales analysis as required for a day, week, month, year and to date for number of prescriptions handled and amount in cash. Estimation of profit and financial ratio analysis. Production of drug usage reports. Calculation of gross margin, reported in all manner of details. Calculate number of prescriptions handled per unit time, to help in staff scheduling. Printing of billing a payment summary.
- c. **Professional:** Building a patient profile. Storing of information on drug and other allergies to warn about possible problems. Retrieval of current drug regimen for review. Updating of patient information in file. Printing of drug-drug and drug-food interactions. Maintaining of physicians file including specialty, designation, address, home office hours, etc.
- d. **Clinical support:**
  - Patient medication profile – Patient education profile
  - Consulting pharmacist activities – Drug utilization monitoring

In pharmacy operations, inventory control is referred to the stock of pharmaceutical products retained to meet future demand. Inventory represents the largest current asset, as well as liquid asset in pharmacy practice and its value continues to rise because of the growth in variety and cost of pharmaceutical products. In addition to the negative impacts on financial outcomes from the pharmacy's business perspective, inventory mismanagement could have deleterious corollaries on patient safety. Such outcomes can be attributed by the availability of expired, counterfeit, substandard, or spoiled products; unavailability of essential products; unclaimed prescriptions; and not updating formularies. To enhance patient safety, it is recommended to conduct stock reviews on weekly basis to check the quantities, and on monthly basis to search for expired products. This can also be accomplished by utilizing software systems that alert the pharmacist when reaching a critical threshold amount or a near-expiry date of stocked products.

Computers play vital role in material planning, purchasing, inventory control and forecasting. Inventory control is very essential because it maintains the balance between stock-in-hand and excessive capital investment. Techniques such as ABC analysis and EDO can be easily programmed. It will eliminate the tedious and time-consuming task of calculations. Computers are used to detect the items which had attained minimum order





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

level It then prepares a list and purchase orders for further supplies Generally there are Two systems for inventory control.

4Ans) **Advantage :** The most important advantage is time saving in conducting literature searches. A pharmacist may require several hours to research a particular the rapeutic question from a literature search covering about 10 years of articles. It can be done in minutes and the computer search is more pleasant.

Only few seconds are required to broaden a computer search from a specific drug to entire therapeutic class, but manually it is a tedious job to search in the '**INDEX MEDICUS**'.

The computerised information retrieval has following advantages over the manual search.

- (i) It is time saving and pleasant.
- (ii) It is more thorough and timely than manual search.

To operate the information retrieval system, the equipments needed include a microcomputer, a printer, a telephone line and a modem.

For information retrieval, the choice of a database is also very important. The databases may be

- (a) Bibliographic database,
- (b) Journal information and
- (c) Textbook material.

Generally, bibliographic database is adopted, as usually there is a medical library nearby from where one can get the articles. The databases are medicine oriented like **MEDLINE**, or pharmacy oriented, like International Pharmaceutical. Abstract may be chosen. Some on-line Databases of the medical and pharmaceutical literature is shown are

Database	Produced by	Data
1. Medline	National Library of Medicine (NLM).	Around 3000 Biomedical journals dating back to 1966.
2. Toxicology Data Bank (TDB)	< _	Toxicological data.
3. International Pharmaceutical Abstracts	American Society of Hospital Pharmacists	More than 600 publications from 1970 are covered.
4. Biosis	Bioscience Information Service	Biological Abstracts

Hospital administration computer helps in rapid data storage and retrieval, particularly when the data stored is subjected Infrequent changes and when group of items based on







## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

the stored data need to be retrieved. Admission of M-patients and their discharge from a hospital require data, which gets changed every minute, e.g., admission of in-patient ties up resources like clinical and nursing staff, a bed, operation theatre, Intensive care unit, pharmacy department, radiological services etc.

Hence decision to admit a new patient is not a simple one. Even the availability of a suitable bed is difficult to determine in male and female ward, isolation ward etc. A prediction must be made that a suitable bed will be available at future date because the estimation is over optimistic, then patients who are called in, may be turned away at the last minute. If the prediction is over pessimistic expensive resources lie idle and the waiting period for treatment is extended.

Once the patient gets admitted, computer records and stores information like clinical information, catering information, diagnosis, sex, medication etc. It helps in providing detailed information about medical and paramedical staff including their duty chart. It helps the senior personnel to keep a check on ward-by-ward loading of nursing staff and to allocate additional help whenever required.



PRINCIPAL

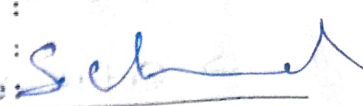
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

# AVANTHI INSTITUTE OF ENGINEERING & TECHNOLOGY

Near Tagarapuvalasa Bridge, Cherukupalli, Bogapuram (M), Vizianagaram (Dist.) A.P. - 531 162.

Ph : 08933-226739, 226956, 97051 69740.

## SUBJECTIVE TEST

Date : 21-04-23  
Name of the Student : V. Syam Kumar  
Subject : Biostatistics & Epidemiology  
Branch : Pharmacy  
Marks Awarded : 27/30  
Hall Ticket No. : 19TS1T0023  
Course : 4th Sem Mid-3  
Max. Marks :  
No. of Additional :  
Invigilators Signature : 

b) use of computers in patient medication profile :

- computers are use in the process of the storing information about the complete data of the patient on the computers.
- From beginning of the process the data is collected and stored on the devices.
- In order to store the complete information of the patient to access the data to be analysed or reported.
- From the beginning of the admission to discharge entire data is collected or stored on the devices in order to overcome the problems.
- By the process of the retrieval to the information regarding the entire life long also be stored on the databases.
- on examination of the patient medication profile is necessary to see unwanted ADR's are managed by the process.
- medication profile gives the entire subjects of the variability in the data process.

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Cherukupalli (V), Bhogapuram Mandal  
Vizianagaram





- Information regarding entire process is to be kept on the documentation form usefull for the life long purposes.
- By the variation of the data is selected & send to the professional knowledge regarding the various processes are to be considered.
- Entire information collected & then used for the manifestation of the results collection.
- Whenever the patient need information regarding that particular case we can easily gave information to them.
- As a clinical pharmacist one has to understand the process of the formation of the regarding evidences.
- Clinical pharmacist involve in the process of the data collection from the patients.

### Advantages:-

- From beginning of the patient profile entire information is present on the document
- Rational usage of drugs are considered.
- used for minimise the ADR, Drug-Drug & Drug-food Interactions
- Acquire more no. of knowledge by clinical Pharmacist
- By this process one has to get complete data & used for the future purposes.



## ② a) Electronic Prescription Dispensing Process

- In older days prescriptions are written by the doctors on handwriting & the pharmacist understand that prescription & dispense the drugs to the patient.
- But now a days e-prescription process is coming. In order to avoid confusion of writing process in this computer typing of the entire data which is on the prescription.
- From the physician prescription directly send to the pharmacist & the total information is gathered on one of the main window in the hospital.
- In order to overcome the process of the occurring of the disease & overcome the problem one has to access the complete data staying is to be done.
- In e-prescription data from the 'complete' sources are taken on to the consideration.
- e-prescription process is useful to overcome the problem of the handwriting understanding & any other processes.
- This prescription contains the data regarding the dose, ROA & also some suggestions are also mentioned on them.
- mainly used for the overcome of problem associated with the resolving.

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Vizianagaram Dt., - 531162



→ Prescription which is not to be typed i.e. directly from system entered to the pharmacist

→ Complete Information of the drug list also present on the doctor system in order to overcome the process.

### Advantages

→ Better to understanding by the pharmacist

→ Easy to carry prescription

→ Formation of the most common forms.

### Disadvantages

→ Expensive

→ not handled in small hospitals.

→ Bcoz lot of cost.

②

→ There are many softwares are used in the clinical pharmacy in order to store the large volume of the data in a charts/graphs to predict the results.

→ mainly used softwares are

Epi info  
SAS  
SPSS

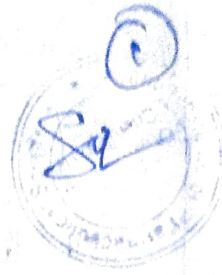
→ Epi info having the information regarding the inclusion of the process to be assigned to measure the quality

→ Information collected or stored in the window to access the complete process.

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

→ EPR info consist of the so, many of the processes regarding the process.



→ SAS (Statistical Analytical system) :-

→ In 1976 carolie state university identify the SAS

→ SAS used for the data string, Retrieval, Analysis in the Report writing.

→ SAS consist of the steps are data process & procedure.

→ In data process entire data is collected in process step data is Analyzed.

SPSS (Statistical packing for the social sciences)

→ SPSS is a window used for the complete data storage of the patients in Graphical Base.

→ In order to overcome the data to be collected on the basis of the structure regarding the process.

→ By using of the data Interpretation on the basic process of data collection & storage of the data.





\* Inference:- Starting of the spec process consist of the opening to be present on them.

\* Tool Bars

1) Title Bar

2) Menu Bar

3) Tool Bar

4) Status Bar

1) Title Bar:- It is present above the system in the process containing of the title of the process.

2) Menu Bar:- It consist of the following.

a) Data:- Data which is to be present & collected by the pharmacist

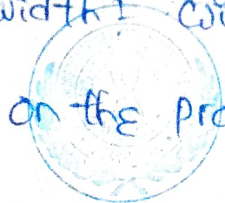
b) Editing:- Editing of the information

c) Loss:- loss of the information

d) Missing:- missing letters are also be considered.

e) Variable:- Variable must be in order.

d) Column width:- width of the column also be seen on the process.



c) Alignment : Data must be aligned & concluded.



d) Windows : shortcut to the tool bar

e) shortcut : used for complete analysis.

### \* Primary windows

a) Data editor window

→ Variable

→ observe all thing.

b) Inform. editor window

→ contain all information regarding process.

c) System editor window

→ main process of the data is to be present on the process.

\* Variables : These are present on the data base containing the all info.

Name

data

label

Variable

manufacture

column width

Alignment

Result



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Chirukugally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## Advantages

- use of this large information is to be set as graphs or charts
- It is having a interactive
- more information gathering

## Dis

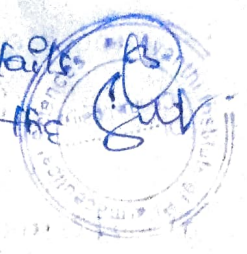
- Not simple as excel
- Buying of software is too cost
- Not to be present in the present

## Application

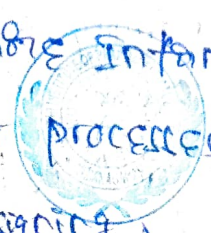
- case report collection on the process of the dispensing process
- many used to rectify the data.
- data collected is preferred.
- Report writing is data interpretation.

## Applications of the computers in drug information retrieval & storage

- Drug information retrieval & storage is nothing but the entire process of the complete drug is to be collected and then collected information is to be analysed for the process
- more information about drugs is useful for the process of the drug update the knowledge



- Information of the complete drug details are taken on to the consideration to the process.
- complete information of the drugs are to be taken on to the consideration
- Drug information Retrieval consist of the literature & Reviewer
- 1<sup>st</sup> literature consist of the All the information regarding the complete process to be preferred.
- mainly Textbooks are to be present on the process
- 2<sup>nd</sup> literature consist of the Abstracts and all the processes.
- on the basic process in order to overcome the problem
- 3<sup>rd</sup> literature consist of the Journals & other processes regarding process
- computer information storage is the use of the computer to store the data on the basis of the requirement
- All the information is to be collected & stored.
- more information collected ~~other~~ than the other processes regarding other process to Assigning.



Avanhi Institute of Pharmaceutical Sciences  
Cherukuvu, Bhadrachalam, Andhra Pradesh, India  
Vizianagaram Dt., - 531162



→ most of the information is to be taken on to the consideration.

- a) Journals :- Journals consist of the more no of information regarding the processes to assign the data
- b) Bibliography :- Instead of the all data collection process some of the more important process to access the complete data.
- c) computer catalogues more number of the information present on the data is to be taken on to the consideration.
- d) library catalogues library catalogues contains the limited information regarding the processes to assign the complete system to analyse the process.
- e) data entry process complete data must be collected on the basis of the drug to consider the knowledge.
- f) Drug utilisation in patient complete data regarding the process is to be taken on to the consideration.

→ On the process of the retrieving of the data interpretation all of the processes are taken on to the conclusion that the data is to be taken on consideration.



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Mid-I, Mid-II, Mid-III and Final Mid Marks					
Subject Name: Biostatistics and Research Methodology (T4104)					
Year: IV					
S No	Roll No	Mid - 1	Mid - 2	Mid - 3	Average of best of 2 Mid's
1	19T51T0001	28	29	27	29
2	19T51T0002	22	16	27	25
3	19T51T0004	24	26	0	25
4	19T51T0005	29	19	27	28
5	19T51T0006	23	28	28	28
6	19T51T0007	22	26	28	27
7	19T51T0008	0	26	27	27
8	19T51T0009	27	27	28	28
9	19T51T0010	27	28	29	29
10	19T51T0011	26	28	29	29
11	19T51T0012	29	29	28	29
12	19T51T0013	27	27	0	27
13	19T51T0014	29	23	27	28
14	19T51T0015	26	0	29	28
15	19T51T0016	25	15	24	25
16	19T51T0017	29	0	22	25
17	19T51T0018	14	23	27	25
18	19T51T0019	23	11	0	17
19	19T51T0020	28	28	27	28
20	19T51T0021	25	28	26	27
21	19T51T0022	28	27	0	28
22	19T51T0023	25	22	27	24
23	19T51T0024	28	27	0	28
24	19T51T0027	14	28	28	28
25	18T51T0001	3	29	28	29
26	17T51T0012	0	28	29	29
27	22T51T0101	0	29	26	27

Signature of Faculty



HOD - Pharm D

Avanthi Institute of Pharmaceutical Sciences

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal,  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

PHARM D EXTERNAL MARKS RESULT ANALYSIS					
Subject name: Biostatistics and Research Methodology (T4104)					
Year: IV					
S No	Roll No	Subject Code	Subject Name	Marks Obtained	Credits
1	19T51T0001	T4104	Biostatistics and Research Methodology	83	1
2	19T51T0002	T4104	Biostatistics and Research Methodology	60	1
3	19T51T0004	T4104	Biostatistics and Research Methodology	62	1
4	19T51T0005	T4104	Biostatistics and Research Methodology	75	1
5	19T51T0006	T4104	Biostatistics and Research Methodology	66	1
6	19T51T0007	T4104	Biostatistics and Research Methodology	64	1
7	19T51T0008	T4104	Biostatistics and Research Methodology	62	1
8	19T51T0009	T4104	Biostatistics and Research Methodology	66	1
9	19T51T0010	T4104	Biostatistics and Research Methodology	72	1
10	19T51T0011	T4104	Biostatistics and Research Methodology	68	1
11	19T51T0012	T4104	Biostatistics and Research Methodology	64	1
12	19T51T0013	T4104	Biostatistics and Research Methodology	66	1
13	19T51T0014	T4104	Biostatistics and Research Methodology	74	1
14	19T51T0015	T4104	Biostatistics and Research Methodology	64	1
15	19T51T0016	T4104	Biostatistics and Research Methodology	59	1
16	19T51T0017	T4104	Biostatistics and Research Methodology	70	1
17	19T51T0018	T4104	Biostatistics and Research Methodology	61	1
18	19T51T0019	T4104	Biostatistics and Research Methodology	50	1
19	19T51T0020	T4104	Biostatistics and Research Methodology	58	1
20	19T51T0021	T4104	Biostatistics and Research Methodology	65	1
21	19T51T0022	T4104	Biostatistics and Research Methodology	74	1



PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

22	19T51T0023	T4104	Biostatistics and Research Methodology	69	1
23	19T51T0024	T4104	Biostatistics and Research Methodology	75	1
24	19T51T0027	T4104	Biostatistics and Research Methodology	71	1
25	18T51T0001	T4104	Biostatistics and Research Methodology	65	1
26	17T51T0012	T4104	Biostatistics and Research Methodology	61	1
27	22T51T0101	T4104	Biostatistics and Research Methodology	65	1

### RESULT ANALYSIS

Total No. of students appeared	27
Total No. of students passed	27
Pass percentage	100%

Signature of Faculty

HOD – Pharm D



**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### Subject wise student results :

S No	Roll No	Pharmaco therapeutics III	Hospital Pharmacy	Clinical Pharmacy	Biostatistics & Research Methodology	Bio pharmaceu tics & Pharma cokinetics	Clinical Toxi cology	No of subjects fail
1	19T51T0001	1	1	1	1	1	1	0
2	19T51T0002	1	1	1	1	1	1	0
3	19T51T0004	1	1	1	1	1	1	0
4	19T51T0005	1	1	1	1	1	1	0
5	19T51T0006	1	1	1	1	1	1	0
6	19T51T0007	1	1	1	1	1	1	0
7	19T51T0008	1	1	1	1	1	1	0
8	19T51T0009	1	1	1	1	1	1	0
9	19T51T0010	1	1	1	1	1	1	0
10	19T51T0011	1	1	1	1	1	1	0
11	19T51T0012	1	1	1	1	1	1	0
12	19T51T0013	1	1	1	1	1	1	0
13	19T51T0014	1	1	1	1	1	1	0
14	19T51T0015	1	1	1	1	1	1	0
15	19T51T0016	1	1	1	1	1	1	0
16	19T51T0017	1	1	1	1	1	1	0
17	19T51T0018	1	1	1	1	1	1	0
18	19T51T0019	1	1	1	1	1	1	0
19	19T51T0020	1	1	1	1	1	1	0
20	19T51T0021	1	1	1	1	1	1	0
21	19T51T0022	1	1	1	1	1	1	0
22	19T51T0023	1	1	1	1	1	1	0
23	19T51T0024	1	1	1	1	1	1	0
24	19T51T0027	1	1	1	1	1	1	0
25	18T51T0001	0	0	1	1	1	1	2
26	17T51T0012	1	0	1	1	1	1	1
27	22T51T0101	1	1	1	1	1	1	0
No. of students failed in each subject:		1	2		0	0	0	

Signature of Faculty



HOD – Pharm D

Avanathi Institute of Pharmaceutical Sciences

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

### Subject wise result analysis

SUBJECT	NAME OF THE FACULTY	PASS	FAIL	%
Biostatistics and Research Methodology-(BRM)	Mrs.Ch. Geetha	27	0	100
Clinical Pharmacy-(CP)	Dr.V C Randeep Raj	27	0	100
Hospital Pharmacy-(HP)	Mr.V Uma Sankar	25	2	92.5
Clinical Toxicology-(CT)	Dr.B. TejaSree	27	0	100
Biopharmaceutics and Pharmacokinetics-(BPPK)	Mr.P. Sandeep	27	0	100
Pharmacotherapeutics – III-(PT-III)	Dr.T. Rushi	26	1	96.2

### Overall Class results

STRENGTH	PASS	FAIL	PASS %
27	25	2	92.5



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)



ESTD : 2005

### AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

Cherukupally( Village), Near Thagarapuvalasa Bridge,  
Vizianagaram (Dist)-531162

Regulation : PCI , Subject : Biostatistics & Research

Methadology Year : IV

**Faculty: Mrs.Ch. Geetha, Associate Professor, Dept. of Phaemaceutics**

Particulars	Overall Attainment					
	CO1	CO2	CO3	CO4	CO5	CO6
Internal Attainment Level (INT)	3	1	2	1	2	1
External Attainment Level (EXT)	1	1	1	1	1	1
TOTAL = INT * 0.25 + EXT * 0.75	1.5	1	1.25	1	3	1
Target Level is 2.2(75%)						

#### Action taken: Suggestions for further Improvement by Course Teacher

Continuous Quality Improvement for COs:

Target =2.2

Observation: All COs are marginally attained.

Action Taken Report: As per discussion and suggested by PAC:

To strengthen CO1, 1.Practice of more numericals from this CO to meet the target

**Target =2.2**

**Observation:** All COs are marginally attained.

To strengthen CO1: Students to be made practice more analysis questions for achieving higher levels of target.

To strengthen CO2:Conduct more number of assignments and practice session to attain the target

To strengthen CO3:Conduct more number of assignments and practice session to attain the target

To strengthen CO4:Conduct guest lecturers to attain the target

To strengthen CO6:Conduct more tutorial classes to attain the target

Signature of the Faculty



V. Nrusankar  
HOD – Pharm D

*[Signature]*

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

Cherukupally( Village), Near Thagarapuvalasa Bridge, Vizianagaram (Dist)-531162

Regulation : PCI , Subject : Biostatistics & Research Methodology Year : IV



ESTD : 2005

The Mapping of CO and PO on 3 point scale{high-3,Medium-2,Low-1} is:														
	CO Attainment Level	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PS O1	PS O2
CO404.1	1.5	1	-	3	2	-	-	-	-	-	-	-	3	-
CO404.2	1	1	-	3	2	-	-	-	-	-	-	-	3	-
CO404.3	1.25	1	3	3	2	-	-	-	-	-	-	-	3	-
CO404.4	1	1	1	3	3	-	-	-	-	-	-	-	3	-
CO404.5	1	1	1	3	3	-	-	-	-	-	-	-	3	-
CO404.6	1	1	-	3	2	-	-	-	-	-	-	-	3	-
PO/PSO Weightage		6	5	18	14	0	0	0	0	0	0	0	18	0
PO/PSO Co-relation weightage all Cos (1-5)		8.7 5	7.7 5	26. 3	21. 5	0	0	0	0	0	0	0	26. 25	0
PO/PSO Attainment Level		1.4 6	1.5 5	1.4 6	1.5 4	-	-	-	-	-	-	-	1.46	-



  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



***I B.PHARMACY I SEM. (PCI)***



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**

**UNIVERSITY EXAMINATION CENTER, KAKINADA**

**I B. PHARMACY I SEMESTER (PCI REGULATION) I MID EXAMINATIONS, MARCH - 2023**

**TIME TABLE**

**TIME: 10.00 AM TO 12.00 NOON**

DATE	06.03.2023 (Monday)	07.03.2023 (Tuesday)	09.03.2023 (Thursday)	10.03.2023 (Friday)
SUBJECTS	Human Anatomy and Physiology-I (BP101T)	Pharmaceutical Analysis-I (BP102T)	Pharmaceutics-I (BP103T)	Pharmaceutical Inorganic Chemistry (BP104T)

- NOTE:**
- (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
  - (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
  - (iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**Date: 25-02-2023**

*H. R. K. K.*

**Controller of Examinations**



*HB*  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

***I B.PHARMACY I SEM. (PCI)***



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**

**UNIVERSITY EXAMINATION CENTER, KAKINADA**

**I B. PHARMACY I SEMESTER (PCI REGULATION) II MID EXAMINATIONS, MAY - 2023**

**TIME TABLE**

**TIME: 10.00 AM TO 12.00 NOON**

DATE	01.05.2023 (Monday)	02.05.2023 (Tuesday)	03.05.2023 (Wednesday)	04.05.2023 (Friday)
SUBJECTS	Human Anatomy and Physiology-I (BP101T)	Pharmaceutical Analysis-I (BP102T)	Pharmaceutics-I (BP103T)	Pharmaceutical Inorganic Chemistry (BP104T)

- NOTE:** (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.  
(ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.  
(iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**Date: 21 -04-2023**

*H. Reddy*

**Controller of Examinations**



**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA

UNIVERSITY EXAMINATION CENTER, KAKINADA

**I B. PHARMACY II SEM. (PCI)**

**I B. PHARMACY II SEMESTER (PCI REGULATION) I MID EXAMINATIONS, JULY - 2023**

## TIME TABLE

**TIME : 10.00 AM TO 12.00 NOON**

DATE	17-07-2023 (Monday)	18-07-2023 (Tuesday)	19-07-2023 (Wednesday)	20-07-2023 (Thursday)
SUBJECTS	Human Anatomy and Physiology-II (BP201T)	Pharmaceutical Organic Chemistry-I (BP202T)	Biochemistry (BP203T)	Pathophysiology (BP204T)

- NOTE:** (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- (iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

*H. R. K. K. K.*

**DATE: 06 -07-2023**

**Controller of Examinations**



**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**  
UNIVERSITY EXAMINATION CENTER, KAKINADA

***I B. PHARMACY II SEM. (PCI)***

**I B. PHARMACY II SEMESTER (PCI REGULATION) II MID EXAMINATIONS, SEPTEMBER - 2023**

**T I M E T A B L E**

**TIME : 10.00 AM TO 12.00 NOON**

DATE	11-09-2023 (Monday)	12-09-2023 (Tuesday)	13-09-2023 (Wednesday)	14-09-2023 (Thursday)
SUBJECTS	Human Anatomy and Physiology-II (BP201T)	Pharmaceutical Organic Chemistry-I (BP202T)	Biochemistry (BP203T)	Pathophysiology (BP204T)

- NOTE:** (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- (iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**DATE: 01-09-2023**

**Controller of Examinations (PG)**



**PRINCIPAL**  
**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**  
UNIVERSITY EXAMINATION CENTER, KAKINADA

**II B.PHARMACY I SEM. (PCI)**

**II B. PHARMACY I SEMESTER (PCI REGULATION) I MID EXAMINATIONS, DECEMBER - 2022**

**TIME TABLE**

**TIME: 10.00 AM TO 12.00 NOON**

DATE	26-12-2022 (Monday)	27-12-2022 (Tuesday)	28-12-2022 (Wednesday)	29-12-2022 (Thursday)
SUBJECTS	Pharmaceutical Organic Chemistry-II (BP301T)	Physical Pharmaceutics-I (BP302T)	Pharmaceutical Microbiology (BP303T)	Pharmaceutical Engineering (BP304T)

- NOTE:** (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.  
(ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.  
(iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

*H. R. Kic*

**DATE: 13-12-2022**

**Controller of Examinations**



**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**II B.PHARMACY I SEM. (PCI)**



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**  
UNIVERSITY EXAMINATION CENTER, KAKINADA

**II B. PHARMACY I SEMESTER (PCI REGULATION) II MID EXAMINATIONS, FEBRUARY - 2023**

**TIME TABLE**

DATE	20-02-2023 (Monday)	21-02-2023 (Tuesday)	22-02-2023 (Wednesday)	23-02-2023 (Thursday)
SUBJECTS	Pharmaceutical Organic Chemistry-II (BP301T)	Physical Pharmaceutics-I (BP302T)	Pharmaceutical Microbiology (BP303T)	Pharmaceutical Engineering (BP304T)

- NOTE:** (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- (iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

DATE: 13-02-2023

*H. R. Kic*

Controller of Examinations



*[Signature]*  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**II B.PHARMACY II SEM. (PCI)**



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**  
UNIVERSITY EXAMINATION CENTER, KAKINADA

**II B.PHARMACY - II SEMESTER (R17 PCI REGULATION) II MID EXAMINATIONS, JULY - 2023**

**TIME TABLE**

**TIME : 10.00 AM TO 12.00 NOON**

DATE & DAY	03.07.2023 (Monday)	04.07.2023 (Tuesday)	05.07.2023 (Wednesday)	06.07.2023 (Thursday)	07.07.2023 (Friday)
SUBJECTS	PHARMACEUTICAL ORGANIC CHEMISTRY-III (BP401T)	MEDICINAL CHEMISTRY-I (BP402T)	PHYSICAL PHARMACEUTICS- II (BP403T)	PHARMACOLOGY-I (BP404T)	PHARMACOGNOSY AND PHYTOCHEMISTRY -I (BP405T)

- NOTE:** (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL
- (iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**DATE: 22-06-2023**



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

*H. R. K. K.*

**Controller of Examinations**

**II B.PHARMACY II SEM. (PCI)**



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**  
**UNIVERSITY EXAMINATION CENTER, KAKINADA**

**II B.PHARMACY - II SEMESTER (R17 PCI REGULATION) I MID EXAMINATIONS, MAY - 2023**

**TIME TABLE**

**TIME: 10.00 AM TO 12.00 NOON**

DATE	08-05-2023 (Monday)	09-05-2023 (Tuesday)	10-05-2023 (Wednesday)	11-05-2023 (Thursday)	12-05-2023 (Friday)
SUBJECTS	PHARMACEUTICAL ORGANIC CHEMISTRY-III (BP401T)	MEDICINAL CHEMISTRY-I (BP402T)	PHYSICAL PHARMACEUTICS- II (BP403T)	PHARMACOLOGY-I (BP404T)	PHARMACOGNOSY AND PHYTOCHEMISTRY -I (BP405T)

- NOTE:** (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- (i) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- (ii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**DATE: 29 -04-2023**

*H. R. Kic*

**Controller of Examinations**



*Avanathi*  
**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**III B.PHARMACY I SEM. (PCI)**



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**

UNIVERSITY EXAMINATION CENTER, KAKINADA

**III B. PHARMACY - I SEMESTER (PCI REGULATION) I MID EXAMINATIONS, SEPTEMBER - 2022**

**TIME TABLE**

**TIME: 10.00 AM TO 12.00 PM**

DATE	26-09-2022 (Monday)	27-09-2022 (Tuesday)	28-09-2022 (Wednesday)	29-09-2022 (Thursday)	30-09-2022 (Friday)
SUBJECTS	MEDICINAL CHEMISTRY-II (BP501T)	INDUSTRIAL PHARMACY - I (BP502T)	PHARMACOLOGY-II (BP503T)	PHARMACOGNOSY AND PHYTOCHEMISTRY-II (BP504T)	PHARMACEUTICAL JURISPRUDENCE (BP505T)

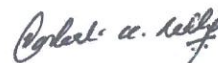
- NOTE:** (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- (iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

DATE: 20-09-2022



**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Gherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

  
Controller of Examinations

**III B.PHARMACY I SEM. (PCI)**



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**  
UNIVERSITY EXAMINATION CENTER, KAKINADA

**III B. PHARMACY - I SEMESTER (PCI REGULATION) II MID EXAMINATIONS, NOVEMBER/DECEMBER - 2022**

**TIME TABLE**

**TIME: 10.00 AM TO 12.00 PM**

DATE	28-11-2022 (Monday)	29-11-2022 (Tuesday)	30-11-2022 (Wednesday)	01-12-2022 (Thursday)	02-12-2022 (Friday)
SUBJECTS	MEDICINAL CHEMISTRY-II (BP501T)	INDUSTRIAL PHARMACY – I (BP502T)	PHARMACOLOGY-II (BP503T)	PHARMACOGNOSY AND PHYTOCHEMISTRY-II (BP504T)	PHARMACEUTICAL JURISPRUDENCE (BP505T)

- NOTE:** (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- (iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**DATE: 17-11-2022**

**Controller of Examinations**



**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**III B.PHARMACY II SEM. (PCI)**



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**

UNIVERSITY EXAMINATION CENTER, KAKINADA

**III B. PHARMACY II SEMESTER (PCI REGULATION) I MID EXAMINATIONS, MARCH - 2023**

**TIME TABLE**

DATE	13-03-2023 (Monday)	14-03-2023 (Tuesday)	15-03-2023 (Wednesday)	16-03-2023 (Thursday)	17-03-2023 (Friday)	18-03-2023 (Saturday)
SUBJECTS	Medicinal Chemistry III (BP601T)	Pharmacology III (BP602T)	Herbal Drug Technology (BP603T)	Biopharmaceutics and Pharmacokinetics (BP604T)	Pharmaceutical Biotechnology (BP605T)	Quality Assurance (BP606T)

- NOTE:** (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- (iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**DATE: 07-03-2023**

*H. R. Kic*

**Controller of Examinations**



*[Signature]*  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**III B. PHARMACY II SEM. (PCI)**



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**

UNIVERSITY EXAMINATION CENTER, KAKINADA

**III B. PHARMACY II SEMESTER (PCI REGULATION) II MID EXAMINATIONS, MAY - 2023**

**TIME TABLE**

DATE	08-05-2023 (Monday)	09-05-2023 (Tuesday)	10-05-2023 (Wednesday)	11-05-2023 (Thursday)	12-05-2023 (Friday)	15-05-2023 (Monday)
SUBJECTS	Medicinal Chemistry III (BP601T)	Pharmacology III (BP602T)	Herbal Drug Technology (BP603T)	Biopharmaceutics and Pharmacokinetics (BP604T)	Pharmaceutical Biotechnology (BP605T)	Quality Assurance (BP606T)

- NOTE:** (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- (iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

*H. R. Kic*

**DATE: 24-04-2023**

**Controller of Examinations**



*Avanthi*  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**UNIVERSITY EXAMINATION CENTER, KAKINADA**

**IV B.PHARMACY I SEMESTER (PCI) I MID EXAMINATIONS, SEPTEMBER - 2022**

**T I M E T A B L E**

**TIME: 10.00 AM TO 12.00 NOON**

COURSE	DATE & DAY			
	06-09-2022 (Tuesday)	07-09-2022 (Wednesday)	08-09-2022 (Thursday)	09-09-2022 (Friday)
SUBJECTS	Instrumental Methods of Analysis (BP701T)	Industrial Pharmacy II (BP702T)	Pharmacy Practice (BP703T)	Novel Drug Delivery System (BP704T)

- NOTE:**
- (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
  - (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
  - (iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**DATE: 02-09-2022**

**Controller of Examinations**



**PRINCIPAL**  
**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
UNIVERSITY EXAMINATION CENTER, KAKINADA

**IV B.PHARMACY I SEMESTER (PCI) II MID EXAMINATIONS, OCTOBER/NOVEMBER - 2022**

**TIME TABLE**

**TIME: 10.00 AM TO 12.00 NOON**

COURSE	DATE & DAY			
	31-10-2022 (Monday)	01-11-2022 (Tuesday)	02-11-2022 (Wednesday)	03-11-2022 (Thursday)
SUBJECTS	Instrumental Methods of Analysis (BP701T)	Industrial Pharmacy II (BP702T)	Pharmacy Practice (BP703T)	Novel Drug Delivery System (BP704T)

- NOTE:**
- (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
  - (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
  - (iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**DATE: 27-10-2022**

**Controller of Examinations**



**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

UNIVERSITY EXAMINATION CENTER, KAKINADA

## IV B.PHARMACY II SEMESTER (PCI REGULATIONS) I MID EXAMINATIONS, APRIL - 2022

### T I M E T A B L E

TIME: 10.00 AM TO 12.00 NOON

DATE & DAY	PCI REGULATION
11.04.2022 (Monday)	Biostatistics and Research Methodology (BP801T)
12.04.2022 (Tuesday)	Social and Preventive Pharmacy (BP802T)
13.04.2022 (Wednesday)	Elective - I
16.04.2022 (Saturday)	Elective - II

#### NOTE

- (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- (iii) FOR ANY OTHER CLARIFICATION IN RESPECT OF THE ABOVE EXAMINATIONS PLEASE CONTACT CONTROLLER OF EXAMINATIONS /OR 9652300902.

DATE: 30-03-2022

Controller of Examinations



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

UNIVERSITY EXAMINATION CENTER, KAKINADA

## IV B.PHARMACY II SEMESTER (PCI REGULATIONS) II MID EXAMINATIONS, MAY/JUNE - 2022

### T I M E T A B L E

TIME: 10.00 AM TO 12.00 NOON

DATE & DAY	PCI REGULATION
30.05.2022 (Monday)	Biostatistics and Research Methodology (BP801T)
31.05.2022 (Tuesday)	Social and Preventive Pharmacy (BP802T)
01.06.2022 (Wednesday)	Elective - I
02.06.2022 (Thursday)	Elective - II

- NOTE**
- (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
  - (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
  - (iii) FOR ANY OTHER CLARIFICATION IN RESPECT OF THE ABOVE EXAMINATIONS PLEASE CONTACT CONTROLLER OF EXAMINATIONS /OR 9652300902.

DATE: 23-05-2022



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Controller of Examinations





# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

UNIVERSITY EXAMINATION CENTER, KAKINADA

## M. PHARMACY I SEMESTER (PCI REGULATION) IST I MID EXAMINATIONS, FEBRUARY - 2023

### TIME TABLE

TIME: 10:00 AM TO 12:00 NOON

BRANCH & SPECIALIZATION	06-02-2023 (Monday)	07-02-2023 (Tuesday)	08-02-2023 (Wednesday)	09-02-2023 (Thursday)
PHARMACEUTICS (03)	Modern Pharmaceutical Analytical Techniques (MPH101T)	Drug Delivery Systems (MPH102T)	Modern Pharmaceutics (MPH103T)	Regulatory Affairs (MPH104T)
PHARMACOLOGY (06)	Modern Pharmaceutical Analytical Techniques (MPL101T)	Advanced Pharmacology-I (MPL102T)	Pharmacological and Toxicological Screening Methods-I (MPL103T)	Cellular and Molecular Pharmacology (MPL104T)
PHARMACEUTICAL ANALYSIS (16)	Modern Pharmaceutical Analytical Techniques (MPA101T)	Advanced Pharmaceutical Analysis (MPA102T)	Pharmaceutical Validation (MPA103T)	Food Analysis (MPA104T)

- NOTE: (i) If Government declares holiday on any of the above dates, the examinations will be conducted as usual  
(ii) Any omissions or clashes in this Time Table may please be informed to the Controller of Examinations immediately.  
(iii) The Principals are requested to inform the University, if any other substitute subjects that are not included in the above time table immediately

Date: 27-01-2023



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Controller of Examinations (PG)



# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

UNIVERSITY EXAMINATION CENTER, KAKINADA

## M. PHARMACY I SEMESTER (PCI REGULATION) IST II MID EXAMINATIONS, APRIL - 2023

### TIME TABLE

TIME: 10:00 AM TO 12:00 NOON

BRANCH & SPECIALIZATION	03-04-2023 (Monday)	06-04-2023 (Thursday)	10-04-2023 (Monday)	11-04-2023 (Tuesday)
<b>PHARMACEUTICS (03)</b>	Modern Pharmaceutical Analytical Techniques (MPH101T)	Drug Delivery Systems (MPH102T)	Modern Pharmaceutics (MPH103T)	Regulatory Affairs (MPH104T)
<b>PHARMACOLGY (06)</b>	Modern Pharmaceutical Analytical Techniques (MPL101T)	Advanced Pharmacology-I (MPL102T)	Pharmacological and Toxicological Screening Methods-I (MPL103T)	Cellular and Molecular Pharmacology (MPL104T)
<b>PHARMACEUTICAL ANALYSIS (16)</b>	Modern Pharmaceutical Analytical Techniques (MPA101T)	Advanced Pharmaceutical Analysis (MPA102T)	Pharmaceutical Validation (MPA103T)	Food Analysis (MPA104T)

- NOTE: (i) If Government declares holiday on any of the above dates, the examinations will be conducted as usual.  
(ii) Any omissions or clashes in this Time Table may please be informed to the Controller of Examinations immediately.  
(iii) The Principals are requested to inform the University, if any other substitute subjects that are not included in the above time table immediately

Date: 28-03-2023

Controller of Examinations (PG)



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

UNIVERSITY EXAMINATION CENTER, KAKINADA

## M. Pharmacy II SEMESTER IST (PCI REGULATION) I MID EXAMINATIONS, JUNE - 2023


### TIME TABLE

TIME : 10.00 AM TO 12.00 NOON


BRANCH & SPECIALIZATION	26-06-2023 (Monday)	27-06-2023 (Tuesday)	28-06-2023 (Wednesday)	30-06-2023 (Friday)
Pharmaceutics (03)	Molecular Pharmaceutics (MPH201T)	Advanced Bio pharmaceutics & Pharmacokinetics (MPH202T)	Computer Aided Drug Development (MPH203T)	Formulation Development of Pharmaceutical and Cosmetic Products (MPH204T)
Pharmaceutical Analysis (16)	Advanced Instrumental Analysis (MPA201T)	Modern Bio-Analytical Techniques (MPA202T)	Quality Control and Quality Assurance (MPA203T)	Herbal and Cosmetic Analysis (MPA204T)
Pharmacology (06)	Advanced Pharmacology – II (MPL201T)	Pharmacology and Toxicology Screening methods- II (MPL202T)	Principles of Drug Discovery (MPL203T)	Clinical Research and Pharmacovigilance (MPL204T)

- NOTE: (i) If Government declares holiday on any of the above dates, the examinations will be conducted as usual  
(ii) Any omissions or clashes in this Time Table may please be informed to the Controller of Examinations immediately.  
(iii) The Principals are requested to inform the University, if any other substitute subjects that are not included in the above time table immediately.

Date: 13-06-2023

  
Controller of Examinations (PG)



  
PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
UNIVERSITY EXAMINATION CENTER, KAKINADA

**M. Pharmacy II SEMESTER IST (PCI REGULATION) II MID EXAMINATIONS. AUGUST - 2023**

**REVISED TIME TABLE**

**TIME : 10.00 AM TO 12.00 NOON**

<b>BRANCH &amp; SPECIALIZATION</b>	<b>17-08-2023 (Thursday)</b>	<b>18-08-2023 (Friday)</b>	<b>19-08-2023 (Saturday)</b>	<b>21-08-2023 (Monday)</b>
<b>Pharmaceutics (03)</b>	Molecular Pharmaceutics (MPH201T)	Advanced Bio pharmaceutics & Pharmacokinetics (MPH202T)	Computer Aided Drug Development (MPH203T)	Formulation Development of Pharmaceutical and Cosmetic Products (MPH204T)
<b>Pharmaceutical Analysis (16)</b>	Advanced Instrumental Analysis (MPA201T)	Modern Bio-Analytical Techniques (MPA202T)	Quality Control and Quality Assurance (MPA203T)	Herbal and Cosmetic Analysis (MPA204T)
<b>Pharmacology (06)</b>	Advanced Pharmacology – II (MPL201T)	Pharmacology and Toxicology Screening methods- II (MPL202T)	Principles of Drug Discovery (MPL203T)	Clinical Research and Pharmacovigilance (MPL204T)

- NOTE: i) If Government declares holiday on any of the above dates, the examinations will be conducted as usual  
(ii) Any omissions or clashes in this Time Table may please be informed to the Controller of Examinations immediately.  
(iii) The Principals are requested to inform the University, if any other substitute subjects that are not included in the above time table immediately.

Date: 16-08-2023

Controller of Examinations (PG)



**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





Date: 27-02-2023

**CIRCULAR**

**I B PHARM, I SEMESTER, I MID MARCH 2023**

First Midterm Examination for I B Pharmacy I semester will commence from 06<sup>th</sup> March 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

**TIME TABLE**

S.No	DATE	SUBJECT
1.	06-03-2023	Human Anatomy and Physiology- I
2.	07-03-2023	Pharmaceutical Analysis I
3.	09-03-2023	Pharmaceutics- I
4.	10-03-2023	Pharmaceutical Inorganic Chemistry
<b>DESCRIPTIVE EXAM</b>		
<b>EXAM TIMINGS -10 A.M – 12 P.M</b>		



  
**Principal**

**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Date: 24-04-2023

**CIRCULAR**

**I B PHARM, I SEMESTER, II MID MAY 2023**

Second Midterm Examination for I B Pharmacy II semester will commence from 01 May 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

**TIME TABLE**

S.No.	DATE	SUBJECT
1.	01-05-2023	Human Anatomy and Physiology- I
2.	02-05-2023	Pharmaceutical Analysis -I
3.	03-05-2023	Pharmaceutics- I
4.	04-05-2023	Pharmaceutical Inorganic Chemistry
<b>DESCRIPTIVE EXAM</b>		
<b>EXAM TIMINGS: 10 A.M – 12 P.M</b>		



**Principal**

**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 10-07-2023

## CIRCULAR

### I B PHARM, II SEMESTER, I MID JULY 2023

First Midterm Examination for I B Pharmacy II semester will commence from 17 July 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

## TIME TABLE

S.No	DATE	SUBJECT
1.	17-07-2023	Human Anatomy and Physiology II
2.	18-07-2023	Pharmaceutical Organic Chemistry I
3.	19-07-2023	Biochemistry
4.	20-07-2023	Pathophysiology
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 10.07.2023

## CIRCULAR

### I B PHARM. II SEMESTER. II MID MARCH 2023

Second Midterm Examination for I B Pharmacy II semester will commence from 11 November 2022 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

## TIME TABLE

S.No	DATE	SUBJECT
1.	11-11-2022	Human Anatomy and Physiology II
2.	12-11-2022	Pharmaceutical Organic Chemistry I
3.	13-11-2022	Biochemistry
4.	14-11-2022	Pathophysiology
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram) Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 10-12-2022

## CIRCULAR

### II BPHARM, I SEMESTER I MID DECEMBER 2022

First Midterm Examination for II B Pharmacy I semester will commence from 26<sup>th</sup> December 2022 as per the schedule. Faculties of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

## TIME TABLE

S. No	DATE	SUBJECT
1.	26-12-2022	Pharmaceutical Organic Chemistry II
2.	27-12-2022	Physical Pharmaceutics I
3.	28-12-2022	Pharmaceutical Microbiology
4.	29-12-2022	Pharmaceutical Engineering
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
Principal

PRINCIPAL  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Date: 13-02-2023

**CIRCULAR**

**II B PHARM, I SEMESTER, II MID FEBRUARY 2023**

Second Midterm Examination for II B Pharmacy I semester will commence from 20 February 2023 as per the schedule. Faculties of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations

**TIME TABLE**

S.No	DATE	SUBJECT
1.	20-02-2023	Pharmaceutical Organic Chemistry II
2.	21-02-2023	Physical Pharmaceutics I
3.	22-02-2023	Pharmaceutical Microbiology
4.	23-02-2023	Pharmaceutical Engineering
<b>DESCRIPTIVE EXAM</b>		
<b>EXAM TIMINGS: 10 A.M – 12 P.M</b>		



**Principal**

**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





Date: 01-05-2023

**CIRCULAR**

**II B PHARM. II SEMESTER. I MID. MAY 2023**

First Midterm Examination for II B Pharmacy II semester will commence from 08<sup>th</sup> May 2023 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

**TIME TABLE**

S. No	DATE	SUBJECT
1.	8-5-2023	Pharmaceutical Organic Chemistry- III
2.	9-5-2023	Medicinal Chemistry- I
3.	10-5-2023	Physical Pharmaceutics- II
4.	11-5-2023	Pharmacology- I
5.	12-5-2023	Pharmacognosy and Phytochemistry - I
<b>DESCRIPTIVE EXAM</b>		
<b>EXAM TIMINGS: 10 A.M – 12 P.M</b>		



**Principal**  
**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 26-06-2023

## CIRCULAR

### II B PHARM, II SEMESTER, II MID JULY 2023

Second Midterm Examination for II B Pharmacy II semester will commence from 03 July 2023 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIMETABLE

S. No	DATE	SUBJECT
1.	03-07-2023	Pharmaceutical Organic Chemistry -III
2.	04-07-2023	Medicinal Chemistry I
3.	05-07-2023	Physical Pharmaceutics -II
4.	06-07-2023	Pharmacology- I
5.	07-07-2023	Pharmacognosy and Phytochemistry I
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
**Principal**

**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 19-09-2022

## CIRCULAR

### II B PHARM. I SEMESTER. I MID. SEPTEMBER 2022

First Midterm Examination for III B Pharmacy I semester will commence from 26<sup>th</sup> September 2022 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

## TIMETABLE

S. No	DATE	SUBJECT
1	26-09-2022	Medicinal Chemistry- II
2	27-09-2022	Industrial Pharmacy -I
3	28-09-2022	Pharmacology- II
4	29-09-2022	Pharmacognosy and Phytochemistry II
5	30-09-2022	Pharmaceutical Jurisprudence
DESCRIPTIVE EXAM		
EXAM TIMINGS : 10 A.M – 12 P.M		



  
**Principal**  
**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 21-11-2022

## CIRCULAR

### III B PHARM. I SEMESTER. II MID NOVEMBER 2022

Second Midterm Examination for III B Pharmacy I semester will commence from 28th November 2022 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

## TIME TABLE

S.No	DATE	SUBJECT
1.	28-11-2022	Medicinal Chemistry II
2.	29-11-2022	Industrial Pharmacy I
3.	30-11-2022	Pharmacology II
4.	01-12-2022	Pharmacognosy and Phytochemistry II
5.	02-12-2022	Pharmaceutical Jurisprudence
DESCRIPTIVE EXAM		
EXAM TIMINGS : 10 A.M – 12 P.M		



  
Principal  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 20-02-2023

## CIRCULAR

### IIB PHARM. II SEMESTER, I MID FEBRUARY 2023

First Midterm Examination for III B Pharmacy II semester will commence from 27<sup>th</sup> February 2023 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

## TIME TABLE

S. No.	DATE	SUBJECT
1.	27-02-2023	Medicinal Chemistry III
2.	28-02-2023	Pharmacology III
3.	01-03-2023	Herbal Drug Technology
4.	02-03-2023	Biopharmaceutics and Pharmacokinetics
5.	03-03-2023	Pharmaceutical Biotechnology
6.	04-03-2023	Quality Assurance
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 24-04-2023

## CIRCULAR

### III B PHARM. II SEMESTER. II MID MAY 2023

Second Midterm Examination for III B Pharmacy II semester will commence from 01 May 2023 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

## TIME TABLE

S. No.	DATE	SUBJECT
1.	01-05-2023	Medicinal Chemistry -III
2.	02-05-2023	Pharmacology III
3.	03-05-2023	Herbal Drug Technology
4.	04 05 2023	Biopharmaceutics and Pharmacokinetics
5.	05-05-2023	Pharmaceutical Biotechnology
6.	06-05-2023	Quality Assurance
DESCRIPTIVE EXAM		
EXAM TIMINGS : 10 A.M – 12 P.M		



  
Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 22-08-2022

## CIRCULAR

### IV B PHARM. I SEMESTER, I MID AUGUST 2022

First Midterm Examination for IV B Pharmacy I semester will commence from 29 August 2022 as per the schedule. Faculty of respective subjects are instructed to submit softcopy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

## TIME TABLE

S. No	DATE	SUBJECT
1	29-08-2022	Instrumental Methods of Analysis
2	30-08-2022	Industrial Pharmacy II
3	31-08-2022	Pharmacy Practice
4	01-09-2022	Novel Drug Delivery Systems
DESCRIPTIVE EXAM		
EXAM TIMINGS : 10 A.M – 12 P.M		



  
Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 25-10-2022

## CIRCULAR

### III B PHARM. I SEMESTER, II MID NOVEMBER 2022

Second Midterm Examination for IV B Pharmacy I semester will commence from 31 October 2022 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIME TABLE

S. No	DATE	SUBJECT
1	31-10-2022	Instrumental Methods of Analysis
2	01-11-2022	Industrial Pharmacy II
3	02-11-2022	Pharmacy Practice
4	03-11-2022	Novel Drug Delivery Systems
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date:04 -04-2022

## CIRCULAR

### IV B PHARM. II SEMESTER, I MID APRIL 2022

First Midterm Examination for IV B Pharmacy II semester will commence from 11 April 2022 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

## TIME TABLE

S. No	DATE	SUBJECT
1.	11-04-2022	Biostatistics and Research Methodology
2.	12-04-2022	Social and Preventive Pharmacy
3.	13-04-2022	Elective - I
4.	16 04 2022	Elective - II
DESCRIPTIVE EXAM		
EXAM TIMINGS : 10 A.M – 12 P.M		



  
Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal

Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E., P.C.I, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 23-05-2022

## CIRCULAR

### IV B PHARM. II SEMESTER. II MID. MAY 2022

Second Midterm Examination for IV B Pharmacy II semester will commence from 30 May 2022 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIME TABLE

S. No	DATE	SUBJECT
1.	03-05-2022	Biostatistics and Research Methodology
2.	31-05-2022	Social and Preventive Pharmacy
3.	01-06-2022	Elective - I
4.	02-06-2022	Elective - II
DESCRIPTIVE EXAM		
EXAM TIMINGS : 10 A.M – 12 P.M		



  
Principal

PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 30-01-2023

### CIRCULAR

#### I M PHARM, I SEMESTER, I MID FEBRUARY 2023

First Midterm Examination for I M Pharmacy I semester will commence from 06 February 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

#### PHARMACEUTICS TIMETABLES

S.NO	DATE	SUBJECT
1.	06-02-2023	MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
2.	07-02-2023	DRUG DELIVERY SYSTEM
3.	08-02-2023	MODERN PHARMACEUTICS
4.	09-02-2023	REGULATORY AFFAIRS
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanathi Institute of Pharmaceutical Sciences



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 30-01-2023

### CIRCULAR

#### I M PHARM, I SEMESTER, I MID FEBRUARY 2023

First Midterm Examination for I M Pharmacy I semester will commence from 06 February 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

#### PHARMACOLOGY TIMETABLE

S.NO	DATE	SUBJECT
1.	06-02-2023	MODERN PHARMACEUTICAL ANALYSIS TEHCNIQUES
2.	07-02-2023	ADVANCED PHARMACOLOGY-1
3.	08-02-2023	PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS-1
4.	09-02-2023	CELLULAR AND MOLECULAR PHARMACOLOGY
DESCRIPTIVE EXAM		
EXAM TIMINGS : 10 A.M - 12 P.M		



  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanathi Institute of Pharmaceutical Sciences





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, Recognized by the Govt. of A.P. & Affiliated to JNUIU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 14-02-2023

### CIRCULAR

#### I M PHARM, I SEMESTER, I MID FEBRUARY 2023

First Midterm Examination for I M Pharmacy I semester will commence from 21 February 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

#### PHARMACEUTICAL ANALYSIS TIMETABLES

S.NO	DATE	SUBJECT
1.	06-02-2023	MODERN PHARMACEUTICAL ANALYSIS TECHNIQUES
2.	07-02-2023	ADVANCED PHARMACEUTICAL ANALYSIS
3.	08-02-2023	PHARMACEUTICAL VALIDATION
4.	09-02-2023	FOOD ANALYSIS
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanathi Institute of Pharmaceutical Sciences



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 27-03-2023

### CIRCULAR

#### I M PHARM, I SEMESTER, II MID APRIL 2023

Second Midterm Examination for I M Pharmacy I semester will commence from 03 April 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

#### PHARMACEUTICS TIMETABLES

S.NO	DATE	SUBJECT
1.	03-04-2023	MODERN PHARMACEUTICAL ANALYSIS TECHNIQUES
2.	06-04-2023	DRUG DELIVERY SYSTEM
3.	10-04-2023	MODERN PHARMACEUTICS
4.	11-04-2023	REGULATORY AFFAIRS
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 27-03-2023

### CIRCULAR

#### I M PHARM, I SEMESTER, II MID APRIL 2023

Second Midterm Examination for I M Pharmacy I semester will commence from 03 April 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

#### PHARMACOLOGY TIMETABLES

S.NO	DATE	SUBJECT
1.	03-04-2023	MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES
2.	06-04-2023	ADVANCED PHARMACOLOGY-1
3.	10-04-2023	PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS-1
4.	11-04-2023	CELLULAR AND MOLECULAR PHARMACOLOGY
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
Principal  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanathi Institute of Pharmaceutical Sciences



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 27-03-2023

### CIRCULAR

#### I M PHARM, I SEMESTER, II MID APRIL 2023

Second Midterm Examination for I M Pharmacy I semester will commence from 03 April 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

#### PHARMACEUTICAL ANALYSIS EXAM TIMETABLE

S.NO	DATE	SUBJECT
1.	03-04-2023	MODERN PHARMACEUTICAL ANALYSIS TECHNIQUES
2.	06-04-2023	ADVANCED PHARMACEUTICAL ANALYSIS
3.	10-04-2023	PHARMACEUTICAL VALIDATION
4.	11-04-2023	FOOD ANALYSIS
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 19-06-2023

### CIRCULAR

#### I M PHARM, II SEMESTER, I MID JUNE 2023

First Midterm Examination for I M Pharmacy II semester will commence from 26 June 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

#### PHARMACEUTICS EXAM TIMETABLES

S.NO	DATE	SUBJECT
1.	26-06-2023	MOLECULAR PHARMACEUTICS
2.	27-06-2023	ADVANCED BIO PHARMACEUTICS AND PHARMACOKINETICS
3.	28-06-2023	COMPUTER AIDED DRUG DEVELOPMENT
4.	30-06-2023	FORMULATION DEVELOPMENT OF PHARMACEUTICAL COSMETIC PRODUCTS
DESCRIPTIVE EXAM		
EXAM TIMINGS : 10 A.M – 12 P.M		



  
**Principal**  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 19-06-2023

### CIRCULAR

#### I M PHARM, II SEMESTER, I MID JUNE 2023

First Midterm Examination for I M Pharmacy II semester will commence from 26 June 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

#### PHARMACOLOGY EXAM TIMETABLE

S.NO	DATE	SUBJECT
1.	26-06-2023	ADVANCED PHARMACOLOGY-II
2.	27-06-2023	PHARMACOLOGY AND TOXICOLOGY SCREENING METHODS-II
3.	28-06-2023	PRINCIPLES OF DRUG DISCOVERY
4.	30-06-2023	CLINICAL RESERCH AND PHARMACOVIGILANCE
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
**Principal**  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 19 -06-2023

### CIRCULAR

#### I M PHARM, II SEMESTER, I MID MARCH 2023

First Midterm Examination for I M Pharmacy II semester will commence from 26 June 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

#### PHARMACEUTICAL ANALYSIS TIMETABLES

S.NO	DATE	SUBJECT
1.	26-06-2023	ADVANCED INSTRUMENTAL ANALYSIS
2.	27-06-2023	MODERN BIO-ANALYTICAL TECHNIQUES
3.	28-06-2023	QUALITY CONTROL AND QUALITY ASSURANCE
4.	30-06-2023	HERBAL AND COSMETIC ANALYSIS
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanathi Institute of Pharmaceutical Sciences



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 10-08-2023

### CIRCULAR

#### I M PHARM, II SEMESTER, II MID AUGUST 2023

Second Midterm Examination for I M Pharmacy II semester will commence from 17 August 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

#### PHARMACEUTICS EXAM TIMETABLE

S.NO	DATE	SUBJECT
1.	17-08-2023	MOLECULAR PHARMACEUTICS
2.	18-08-2023	ADVANCED BIO PHARMACEUTICS AND PHARMACOKINETICS
3.	19-08-2023	COMPUTER AIDED DRUG DEVELOPMENT
4.	21-08-2023	FORMULATION DEVELOPMENT OF PHARMACEUTICAL COSMETIC PRODUCTS
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
Principal  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanathi Institute of Pharmaceutical Sciences





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 10-08-2023

### CIRCULAR

#### I M PHARM, II SEMESTER, II MID AUGUST 2023

Second Midterm Examination for I M Pharmacy II semester will commence from 17 August 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

#### PHARMACOLOGY EXAM TIMETABLE

S.NO	DATE	SUBJECT
1.	17-08-2023	ADVANCED PHARMACOLOGY-II
2.	18-08-2023	PHARMACOLOGY AND TOXICOLOGY SCREENING METHODS-II
3.	19-08-2023	PRINCIPLES OF DRUG DISCOVERY
4.	21-08-2023	CLINICAL RESEARCH AND PHARMACOVIGILANCE
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
**Principal**  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 10-08-2023

## CIRCULAR

### I M PHARM, II SEMESTER, II MID AUGUST 2023

Second Midterm Examination for I M Pharmacy II semester will commence from 17 August 2023 as per the schedule. Faculty of respective subjects is instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### PHARMACEUTICAL ANALYSIS EXAM TIMETABLE

S.NO	DATE	SUBJECT
1.	17-08-2023	ADVANCED INSTRUMENTAL ANALYSIS
2.	18-08-2023	MODERN BIO-ANALYTICAL TECHNIQUES
3.	19-08-2023	QUALITY CONTROL AND QUALITY ASSURANCE
4.	21-08-2023	HERBAL AND COSMETIC ANALYSIS
DESCRIPTIVE EXAM		
EXAM TIMINGS: 10 A.M – 12 P.M		



  
Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanthi Institute of Pharmaceutical Sciences





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.J.C. I.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 06-03-2023

### CIRCULAR

### I PHARM.D I MID JANUARY 2023

First Midterm Examination for I PharmD will commence from 13 January 2023 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIMETABLE

S. No	DATE	SUBJECT
1.	13-03-2023	HUMAN ANATOMY AND PHYSIOLOGY
2.	14-03-2023	PHARMACEUTICS
3.	15-03-2023	MEDICINAL BIOCHEMISTRY
4.	16-03-2023	PH.ORGANIC CHEMISTRY
5.	17-03-2023	PH.INORGANIC CHEMISTRY
6.	18-03-2023	REMEDIAL MATHEMATICS /BIOLOGY
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		



  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

Avanathi Institute of Pharmaceutical Sciences



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 29-05-2023

### CIRCULAR

### I PHARM.D II MID JUNE 2023

Second Midterm Examination for I PharmD will commence from 05 June 2023 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIMETABLE

S. No	DATE	SUBJECT
1.	05-06-2023	HUMAN ANATOMY AND PHYSIOLOGY
2.	06-06-2023	PHARMACEUTICS
3.	07-06-2023	MEDICINAL BIOCHEMISTRY
4.	08-06-2023	PH.ORGANIC CHEMISTRY
5.	09-06-2023	PH.INORGANIC CHEMISTRY
6.	10-06-2023	REMEDIAL MATHEMATICS /BIOLOGY
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		

Principal  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Avanthi Institute of Pharmaceutical Sciences





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 21-08-2023

### CIRCULAR

#### I PHARM.D III MID AUGUST 2023

Third Midterm Examination for I Pharma D will commence from 28 August 2023 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately

#### TIME TABLE

S. No	DATE	SUBJECT
1.	28-08-2023	HUMAN ANATOMY AND PHYSIOLOGY
2.	29-08-2023	PHARMACEUTICS
3.	30-08-2023	MEDICINAL BIOCHEMISTRY
4.	31-08-2023	PH.ORGANIC CHEMISTRY
5.	01-09-2023	PH. INORGANIC CHEMISTRY
6.	02-09-2023	REMEDIAL MATHEMATICS /BIOLOGY
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		



  
Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 16-01-2023

### CIRCULAR

### II PHARM.D I MID JANUARY 2023

First Midterm Examination for II Pharm D will commence from 23 January 2023 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIMETABLE

S. No	DATE	SUBJECT
1.	23-01-2023	PATHOPHYSIOLOGY
2.	24-01-2023	PHARMACEUTICAL MICROBIOLOGY
3.	25-01-2023	PHARMACOGNOSY AND PHYTOPHARMACEUTICALS
4.	27-01-2023	PHARMACOLOGY-I
5.	28-01-2023	COMMUNITY PHARMACY
6.	29-03-2023	PHARMACOTHERAPEUTICS-I
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		



  
Principal  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date:10-04-2023

### CIRCULAR

### II PHARM.D II MID APRIL 2023

Second Midterm Examination for II Pharm D will commence from 17 April 2023 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIMETABLE

S. No	DATE	SUBJECT
1.	17-04-2023	PATHOPHYSIOLOGY
2.	18-04-2023	PHARMACEUTICAL MICROBIOLOGY
3.	19-04-2023	PHARMACOGNOSY AND PHYTOPHARMACEUTICALS
4.	20-04-2023	PHARMACOLOGY-I
5.	21-04-2023	COMMUNITY PHARMACY
6.	24-04-2023	PHARMACOTHERAPEUTICS-I
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		



  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C. I.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date: 24-10-2022

### CIRCULAR

### III PHARM.D I MID OCTOBER 2022

First Midterm Examination for III Pharm D will commence from 31 October 2022 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIMETABLE

S. No	DATE	SUBJECT
1.	31-10-2022	PHARMACOLOGY-II
2.	01-11-2022	PHARMACEUTICAL ANALYSIS
3.	02-11-2022	PHARMACOTHERAPEUTICS-II
4.	03-11-2022	PHARMACEUTICAL JURISPRUDENCE
5.	04-11-2022	MEDICINAL CHEMISTRY
6.	05-11-2022	PHARMACEUTICAL FORMULATIONS
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		





Principal  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt. - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date:16-01-2022

### CIRCULAR

#### III PHARM.D II MID JANUARY 2022

Second Midterm Examination for III Pharm D will commence from 23 January 2022 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIMETABLE

S. No	DATE	SUBJECT
1.	23-01-2023	PHARMACOLOGY-II
2.	24-01-2023	PHARMACEUTICAL ANALYSIS
3.	25-01-2023	PHARMACOTHERAPEUTICS-II
4.	27-01-2023	PHARMACEUTICAL JURISPRUDENCE
5.	28-01-2023	MEDICINAL CHEMISTRY
6.	29-03-2023	PHARMACEUTICAL FORMULATIONS
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		





Principal  
PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES**  
(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date:10-04-2023

**CIRCULAR**

**III PHARM.D III MIDAPRIL 2023**

Third Midterm Examination for III Pharm D will commence from 17 April 2023 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

**TIMETABLE**

S. No	DATE	SUBJECT
1.	17-04-2023	PHARMACOLOGY-II
2.	18-04-2023	PHARMACEUTICAL ANALYSIS
3.	19-04-2023	PHARMACOTHERAPEUTICS-II
4.	20-04-2023	PHARMACEUTICAL JURISPRUDENCE
5.	21-04-2023	MEDICINAL CHEMISTRY
6.	22-04-2023	PHARMACEUTICAL FORMULATIONS
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		



  
Principal

PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.J.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date:10-04-2022

### CIRCULAR

### IV PHARM.D I MID OCTOBER2022

First Midterm Examination for IV Pharm D will commence from 31 October 2022 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIMETABLE

S. No	DATE	SUBJECT
1.	31-10-2022	PHARMACOTHERAPEUTICS -III
2.	01-11-2022	HOSPITAL PHARMACY
3.	02-11-2022	CLINICAL PHARMACY
4.	03-11-2022	BIOSTATISTICS AND RESEARCH METHODOLOGY
5.	04-11-2022	BIOPHARMACEUTICS AND PHARMCOKINETICS
6.	05-11-2022	CLINICAL TOXICOLOGY
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		



  
Principal

PRINCIPAL  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E., PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date:16-01-2023

### CIRCULAR

#### IV PHARM.D II MIDJANUARY 2023

Second Midterm Examination for IV Pharm D will commence from 23 January 2022 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIMETABLE

S. No	DATE	SUBJECT
1.	23-01-2023	PHARMACOTHERAPEUTICS -III
2.	24-01-2023	HOSPITAL PHARMACY
3.	25-01-2023	CLINICAL PHARMACY
4.	27-01-2023	BIostatISTICS AND RESEARCH METHODOLOGY
5.	28-01-2023	BIOPHARMACEUTICS AND PHARMCOKINETICS
6.	29-03-2023	CLINICAL TOXICOLOGY
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		



  
Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date:16-01-2023

### CIRCULAR

#### IV PHARM.D III MID APRIL 2023

Third Midterm Examination for IV Pharm D will commence from 17 April 2023 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIMETABLE

S. No	DATE	SUBJECT
1.	17-04-2023	PHARMACOTHERAPEUTICS -III
2.	18-04-2023	HOSPITAL PHARMACY
3.	19-04-2023	CLINICAL PHARMACY
4.	20-04-2023	BIOSTATISTICS AND RESEARCH METHODOLOGY
5.	21-04-2023	BIOPHARMACEUTICS AND PHARMACOKINETICS
6.	22-04-2023	CLINICAL TOXICOLOGY
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		

Principal  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date:24-10-2023

### CIRCULAR

### V PHARM.D I MID OCTOBER 2022

Second Midterm Examination for IV Pharm D will commence from 31 October 2022 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIMETABLE

S. No	DATE	SUBJECT
1.	31-10-2022	CLINICAL RESEARCH
2.	01-11-2022	PHARMACOEPIDIMIOLOGY AND PHARMACOECONOMICS
3.	02-11-2022	CLINICAL PHARMACOKINETICS AND PHARMCOTHERAPEUTIC DRUG MONITORING
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		



  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date:16-01-2023

### CIRCULAR

### V PHARM.D II MIDJANUARY 2023

Second Midterm Examination for V Pharm D will commence from 23 January 2022 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIMETABLE

S. No	DATE	SUBJECT
1.	23-01-2023	CLINICAL RESEARCH
2.	24-01-2023	PHARMACOEPIDIMIOLOGY AND PHARMACOECONOMICS
3.	25-01-2023	CLINICAL PHARMACOKINETICS AND PHARMCO THERAPEUTIC DRUG MONITORING
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		



Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences

Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTU-GV, Vizianagaram)

Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

Date:11-04-2023

### CIRCULAR

### V PHARM.D III MID APRIL 2023

Third Midterm Examination for V Pharm D will commence from 17 April 2023 as per the schedule. Faculty of respective subjects are instructed to submit soft copy of the question paper at least one day before examination. Students shall consult teachers in their respective subject for the syllabus of the examination. Lab internal exam will be conducted immediately after theory mid examinations.

### TIMETABLE

S. No	DATE	SUBJECT
1.	17-04-2023	CLINICAL RESEARCH
2.	18-04-2023	PHARMACOEPIDIMIOLOGY AND PHARMACOECONOMICS
3.	19-04-2023	CLINICAL PHARMACOKINETICS AND PHARMCOTHERAPEUTIC DRUG MONITORING
DESCRIPTIVE EXAM		
EXAM TIMINGS – 10AM -12PM		



Principal  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA

UNIVERSITY EXAMINATION CENTER, KAKINADA

**I B. PHARMACY I SEM.**

## **I B. PHARMACY - I SEMESTER (PCI, R16, R13) REGULAR/SUPPLEMENTARY EXAMINATIONS, MAY - 2023**

### **TIME TABLE**

**TIME: 10.00 AM TO 01.00 PM**

<b>DATES</b>	<b>PCI REGULATION</b>	<b>R16 REGULATION</b>	<b>R13 REGULATION</b>
<b>16-05-2023 (Tuesday)</b>	Human Anatomy and Physiology-I (BP101T)	English (PHR16111)	English (B13101)
<b>18-05-2023 (Thursday)</b>	Pharmaceutical Analysis-I (BP102T)	Remedial Mathematics (PHR16112), Remedial Biology (PHR16113)	Remedial Mathematics – I (B13102), Remedial Biology – I (B13103)
<b>20-05-2023 (Saturday)</b>	Pharmaceutics-I (BP103T)	Human Anatomy & Physiology – I (PHR16114)	Human Anatomy & Physiology – I (B13104)
<b>23-05-2023 (Tuesday)</b>	Pharmaceutical Inorganic Chemistry (BP104T)	General & Dispensing Pharmacy (PHR16115)	Dispensing Pharmacy & Ethics (B13105)
<b>25-05-2023 (Thursday)</b>	---	Pharmaceutical Organic Chemistry-I (PHR16116)	Pharmaceutical Organic Chemistry – I (B13106)

**NOTE:** (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.  
(ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.  
(iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**DATE: 03-05-2023**



**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

*H. R. K. K.*

**Controller of Examinations**



# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

UNIVERSITY EXAMINATION CENTER, KAKINADA

## I B. PHARMACY II SEMESTER (PCI, R16, R13) REGULAR/SUPPLEMENTARY EXAMINATIONS, SEP/OCT - 2023

### T I M E T A B L E

TIME: 10.00 AM TO 01.00 PM

DATE & DAY	(PCI REGULATION) REGULAR/SUPPLEMENTARY	R16 REGULATION SUPPLEMENTARY	R13 REGULATION SUPPLEMENTARY
27-09-2023 (Wednesday)	Human Anatomy and Physiology-II (BP201T)	Human Anatomy & Physiology-II (PHR16121)	Human Anatomy & Physiology – II (B13204)
29-09-2023 (Friday)	Pharmaceutical Organic Chemistry-I (BP202T)	Pharm. Inorganic Chemistry (PHR16122)	Pharm. Inorganic Chemistry (B13201)
03-10-2023 (Tuesday)	Biochemistry (BP203T)	Pharm. Organic Chemistry-II (PHR16123)	Pharm. Organic Chemistry – II (B13205)
05-10-2023 (Thursday)	Pathophysiology (BP204T)	Physical Pharmacy-I (PHR16124)	Physical Pharmacy – I (B13202)
07-10-2023 (Saturday)	----	Computer Applications & Biostatistics (PHR16125)	Computer Applications & Biostatistics (B13203)

#### NOTE:

- ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE TIME TABLE IMMEDIATELY.

DATE: 19-09-2023



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

H. R. K. K.

Controller of Examinations (UG)





# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

UNIVERSITY EXAMINATION CENTER, KAKINADA

## II B.PHARMACY I SEMESTER (PCI.R16 & R13) REGULAR/SUPPLEMENTARY EXAMINATIONS, FEB/MAR - 2022

### TIME TABLE

TIME: 10.00 AM TO 01.00 PM

DATE & DAY	PCI REGULATION REGULAR/SUPPLEMENTARY	R16 REGULATION SUPPLEMENTARY	R13 REGULATION SUPPLEMENTARY
21-02-2022 (Monday)	PHARMACEUTICAL ORGANIC CHEMISTRY – II (BP301T)	PHARMACEUTICAL UNIT OPERATIONS-I (PHR16211)	PHARMACEUTICAL UNIT OPERATIONS – I (B132101)
23-02-2022 (Wednesday)	PHYSICAL PHARMACEUTICS – I (BP302T)	PHARMACEUTICAL BIOCHEMISTRY (PHR16212)	PHARMACOGNOSY – I (B132102)
25-02-2022 (Friday)	PHARMACEUTICAL MICROBIOLOGY (BP303T)	PHYSICAL PHARMACY-II (PHR16213)	PHYSICAL PHARMACY – II (B132103)
28-02-2022 (Monday)	PHARMACEUTICAL ENGINEERING (BP304T)	PHARMACEUTICAL MICROBIOLOGY (PHR16214)	PHARMACEUTICAL MICROBIOLOGY (B132104)
03-03-2022 (Thursday)	---	HEALTH EDUCATION & PATHOPHYSIOLOGY (PHR16215)	ENVIRONMENTAL SCIENCE (B132105)

### NOTE:

- ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

Date: 02-02-2022



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

*Control. a. Kalya*

Controller of Examinations

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**UNIVERSITY EXAMINATION CENTER, KAKINADA**

**TIME TABLE FOR II B.PHARMACY I SEMESTER ADITONAL SUBJECT FOR TRANSFER STUDENTS**  
**FROM R16 TO PCI REGULATIONS**

DATE OF EXAMINATION: 21-02-2022 (Monday)		TIME OF EXAMINATION: 10.00 AM TO 01.00 PM
Name of the Course	Already Studied Subject	Substitute Subject (PCI)
II B. Pharmacy I Semester	Physical Pharmaceutics-I	Biochemistry (PBP203T)

**NOTE:**

- ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

Date: 02-02-2022

*Robert A. Kelly*

Controller of Examinations



*h m*  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
**Cherukupally (V), Bhogapuram Mandal**  
**Vizianagaram Dt., - 531162**



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
**UNIVERSITY EXAMINATION CENTER, KAKINADA**

**TIME TABLE FOR II B.PHARMACY I SEMESTER ADDITIONAL SUBJECT FOR TRANSFER STUDENTS**  
**FROM R13 TO R16 REGULATIONS**

<b>DATE OF EXAMINATION: 21-02-2022 (Monday)</b>		<b>TIME OF EXAMINATION: 10.00 AM TO 01.00 PM</b>
<b>Name of the Course</b>	<b>Subject Already Studied</b>	<b>Substituted Subject</b>
<b>II B. Pharmacy I Semester</b>	----	<b>Computer Applications &amp; Biostatistics</b>

**TIME TABLE FOR II B.PHARMACY I SEMESTER SUBSTITUTE SUBJECT FOR READMITTED STUDENTS FROM R13**  
**REGULATIONS**

<b>DATE OF EXAMINATION: 03-03-2022 (Thursday)</b>		<b>TIME OF EXAMINATION: 10.00 AM TO 01.00 PM</b>
<b>Name of the Course</b>	<b>Subject Already Studied</b>	<b>Substituted Subject</b>
<b>II B. Pharmacy I Semester</b>	<b>Environmental Studies</b>	<b>Dispensing Pharmacy &amp; Ethics</b>

**NOTE:**


- ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**Date: 02-02-2022**



  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
**Cherukupally (V), Bhogapuram Mandal**  
**Vizianagaram Dt., - 531162**

  
**Controller of Examinations**

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA  
UNIVERSITY EXAMINATION CENTER, KAKINADA**

**TIME TABLE FOR II B. PHARMACY I SEMESTER ADDITIONAL SUBJECT FOR TRANSFER STUDENTS  
FROM R16 TO PCI REGULATIONS**

<b>DATE OF EXAMINATION: 03-03-2022 (Thursday)</b>		<b>TIME OF EXAMINATION: 10.00 AM TO 01.00 PM</b>
<b>Name of the Course</b>	<b>Already Studied Subject</b>	<b>Additional Subject (PCI)</b>
<b>II B. Pharmacy I Semester</b>	<b>Pharm. Organic Chemistry-II</b>	<b>Pathophysiology (ABP204T)</b>

**TIME TABLE FOR II B. PHARMACY I SEMESTER SUBSTITUTE SUBJECT FOR READMITTED STUDENTS  
FROM R16 TO PCI REGULATIONS**

<b>DATE OF EXAMINATION: 23-02-2022 (Wednesday)</b>		<b>TIME OF EXAMINATION: 10.00 AM TO 01.00 PM</b>
<b>Name of the Course</b>	<b>Already Studied Subject</b>	<b>Substitute Subject (PCI)</b>
<b>II B. Pharmacy I Semester</b>	<b>Pharm. Organic Chemistry-II</b>	<b>Pharmaceutical Analysis-I (PBP102T)</b>

**NOTE:**

- ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**Date: 02-02-2022**



*(Signature)*  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162**

*(Signature)*  
**Controller of Examinations**





**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
UNIVERSITY EXAMINATION CENTER, KAKINADA

**II B.PHARMACY II SEMESTER (PCI, R16 & R13) REGULAR/SUPPLEMENTARY EXAMINATIONS, JUNE/JULY - 2022**

**TIME TABLE**

**TIME: 10.00 AM TO 01.00 PM**

DATE & DAY	PCI REGULATION REGULAR/SUPPLEMENTARY	R16 REGULATION SUPPLEMENTARY	R13 REGULATION SUPPLEMENTARY
28-06-2022 (Tuesday)	PHARMACEUTICAL ORGANIC CHEMISTRY-III (BP401T)	PHARMACEUTICAL UNIT OPERATIONS – II (PHR16221)	PHARMACEUTICAL UNIT OPERATIONS – II (B132201)
30-06-2022 (Thursday)	MEDICINAL CHEMISTRY-I (BP402T)	PHARMACEUTICAL ANALYSIS - I (PHR161222)	PHARMACEUTICAL ANALYSIS – I (B132202)
02-07-2022 (Saturday)	PHYSICAL PHARMACEUTICS-II (BP403T)	PHARMACOGNOSY – I (PHR16223)	PHARMACOGNOSY – II (B132203)
05-07-2022 (Tuesday)	PHARMACOLOGY-I (BP404T)	MEDICINAL CHEMISTRY – I (PHR161224)	MEDICINAL CHEMISTRY – I (B132204)
07-07-2022 (Thursday)	PHARMACOGNOSY AND PHYTOCHEMISTRY-I (BP405T)	PHARMACOLOGY-I (PHR16225)	HEALTH EDUCATION & PATHOPHYSIOLOGY (B132205)

**NOTE:**

- ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE TIME TABLE IMMEDIATELY.

**DATE: 14-06-2022**



**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

*Robert. A. Kelly*

**Controller of Examinations**

**TIME TABLE OF II B.PHARMACY II SEMESTER SUBSTITUTE SUBJECTS FOR READMITTED STUDENTS FROM R16 REGULATIONS**

DATE OF EXAMINATION: 02-07-2022 (Saturday)		TIME OF EXAMINATION: 10.00 AM TO 01.00 PM
BRANCH	SUBJECT ALREADY STUDIED	SUBSTITUTED SUBJECT
B. PHARMACY	---	PHARMACEUTICAL BIO CHEMISTRY (RAB132102)

- NOTE:** (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IM MEDIATELY.  
(ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.  
(iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

DATE: 14-06-2022

*Robert. A. Lally*

Controller of Examinations



*the*  
**PRINCIPAL**

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
UNIVERSITY EXAMINATION CENTER, KAKINADA

**III B.PHARMACY I SEMESTER (PCI, R16 & R13) REGULAR/SUPPLEMENTARY EXAMINATIONS, DEC/JAN – 2022/2023**

**REVISED TIME TABLE**

TIME: 10.00 AM TO 01.00 PM

DATE & DAY	PCI REGULATION REGULAR/SUPPLEMENTARY	R16 REGULATION SUPPLEMENTARY	R13 REGULATION SUPPLEMENTARY
<b>26-12-2022 (Monday)</b>	Medicinal Chemistry – II (BP501T)	Pharmacognosy-II (PHR16311)	Pharmaceutical Biochemistry (B133101)
<b>28-12-2022 (Wednesday)</b>	Industrial Pharmacy – I (BP502T)	Medicinal Chemistry-II (PHR16312)	Medicinal Chemistry – II (B133102)
<b>30-12-2022 (Friday)</b>	Pharmacology – II (BP503T)	Pharm. Technology-I (PHR16313)	Pharmaceutical Technology – I (B133103)
<b>02-01-2023 (Monday)</b>	Pharmacognosy and Phytochemistry – II (BP504T)	Environmental Sciences (PHR16314)	Pharmacology – I (B133104)
<b>04-01-2023 (Wednesday)</b>	Pharmaceutical Jurisprudence (BP505T)	Pharm. Management (PHR16315)	Pharmaceutical Management (B133105)

**NOTE:**

- (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- (iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY

DATE: 09-12-2022

*H. R. K. K.*

Controller of Examinations



**PRINCIPAL**  
**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
UNIVERSITY EXAMINATION CENTER, KAKINADA

**TIME TABLE OF III B.PHARMACY I SEMESTER SUBSTITUTE SUBJECTS FOR READMITTED STUDENTS**  
**FROM R13 TO R16 REGULATIONS**

DATE OF EXAMINATION: 26.12.2022 (Monday)		TIME OF EXAMINATION: 10.00 AM TO 01.00 PM
BRANCH	ALREADY STUDIED SUBJECT	SUGGESTED SUBJECTS (R13)
III B.Pharmacy I Semester	Pharmacognosy-II	Pharmaceutical Biochemistry (PHP16212)

DATE OF EXAMINATION: 02.01.2023 (Monday)		TIME OF EXAMINATION: 10.00 AM TO 01.00 PM
BRANCH	ALREADY STUDIED SUBJECT	SUGGESTED SUBJECTS (R13)
III B.Pharmacy I Semester	Environmental Science	Pharmacology-I (PHP16225)
		Health Education & Pathophysiology (PHP16215)

**NOTE:**

- i. ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS, IMMEDIATELY.
- ii. EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- iii. THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**DATE: 09-12-2022**



**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

*H. R. K. K.*

**Controller of Examinations**





**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA**  
UNIVERSITY EXAMINATION CENTER, KAKINADA

**III B.PHARMACY II SEMESTER (PCI, R16 & R13) REGULAR/SUPPLEMENTARY EXAMINATIONS, MAY/JUNE - 2023**

**TIME TABLE**

**TIME: 10.00 AM TO 01.00 PM**

DATE & DAY	PCI REGULATIONS REGULAR/SUPPLEMENTARY	R16 REGULATION SUPPLEMENTARY	R13 REGULATION SUPPLEMENTARY
<b>22-05-2023 (Monday)</b>	Medicinal Chemistry III (BP601T)	PHARMACEUTICAL TECHNOLOGY-II (PHR16321)	PHARMACEUTICAL TECHNOLOGY-II (B133201)
<b>24-05-2023 (Wednesday)</b>	Pharmacology III (BP602T)	PHARM. BIOTECHNOLOGY (PHR16322)	PHARM. BIOTECHNOLOGY (B133202)
<b>26-05-2023 (Friday)</b>	Herbal Drug Technology (BP603T)	PHARMACOLOGY-II (PHR16323)	PHARMACOLOGY-II (B133203)
<b>29-05-2023 (Monday)</b>	Biopharmaceutics and Pharmacokinetics (BP604T)	MEDICINAL CHEMISTRY-III (PHR16324)	MEDICINAL CHEMISTRY-III (B133204)
<b>31-05-2023 (Wednesday)</b>	Pharmaceutical Biotechnology (BP605T)	REGULATORY AFFAIRS, IPR & PATENTS (PHR16325)	REGULATORY AFFAIRS, IPR & PATENTS (B133205)
<b>02-06-2023 (Friday)</b>	Quality Assurance (BP606T)	--	--

**NOTE :**

- ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
- EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY, IF ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

*H. R. Kic*

**Controller of Examinations**

**DATE: 12 -05-2023**



*Principal*  
**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

UNIVERSITY EXAMINATION CENTER, KAKINADA

## IV B.PHARMACY I SEMESTER (PCI, R16 & R13) REGULAR/SUPPLEMENTARY EXAMINATIONS, NOVEMBER - 2022

### T I M E T A B L E

TIME: 10.00 AM TO 01.00 PM

DATE & DAY	PCI REGULATIONS REGULAR/SUPPLEMENTARY	R16 REGULATIONS SUPPLEMENTARY	R13 REGULATIONS SUPPLEMENTARY
14-11-2022 (Monday)	Instrumental Methods of Analysis (BP701T)	Pharmaceutical Analysis –II (PHR16411)	Pharmaceutical Analysis – II (B134101)
16-11-2022 (Wednesday)	Industrial Pharmacy II (BP702T)	Biopharmaceutics & Pharmacokinetics (PHR16412)	Bio Assays & Toxicology (B134102)
18-11-2022 (Friday)	Pharmacy Practice (BP703T)	Chemistry of Natural Products (PHR16413)	Chemistry of Natural Products (B134103)
21-11-2022 (Monday)	Novel Drug Delivery System (BP704T)	Hospital & Community Pharmacy (PHR16414)	Hospital & Community Pharmacy (B134104)
23-11-2022 (Wednesday)	---	Pharmaceutical Jurisprudence (PHR16415)	Pharmaceutical Jurisprudence (B134105)

- NOTE:**
- ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
  - EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
  - THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

Date: 29-10-2022



PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

*Robert A. Kelly*  
Controller of Examinations



**TIME TABLE OF IV B.PHARMACY I SEMESTER SUBSTITUTE SUBJECTS FOR READMITTED STUDENTS  
FROM R10 TO R13 REGULATIONS**

<b>DATE OF EXAMINATION: 18.11.2022 (Friday)</b>		<b>TIME OF EXAMINATION: 10.00 AM TO 01.00 PM</b>
<b>Name of the Course</b>	<b>Subject Already Studied</b>	<b>Substituted Subject</b>
<b>B. Pharmacy</b>	-----	<b>Pharmaceutical Management (RAB134109)</b>

**NOTE:**

- i ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS, IMMEDIATELY.
- ii EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
- iii THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY ANY OTHER SUBSTITUTE SUBJECTS THAT ARE NOT INCLUDED IN THE ABOVE LIST IMMEDIATELY.

**Date: 29-10-2022**

*Prakash A. Reddy*  
**Controller of Examinations**



*Prakash A. Reddy*  
**PRINCIPAL**  
**Avanathi Institute of Pharmaceutical Sciences**  
**Cherukupally (V), Bhogapuram Mandal**  
**Vizianagaram Dt., - 531162**



## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY KAKINADA

UNIVERSITY EXAMINATION CENTER, KAKINADA

### IV B.PHARMACY II SEMESTER (PCI.R16.R13) REGULAR/SUPPLEMENTARY EXAMINATIONS, APRIL - 2023

#### TIME TABLE

TIME: 10.00 AM TO 01.00 PM

DATE & DAY	PCI REGULAR/SUPPLEMENTAR Y	R16 REGULATION SUPPLEMENTARY	R13 REGULATION SUPPLEMENTARY
17.04.2023 (Monday)	Biostatistics and Research Methodology (BP801T)	Bioassays & Toxicology (PHR16421)	BIOPHARMACEUTICS & PHARMACOKINETICS
19.04.2023 (Wednesday)	Social and Preventive Pharmacy (BP802T)	Clinical Pharmacy, Therapeutics & Pharmaco vigilance (PHR16422)	CLINICAL PHARMACY, THERAPEUTICS & PHARMACOVIGILANCE
21.04.2023 (Friday)	Elective - I	Controlled release & Novel Drug Delivery Systems (PHR16423)	CONTROLLED RELEASE & NOVEL DRUG DELIVERY SYSTEMS
24.04.2023 (Monday)	Elective – II	Quality Assurance, GMP, GLP (PHR16424)	QUALITY ASSURANCE, GMP, GLP

- NOTE**
- (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.
  - (ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.
  - (iii) FOR ANY OTHER CLARIFICATION IN RESPECT OF THE ABOVE EXAMINATIONS PLEASE CONTACT CONTROLLER OF EXAMINATIONS /OR 9652300902.

DATE: 01-04-2023



  
PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



Controller of Examinations



JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM  
UNIVERSITY EXAMINATION CENTER, VIZIANAGARAM

PHARM "D" 1 YEAR REGULAR & SUPPLEMENTARY EXAMINATIONS, OCTOBER- 2023

(2022 TO 2012 ADMITTED BATCHES)

TIME TABLE

Time: 02.00 PM To 05.00 PM

DATE & DAY

03-10-2023 (Tuesday)	05-10-2023 (Thursday)	07-10-2023 (Saturday)	10-10-2023 (Tuesday)	12-10-2023 (Thursday)	16-10-2023 (Monday)
HUMAN ANATOMY AND PHYSIOLOGY (TH01)	PHARMACEUTICS (TH02)	MEDICINAL BIOCHEMISTRY (TH03)	PHARMACEUTICAL ORGANIC CHEMISTRY (TH04)	PHARMACEUTICAL INORGANIC CHEMISTRY (TH05)	REMEDIAL STATISTICS (TH06)

NOTE:

(i) ANY OMISSIONS OR CLONING IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.

(ii) EVEN IF GOVERNMENT DECLARES A HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.

(iii) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY IMMEDIATELY, IF ANY OTHER SUBSTITUTE SUBJECTS ARE NOT INCLUDED IN THE ABOVE LIST.

Date: 19-09-2023

Controller of Examinations

Controller of Examinations  
JNTU Gurajada, Vizianagaram



*h*

**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**

**Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162**



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY GURAJADA VIZIANAGARAM**  
**UNIVERSITY EXAMINATION CENTER, VIZIANAGARAM**  
**PHARM "D" 2ND YEAR (08 REGULATION)-REGULAR & SUPPLEMENTARY EXAMINATIONS, JULY/AUGUST- 2023**  
**(2021 TO 2012 ADMITTED BATCHES)**

**REVISED TIME TABLE**

*Time: 02.00 PM To 05.00 PM*

DATE & DAY					
24-07-2023 (Monday)	26-07-2023 (Wednesday)	28-07-2023 (Friday)	31-07-2023 (Monday)	02-08-2023 (Wednesday)	04-08-2023 (Friday)
<b>PATHOPHYSIOLOGY (T2101)</b>	<b>PHARMACEUTICAL MICROBIOLOGY (T2102)</b>	<b>PHARMACOGNOSY AND PHYTOPHARMA CEUTICALS (T2103)</b>	<b>PHARMACOLOGY - I (T2104)</b>	<b>COMMUNITY PHARMACY (T2105)</b>	<b>PHARMACOTHERA PEUTICS - I (T2106)</b>


**NOTE:**

- (I) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS, IMMEDIATELY  
(II) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.  
(III) THE PRINCIPALS ARE REQUESTED TO INFORM THE UNIVERSITY IMMEDIATELY, IF ANY OTHER SUBSTITUTE SUBJECTS ARE NOT INCLUDED IN THE ABOVE LIST

**Date: 22-07-2023**

  
**Controller of Examinations**



  
**PRINCIPAL**  
**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**  
UNIVERSITY EXAMINATION CENTER, KAKINADA

**PHARM "D" III YEAR SUPPLEMENTARY EXAMINATIONS, MARCH – 2023**  
(2019 TO 2012 ADMITTED BATCHES)

**TIME TABLE**


**TIME: 10.00 AM TO 01.00 PM**


<b>14-03-2023 (Tuesday)</b>	<b>16-03-2023 (Thursday)</b>	<b>18-03-2023 (Saturday)</b>	<b>21-03-2023 (Tuesday)</b>	<b>24-03-2023 (Friday)</b>	<b>27-03-2023 (Monday)</b>
PHARMACOTHERAPEUTICS – II (T3103)	PHARMACEUTICAL JURISPRUDENCE (T3104)	PHARMACEUTICAL FORMULATIONS (T3106)	PHARMACOLOGY –II (T3101)	MEDICINAL CHEMISTRY (T3105)	PHARMACEUTICAL ANALYSIS (T3102)

- NOTE: (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.  
(ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.  
(iii) FOR ANY OTHER CLARIFICATIONS IN RESPECT OF THE ABOVE EXAMINATIONS PLEASE CONTACT CONTROLLER OF EXAMINATIONS

**DATE: 24-02-2023**



  
**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162

  
**Controller of Examinations**



**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**  
**UNIVERSITY EXAMINATION CENTER, KAKINADA**

**PHARM "D" IV YEAR SUPPLEMENTARY EXAMINATIONS, MARCH - 2023**

**(2018 TO 2012 ADMITTED BATCHES)**

**TIME TABLE**

**TIME: 10.00 AM TO 1.00 PM**

<b>13-03-2023 (Monday)</b>	<b>15-03-2023 (Wednesday)</b>	<b>17-03-2023 (Friday)</b>	<b>20-03-2023 (Monday)</b>	<b>23-03-2023 (Thursday)</b>	<b>25-03-2023 (Saturday)</b>	<b>28-03-2023 (Tuesday)</b>
<b>CLINICAL TOXICOLOGY (T4106)</b>	<b>PHARMACOTHERA PEUTICS –III (T4101)</b>	<b>BIOPHARMACEU TICS &amp; PHARMACOKINE TICS (T4105)</b>	<b>HOSPITAL PHARMACY (T4102)</b>	<b>BIostatISTICS &amp; RESEARCH METHODOLOGY (T4104)</b>	<b>CLINICAL PHARMACY (T4103)</b>	<b>PHARMACO THERAPEUTI CS – I &amp; II (T4111)</b>

- NOTE: (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.  
(ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.  
(iii) FOR ANY OTHER CLARIFICATIONS IN RESPECT OF THE ABOVE EXAMINATIONS PLEASE CONTACT CONTROLLER OF EXAMINATIONS

**DATE: 24-02-2023**

*H. R. Kic*

**Controller of Examinations**



**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
**Cherukupally (V), Bhogapuram Mandal**  
**Vizianagaram Dt., - 531162**





**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA**  
UNIVERSITY EXAMINATION CENTER, KAKINADA

**PHARM "D" V YEAR SUPPLEMENTARY EXAMINATIONS, MARCH - 2023**

(2017 TO 2012 ADMITTED BATCHES)

**TIME TABLE**

TIME: 02.00 PM TO 5.00 PM

<b>13-03-2023 (Monday)</b>	<b>15-03-2023 (Wednesday)</b>	<b>17-03-2023 (Friday)</b>
CLINICAL PHARMACOKINETICS & PHARMACOTHERAPEUTIC DRUG MONITORING (T5103)	PHARMACOEPIDEMOLOGY & PHARMACOECONOMICS (T5102)	CLINICAL RESEARCH (T5101)

- NOTE: (i) ANY OMISSIONS OR CLASHES IN THIS TIME TABLE MAY PLEASE BE INFORMED TO THE CONTROLLER OF EXAMINATIONS IMMEDIATELY.  
(ii) EVEN IF GOVERNMENT DECLARES HOLIDAY ON ANY OF THE ABOVE DATES, THE EXAMINATIONS SHALL BE CONDUCTED AS USUAL.  
(iii) FOR ANY OTHER CLARIFICATIONS IN RESPECT OF THE ABOVE EXAMINATIONS PLEASE CONTACT CONTROLLER OF EXAMINATIONS

DATE: 24 -02-2023

*H. R. Kic*

Controller of Examinations



*Avanthi*  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**IV B PHARM SEM I**

**Section-A**

**DATE: 26-08-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Instrumental Methods of Analysis	Mrs.B.Aruna	2.5 units	B. Aruna
2.	Industrial Pharmacy II	Mr . M.Rajeswara Rao	2.5 units	M. Rajeswara
3.	Pharmacy Practice	Mr . M.Vasu	2.5 units	M. Vasu
4.	Novel Drug Delivery System	Mr . V.H.S. Reddy	2.5 units	V.H.S. Reddy

**IV B PHARM SEM I**

**Section-B**

**DATE: 26 08 2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Instrumental Methods of Analysis	Mrs. Y.Pavani	2.5 units	Y. Pavani
2.	Industrial Pharmacy II	Mr .S. Rama.Krishna	2.5 units	Ramakrishna
3.	Pharmacy Practice	Mrs.M.Divya	2.5 units	Divya
4.	Novel Drug Delivery System	M.V.Naga Deepika	2.5 units	M. Deepika

  
**Principal**



**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**III B PHARM SEM I**

**Section-A**

**DATE: 23-09-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Medicinal Chemistry II	Dr.M.Sowmya	2.5units	M. S. Sowmya
2.	Industrial Pharmacy I	Mrs.I.Adi Lakshmi	2.5units	Adi lakshmi
3.	Pharmacology II	Mr. Vamsi Yadav	2.5units	Vamsi
4.	Pharmacognosy and Phytochemistry II	Mr . A.Nanaji	2.5units	Ananji
5.	Pharmaceutical Jurisprudence	Mrs.M.Geethanjali	2.5units	M. Geethanjali

**III B PHARM SEM I**

**Section-B**

**DATE: 23-09-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Medicinal Chemistry II	Dr.M.Sowmya	2.5units	M. S. Sowmya
2.	Industrial Pharmacy I	Mr.K.B.K.Raju	2.5units	B.K.Raju
3.	Pharmacology II	Mr.B.Yerni Kumar	2.5units	Yerni Kumar
4.	Pharmacognosy and Phytochemistry II	Mr . A.Srinivas	2.5units	A Srinivas
5.	Pharmaceutical Jurisprudence	Mr.M.Suresh Kumar	2.5units	Suresh Kumar



  
**Principal**  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**II B PHARM SEM I Section-A**

**DATE: 23-12-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmaceutical Organic Chemistry II	Mr. S. Rama Krishna	2.5 units	<i>S. Rama Krishna</i>
2.	Physical Pharmaceutics I	Mr. M. Rajeswararao	2.5 units	<i>M. Rajeswararao</i>
3.	Pharmaceutical Microbiology	Ms. K. Rohini	2.5 units	<i>K. Rohini</i>
4.	Pharmaceutical Engineering	Mrs. M. Venkata Naga Deepika	2.5 units	<i>M. Deepika</i>

**II B PHARM SEM I Section-B**

**DATE: 23-12-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmaceutical Organic Chemistry II	Mr. A. Srinivas	2.5 units	<i>A. Srinivas</i>
2.	Physical Pharmaceutics I	Mr. V.H.S.Reddy	2.5 units	<i>V.H.S. Reddy</i>
3.	Pharmaceutical Microbiology	Mrs. B. Poornima	2.5 units	<i>B. Poornima</i>
4.	Pharmaceutical Engineering	Ms. D. Purnima Yadav	2.5 units	<i>D. Purnima</i>



*[Signature]*  
**Principal**

**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**I B PHARM SEM I Section-A**

**DATE: 03-03-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Human Anatomy and Physiology I	Mr. Vamsi Krishna Yadav	2.5 units	Vamsi
2.	Pharmaceutical Analysis I	Mrs.Y. Pavani	2.5 units	Y. Pavani
3.	Pharmaceutics I	Mrs.I. Adi Lakshmi	2.5 units	Adi lakshmi
4.	Pharmaceutical Inorganic Chemistry	Mrs.Ch. Geetha	2.5 units	Geetha
5.	Communication skills	Mrs.K Subha Lakshmi	2.5 units	Subha Lakshmi
6.	Remedial Biology/ Remedial Mathematics	Mr. A. Nanaji/ Mr. A Seshu	2.5 units	Nanaji

**I B PHARM SEM I Section-B**

**DATE: 03-03-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Human Anatomy and Physiology I	Mr.B. Yenni Kumar	2.5 units	Yenni Kumar
2.	Pharmaceutical Analysis I	Mrs. B. Rama Madhuri	2.5 units	Ramamadhuri
3.	Pharmaceutics I	Mr. S. Chandrasekhar	2.5 units	S. Chandrasekhar
4.	Pharmaceutical Inorganic Chemistry	Mrs. K. Venkata Radhika	2.5 units	Radhika
5.	Communication skills	Mrs.K. Subha Lakshmi	2.5 units	Subha lakshmi
6.	Remedial Biology/ Remedial Mathematics	Mr. A. Nanaji/ Mr. A Seshu	2.5 units	Nanaji



Principal

**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**IV B PHARM SEM II**

**Section-A**

**DATE: 27-01-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Biostatistics and Research Methodology	Mr.B. Yerni Kumar	2.5 units	Yerni Kumar
2.	Social and Preventive Pharmacy	Mrs.Y. Anveshi Dhananjaya	2.5 units	Dhananjaya
3.	Pharmaceutical Marketing	Mrs.K. Venkata Radhika	2.5 units	Radhika
4.	Cosmetic Science	Mrs.M. Divya	2.5 units	Divya

**IV B PHARM SEM II**

**Section-B**

**DATE: 27-01-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Biostatistics and Research Methodology	Mr.B. Yerni Kumar	2.5 units	Yerni Kumar
2.	Social and Preventive Pharmacy	Mrs.Y. Anveshi Dhananjaya	2.5 units	Dhananjaya
3.	Pharmaceutical Marketing	Mrs.K. Venkata Radhika	2.5 units	Radhika
4.	Cosmetic Science	Mrs.M.Divya	2.5 units	Divya

  
Principal



**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**III B PHARM SEM II**

**Section-A**

**DATE: 24-02-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Medicinal Chemistry III	Dr. M. Sowmya	2.5 units	M. S. Sowmya
2.	Pharmacology III	Mrs.B. Meher Jyothi	2.5 units	B. Meher Jyothi
3.	Herbal Drug Technology	Mr . M. Suresh Kumar	2.5 units	Suresh Kumar
4.	Biopharmaceutics and Pharmacokinetics – Theory	Mr . K. Bhargav Krishna Raju	2.5 units	B.K. Raju
5.	Pharmaceutical Biotechnology	Mr . V. H.S. Reddy	2.5 units	VHS Reddy
6.	Quality Assurance	Mrs.B. Aruna	2.5 units	B. Aruna

**III B PHARM SEM II**

**Section-B**

**DATE: 24-02-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Medicinal Chemistry III	Mr . M. Vasu	2.5 units	M. Vasu
2.	Pharmacology III	Mr . D. Vinay Ramji	2.5 units	D. Vinay Ramji
3.	Herbal Drug Technology	Mrs.L. Divya Sri	2.5 units	L. Divya Sri
4.	Biopharmaceutics and Pharmacokinetics – Theory	Mr.K.Bhargav Krishna Raju	2.5 units	B.K. Raju
5.	Pharmaceutical Biotechnology	Mrs.Y. Pavani	2.5 units	Y. Pavani
6.	Quality Assurance	Mrs.B. Aruna	2.5 units	B. Aruna



Principal

**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**II B PHARM SEM II**

**Section-A**

**DATE: 04-05-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmaceutical Organic Chemistry III	Mrs. Anveshi Dhananjaya	2.5 units	Dhananjaya
2.	Medicinal Chemistry I	Mr. S. Rama Krishna	2.5 units	Ramakrishna
3.	Physical Pharmaceutics II	Mr. M. Rajeswara rao	2.5 units	M. Rajeswara
4.	Pharmacology I	Ms. K. Rohini	2.5 units	K. Rohini
5.	Pharmacognosy and Phytochemistry I	Mr. A. Nanaji	2.5 units	Anaji

**II B PHARM SEM II**

**Section-B**

**DATE: 04-05-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmaceutical Organic Chemistry III	Mrs. Anveshi Dhananjaya	2.5 units	Dhananjaya
2.	Medicinal Chemistry I	Mr. A.Naga Srinivas	2.5 units	A. Srinivas
3.	Physical Pharmaceutics II	Ms. D.Purnima Yadav	2.5 units	D. Purnima
4.	Pharmacology I	Mrs.M.Geethanjali	2.5 units	M. Geethanjali
5.	Pharmacognosy and Phytochemistry I	Mr.A.Nanaji	2.5 units	Anaji



**Principal**  
**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**I B PHARM SEM II Section-A**

**DATE: 14-07-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Human Anatomy and Physiology II	Mr. Vinay Ramji	2.5 units	
2.	Pharmaceutical Organic Chemistry I	Ms.D. Purnima Yadav	2.5 units	
3.	Biochemistry	Mrs.L. Divya Sri	2.5 units	
4.	Pathophysiology	Mrs.B. Meher Jyoti	2.5 units	
5.	Computer Applications in Pharmacy	Mrs.K. Venkata Radhika	2.5 units	
6.	Environmental sciences	Ms. K. Rohini	1.5 units	

**I B PHARM SEM II Section-B**

**DATE: 14-07-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Human Anatomy and Physiology II	Mrs.Anveshi Dhananjaya	2.5 units	
2.	Pharmaceutical Organic Chemistry I	Mr.S. Chandra Sekhar	2.5 units	
3.	Biochemistry	Mrs.B. Poornima	2.5 units	
4.	Pathophysiology	Mrs.B. Meher Jyoti	2.5 units	
5.	Computer Applications in Pharmacy	Mrs.B. Rama Madhuri	2.5 units	
6.	Environmental sciences	Ms.K. Rohini	1.5 units	



**Principal**  
**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**IV B PHARM SEM I**

**Section -A**

**DATE: 28-10-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Instrumental Methods of Analysis	Mrs.B.Aruna	2.5units	B. Aruna
2.	Industrial Pharmacy II	Mr .M.Rajeswara Rao	2.5units	M. Rajeswara
3.	Pharmacy Practice	Mr . M.Vasu	2.5units	M. Vasu
4.	Novel Drug Delivery System	Mr .V.H.S. Reddy	2.5units	VHS Reddy

**IV B PHARM SEM I**

**Section -B**

**DATE: 28-10-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Instrumental Methods of Analysis	Mrs.Y.Pavani	2.5units	Y. Pavani
2.	Industrial Pharmacy II	Mr .S. Rama.Krishna	2.5units	Rama Krishna
3.	Pharmacy Practice	Mrs.M.Divya	2.5units	Divya
4.	Novel Drug Delivery System	Mrs.M.V.Naga Deepika	2.5units	M. Deepika



  
Principal

**PRINCIPAL**

Avanathi Institute of Pharmaceutical Science  
Cherukupally (V), Bhogapuram Manda  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**III B PHARM SEM I**

**Section-A**

**DATE: 25-11-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Medicinal Chemistry II	Dr.M.Sowmya	2.5 units	M. S. Sowmya
2.	Industrial Pharmacy I	Mrs.I.Adi Lakshmi	2.5 units	Adi Lakshmi
3.	Pharmacology II	Mr. Vamsi Yadav	2.5 units	Vamsi
4.	Pharmacognosy and Phytochemistry II	Mr . A.Nanaji	2.5 units	Ananaji
5.	Pharmaceutical Jurisprudence	Mrs.Ch.Geetha	2.5 units	Geetha

**III B PHARM SEM I**

**Section-B**

**DATE: 25-11-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Medicinal Chemistry II	Dr.M.Sowmya	2.5 units	M. S. Sowmya
2.	Industrial Pharmacy I	Mr.K.B.K.Raju	2.5 units	B.K. Raju
3.	Pharmacology II	Mr.B.Yerni Kumar	2.5 units	Yerni Kumar
4.	Pharmacognosy and Phytochemistry II	Mr . A.Srinivas	2.5 units	A. Srinivas
5.	Pharmaceutical Jurisprudence	Mr.M.Suresh Kumar	2.5 units	Suresh Kumar



  
**Principal**

**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**II B PHARM SEM I**

**Section-A**

**DATE: 17-02-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmaceutical Organic Chemistry II	Mr. S. Rama Krishna	2.5 units	<i>S. Rama Krishna</i>
2.	Physical Pharmaceutics I	Mr. M. Rajeswararao	2.5 units	<i>M. Rajeswararao</i>
3.	Pharmaceutical Microbiology	Ms. K. Rohini	2.5 units	<i>K. Rohini</i>
4.	Pharmaceutical Engineering	Mrs. M. Venkata Naga Deepika	2.5 units	<i>M. Deepika</i>

**II B PHARM SEM I**

**Section-B**

**DATE: 17-02-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmaceutical Organic Chemistry II	Mr. A. Srinivas	2.5 units	<i>A. Srinivas</i>
2.	Physical Pharmaceutics I	Mr. V.H.S.Reddy	2.5 units	<i>V.H.S.Reddy</i>
3.	Pharmaceutical Microbiology	Mrs. B. Poornima	2.5 units	<i>B. Poornima</i>
4.	Pharmaceutical Engineering	Ms. D. Purnima	2.5 units	<i>D. Purnima</i>



*[Signature]*  
**Principal**

**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**I B PHARM SEM I**

**Section-A**

**DATE: 28-04-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Human Anatomy and Physiology I	Mr. Vamsi Krishna Yadav	2.5 units	Vamsi
2.	Pharmaceutical Analysis I	Mrs.Y. Pavani	2.5 units	Y. Pavani
3.	Pharmaceutics I	Mrs.I. Adi Lakshmi	2.5 units	Adi lakshmi
4.	Pharmaceutical Inorganic Chemistry	Mrs.M. Geethanjali	2.5 units	M. Geethanjali
5.	Communication skills	Mrs.K Subha Lakshmi	2.5 units	Subha Lakshmi
6.	Remedial Biology/ Remedial Mathematics	Mr. A. Nanaji/ Mr. A Seshu	2.5 units	Mr. A Seshu

**I B PHARM SEM I**

**Section-B**

**DATE: 28-04-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Human Anatomy and Physiology I	Mr.B. Yenni Kumar	2.5 units	Yenni Kumar
2.	Pharmaceutical Analysis I	Mrs. B. Rama Madhuri	2.5 units	Ramanadhuri
3.	Pharmaceutics I	Mr. S. Chandrasekhar	2.5 units	S. Chandrasekhar
4.	Pharmaceutical Inorganic Chemistry	Mrs. K. Venkata Radhika	2.5 units	Radhika
5.	Communication skills	Mrs.K. Subha Lakshmi	2.5 units	Subha Lakshmi
6.	Remedial Biology/ Remedial Mathematics	Mr. A. Nanaji/ Mr. A Seshu	2.5 units	Mr. A Seshu



  
**Principal**

**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Science  
Cherukupally (V), Bhogapuram Manda  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**IV B PHARM SEM II**

**Section-A**

**DATE: 31-03-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Biostatistics and Research Methodology	Mr.B. Yerni Kumar	2.5 units	Yerni Kumar
2.	Social and Preventive Pharmacy	Mrs.Y. Anveshi Dhananjaya	2.5 units	Dhananjaya
3.	Pharmaceutical Marketing	Mrs.K. Venkata Radhika	2.5 units	Radhika
4.	Cosmetic Science	Mrs.M. Divya	2.5 units	Divya

**IV B PHARM SEM II**

**Section-B**

**DATE: 31-03-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Biostatistics and Research Methodology	Mr.B. Yerni Kumar	2.5 units	Yerni Kumar
2.	Social and Preventive Pharmacy	Mrs.Y. Anveshi Dhananjaya	2.5 units	Dhananjaya
3.	Pharmaceutical Marketing	Mrs.K. Venkata Radhika	2.5 units	Radhika
4.	Cosmetic Science	Mrs.M. Divya	2.5 units	Divya



  
Principal

**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**III B PHARM SEM II**

**Section-A**

**DATE: 28-04-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Medicinal Chemistry III	Dr. M. Sowmya	2.5 units	M.S. Sowmya
2.	Pharmacology III	Mrs..B. Meher Jyothi	2.5 units	B. Meher Jyothi
3.	Herbal Drug Technology	Mr . M. Suresh Kumar	2.5 units	Suresh Kumar
4.	Biopharmaceutics and Pharmacokinetics – Theory	Mr . K. Bhargav Krishna Raju	2.5 units	B.K. Raju
5.	Pharmaceutical Biotechnology	Mr . V. H.S. Reddy	2.5 units	VHS Reddy
6.	Quality Assurance	Mrs.B. Aruna	2.5 units	B - Aruna

**III B PHARM SEM II**

**Section-B**

**DATE: 28-04-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Medicinal Chemistry III	Mr . M. Vasu	2.5 units	M. Vasu
2.	Pharmacology III	Mr . D. Vinay Ramji	2.5 units	D. Vinay Ramji
3.	Herbal Drug Technology	Mrs.L. Divya Sri	2.5 units	Divya Sri
4.	Biopharmaceutics and Pharmacokinetics – Theory	Mr.K.Bhargav KrishnaRaju	2.5 units	B.K. Raju
5.	Pharmaceutical Biotechnology	Mrs.Y. Pavani	2.5 units	Y. Pavani
6.	Quality Assurance	Mrs.B. Aruna	2.5 units	B - Aruna





**Principal**

**PRINCIPAL**

**Avanthi Institute of Pharmaceutical Science:**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**II B PHARM SEM II**

**Section-A**

**DATE: 30-06-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmaceutical Organic Chemistry III	Mrs. Anveshi Dhananjaya	2.5units	Dhananjaya
2.	Medicinal Chemistry I	Mr. S. Rama Krishna	2.5units	Rama Krishna
3.	Physical Pharmaceutics II	Mr. M. Rajeswara rao	2.5units	M. Rajeswara
4.	Pharmacology I	Ms. K. Rohini	2.5units	K. Rohini
5.	Pharmacognosy and Phytochemistry I	Mr. A. Nanaji	2.5units	Ananji

**II B PHARM SEM II**

**Section-B**

**DATE: 30-06-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmaceutical Organic Chemistry III	Mrs. Anveshi Dhananjaya	2.5units	Dhananjaya
2.	Medicinal Chemistry I	Mr. A.Naga Srinivas	2.5units	A. Srinivas
3.	Physical Pharmaceutics II	Ms. D.Purnima Yadav	2.5units	D. Purnima
4.	Pharmacology I	Mrs.M.Geethanjali	2.5units	M. Geethanjali
5.	Pharmacognosy and Phytochemistry I	Mr.A.Nanaji	2.5units	Ananji



Principal

**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**I B PHARM SEM II**

**Section-A**

**DATE: 08-09-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Human Anatomy and Physiology II	Mr.Vinay Ramji	2.5units	<i>Vinay Ramji</i>
2.	Pharmaceutical Organic Chemistry I	Ms.D. Purnima Yadav	2.5units	<i>D. Purnima</i>
3.	Biochemistry	Ms.L. Divya Sri	2.5units	<i>Divya Sri</i>
4.	Pathophysiology	Mrs.B. Meher Jyoti	2.5units	<i>B. Meher Jyoti</i>
5.	Computer Applications in Pharmacy	Mrs.K. Venkata Radhika	2.5units	<i>Radhika</i>
6.	Environmental sciences	Ms.K. Rohini	1.5units	<i>K. Rohini</i>

**I B PHARM SEM II**

**Section-B**

**DATE: 08-09-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Human Anatomy and Physiology II	Mrs.Anveshi Dhananjaya	2.5units	<i>Anveshi Dhananjaya</i>
2.	Pharmaceutical Organic Chemistry I	Mr.S. Chandra Sekhar	2.5units	<i>S. Chandra Sekhar</i>
3.	Biochemistry	Mrs.B. Poornima	2.5units	<i>B. Poornima</i>
4.	Pathophysiology	Mrs.B. Meher Jyoti	2.5units	<i>B. Meher Jyoti</i>
5.	Computer Applications in Pharmacy	Mrs.B. Rama Madhuri	2.5units	<i>Rama Madhuri</i>
6.	Environmental sciences	Ms.K. Rohini	1.5unit	<i>K. Rohini</i>



*Principal*  
**Principal**

**Avanthi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES**  
(Approved by A.I.C.T.E, PCI, New Delhi Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.  
[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**PHARM.D-V**

**DATE: 28-10-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Clinical Research	Dr.M.S.V. Sudeep	4 units	H.S.V. Sudeep
2.	Pharmacoepidemiology and Pharmacoeconomics	Dr.B. Manoj Kumar	1 unit	B. Manoj Kumar
3.	Pharmacokinetics & Pharmacotherapeutic Drug Monitoring	Dr.T. Rushi	2 units	Rushi



  
**Principal**  
**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**PHARM.D-IV**

**DATE: 28-10-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmacotherapeutics-III	Dr.T. Rushi	2 units	
2.	Hospital Pharmacy	Mr.V Uma Sankar	3 units	
3.	Clinical Pharmacy	Dr. V C Randeep Raj	3 units	
4.	Biostatistics & Research Methodology	Mrs.Ch. Geetha	1 unit	
5.	Biopharmaceutics & Pharmacokinetics	Mr.P. Sandeep	3 units	
6.	Clinical Toxicology	Dr .B. TejaSree	4 units	



  
**Principal**  
**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162




**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**PHARM.D-III**

**DATE: 28-10-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmacology-II	Mrs.B.Ramavathi	2 units	B.Ramavathi
2.	Pharmaceutical Analysis	Mrs.Ch.Geetha	1.5 units	Ch.Geetha
3.	Pharmacotherapeutics-II	Dr .V.C.Randeep Raj	1.5 units	V.C.Randeep Raj
4.	Pharmaceutical Jurisprudence	Dr .N.Hema Madhuri	4 units	N.Hema Madhuri
5.	Medicinal Chemistry	Dr.ArunSatyadev	4 units	ArunSatyadev
6.	Pharmaceutical Formulations	Dr .B.Tejasree	2 units	B.Tejasree



  
**Principal**  
**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**PHARM.D-II**

**DATE: 20-01-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pathophysiology	Dr .Naga Phani Sharma	3 unit	Phani
2.	Pharmaceutical Microbiology	Dr .D. Subha Sri	3 unit	Subhasri
3.	Pharmacognosy & Phytopharmaceuticals	Dr .A.Jyotsna	5 unit	A.Jyotsna
4.	Pharmacology-I	Dr .B.Tejasree	3 unit	B.Tejasree
5.	Community Pharmacy	Dr .N. HemaMadhuri	3 unit	N.HemaMadhuri
6.	Pharmacotherapeutics-I	Dr .B. Manoj Kumar	4.5 unit	B.Man



  
**Principal**

**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**PHARM.D-I**

**DATE: 31-03-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Human Anatomy and Physiology	Dr .Naga Phani Sharma	5 units	Tham
2.	Pharmaceutics	Dr .M.S.V. Sudeep	4 units	M.S.V.Sudeep
3.	Medicinal Biochemistry	Dr .N. HemaMadhuri	5 units	N. Hema Madhuri
4.	Pharmaceutical Organic Chemistry	Dr .A. Jyotsna	5 units	A-Jyotsna
5.	Pharmaceutical Inorganic Chemistry	Dr .D. Subha Sri	7 units	Subhasri
6.	Remedial Mathematics/ Biology	Mr.A.Seshu/ Mr.V.Uma Sankar	3 units	V. Uma Sankar



  
**Principal**

**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**PHARM.D-V**

**DATE: 20-01-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Clinical Research	Dr .M.S.V. Sudeep	5 units	M.S.v.Sudeep
2.	Pharmacoepidemiology and Pharmacoeconomics	Dr .B. Manoj Kumar	1 unit	B.K.
3.	Pharmacokinetics & Pharmacotherapeutic Drug Monitoring	Dr .T. Rushi	3 units	Rushi



Principal

**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**PHARM.D-IV**

**DATE: 20-01-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmacotherapeutics-III	Dr .T. Rushi	2 units	
2.	Hospital Pharmacy	Mr.V Uma Sankar	3 units	
3.	Clinical Pharmacy	Dr .V C Randeep Raj	3 units	
4.	Biostatistics & Research Methodology	Mrs.M. Geethajali	1 unit	
5.	Biopharmaceutics & Pharmacokinetics	Mr.P. Sandeep	3 units	
6.	Clinical Toxicology	Dr .B. TejaSree	4 units	



**Principal**

**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**PHARM.D-III**

**DATE: 20-01-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmacology-II	Mrs.B.Ramavathi	2 units	B.Ramavathi
2.	Pharmaceutical Analysis	Mrs.Ch.Geetha	1.5 units	Ch.Geetha
3.	Pharmacotherapeutics-II	Dr .V.C.Randeep Raj	1.5 units	V.C.Randeep Raj
4.	Pharmaceutical Jurisprudence	Dr .N.Hema Madhuri	4 units	N.Hema Madhuri
5.	Medicinal Chemistry	Dr.ArunSatyadev	4 units	ArunSatyadev
6.	Pharmaceutical Formulations	Dr .B.Tejasree	3 units	B.Tejasree



  
**Principal**

**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**PHARM.D-II**

**DATE: 13-04-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pathophysiology	Dr.Naga Phani Sharma	3 units	Phani
2.	Pharmaceutical Microbiology	Dr.D. Subha Sri	3 units	Subhasri
3.	Pharmacognosy & Phytopharmaceuticals	Dr.A.Jyotsna	6 units	A.Jyotsna
4.	Pharmacology-I	Dr.B.Tejasree	2 units	B.Tejasree
5.	Community Pharmacy	Dr.N. HemaMadhuri	5 units	N.Hema Madhuri
6.	Pharmacotherapeutics-I	Dr .B. Manoj Kumar	1.5 units	B.m



  
**Principal**

**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162






**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**PHARM.D-I**

**DATE: 23-06-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Human Anatomy and Physiology	Dr .Naga Phani Sharma	5 units	Phani
2.	Pharmaceutics	Dr .M.S.V. Sudeep	4 units	M.S.V. Sudeep
3.	Medicinal Biochemistry	Dr .N. Hema Madhuri	4 units	N. Hema Madhuri
4.	Pharmaceutical Organic Chemistry	Dr .A. Jyotsna	6 units	A. Jyotsna
5.	Pharmaceutical Inorganic Chemistry	Dr .D. Subha Sri	7 units	Subhasri
6.	Remedial Mathematics/ Biology	Mr.A.Seshu/ Mr.V.Uma Sankar	2 units	V. Uma Sankar



  
**Principal**  
**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – III**

**PHARM.D-V**

**DATE: 13-04-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Clinical Research	Dr.M.S.V. Sudeep	5 units	M.S.V. Sudeep
2.	Pharmacoepidemiology and Pharmacoeconomics	Dr.B. Manoj Kumar	1 Unit	B. Manoj
3.	Pharmacokinetics & Pharmacotherapeutic Drug Monitoring	Dr.T. Rushi	2 units	Rushi

  
**Principal**



**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – III**

**PHARM.D-IV**

**DATE: 13-04-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmacotherapeutics-III	Dr.T. Rushi	2 units	
2.	Hospital Pharmacy	Mr.V Uma Sankar	3 units	
3.	Clinical Pharmacy	Dr.V C Randeep Raj	4 units	
4.	Biostatistics & Research Methodology	Mrs.Ch.Geetha	1 unit	
5.	Biopharmaceutics & Pharmacokinetics	Mr.P. Sandeep	2 units	
6.	Clinical Toxicology	Dr.B. TejaSree	4 units	



**Principal**

**PRINCIPAL**

**Avanathi Institute of Pharmaceutical Sciences**  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – III**

**PHARM.D-III**

**DATE: 13-04-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pharmacology-II	Mrs.B.Ramavathi	2 units	B. Ramavathi
2.	Pharmaceutical Analysis	Mrs.Ch.Geetha	1 unit	Ch. Geetha
3.	Pharmacotherapeutics-II	Dr. V.C.Randeep Raj	2 units	V.C. Randeep Raj
4.	Pharmaceutical Jurisprudence	Dr.N.Hema Madhuri	4 units	N. Hema Madhuri
5.	Medicinal Chemistry	Dr.ArunSatyadev	6 units	Arun Satyadev
6.	Pharmaceutical Formulations	Dr.B.Tejasree	2 units	B. Teja Sree.



  
Principal

**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – III**

**PHARM.D-II**

**DATE: 07-07-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Pathophysiology	Dr.Naga Phani Sharma	3 units	Phani
2.	Pharmaceutical Microbiology	Dr.D. Subha Sri	4 units	Subhasri
3.	Pharmacognosy & Phytopharmaceuticals	Dr.A.Jyotsna	5 units	A.Jyotsna
4.	Pharmacology-I	Dr.B.Tejasree	2 units	B. Tejasree
5.	Community Pharmacy	Dr N. HemaMadhuri	5 units	N. Hema Madhuri
6.	Pharmacotherapeutics-I	Dr B. Manoj Kumar	2 units	B. Manoj



  
**Principal**

**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – III**

**PHARM.D-I**

**DATE: 15-09-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Human Anatomy and Physiology	Dr Naga Phani Sharma	6 units	Phani
2.	Pharmaceutics	Dr .M.S.V. Sudeep	4 units	M.S.V. Sudeep
3.	Medicinal Biochemistry	Dr .N. HemaMadhuri	4 units	N. HemaMadhuri
4.	Pharmaceutical Organic Chemistry	Dr .A. Jyotsna	5 units	A-Jyotsna
5.	Pharmaceutical Inorganic Chemistry	Dr .D. Subha Sri	2 units	Subhasri
6.	Remedial Mathematics/ Biology	Mr.A.Seshu/ Mr.V.Uma Sankar	2 units	V. Uma Sankar



  
**Principal**

**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES**  
(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

A.Y. 2022 – 2023

SYLLABUS COMPLETION STATUS FOR MID – I

M PHARM (PHARMACEUTICAL ANALYSIS) SEM I

DATE: 03-02-2023

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Modern Pharmaceutical Analytical Techniques	Dr.M.B.V.Raju	3 units	
2.	Advanced Pharmaceutical Analysis	Mrs. B.Chaitanya	3 units	B.Chaitanya
3.	Pharmaceutical Validation	Mrs.A.H.V.Santhoshi	2.5 units	A.H.V.Santhoshi
4.	Food Analysis	Mr.A.N.Srinivas	2.5 units	A. Srinivas
5.	Pharmaceutical Analysis Practical I	Dr.M.B.V.Raju	8 experiments	
6.	Pharmaceutical Analysis Practical II	Mrs. B.Chaitanya	8 experiments	B.Chaitanya

M.PHARM (PHARMACOLOGY) SEM I

DATE: 03-02-2023

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Modern Pharmaceutical Analytical Techniques	Dr.K.Murali Krishna	3 units	
2.	Advanced Pharmacology-I	Mrs.M.Madhavi Kumari	2.5 units	Madhavi
3.	Pharmacological and Toxicological Screening Methods-I	Mr.Ch.Madhu	2.5 units	Ch.Madhu
4.	Cellular and Molecular Pharmacology	Mrs.B.Ramavathi	2.5 units	B.Ramavathi
5.	Pharmacology Practical I	Dr.K.Murali Krishna	7 Experiments	
6.	Pharmacology Practical II	Mrs.M.Madhavi Kumari	7 experiments	Madhavi



Principal

**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**M .PHARM (PHARMACEUTICS) SEM I**

**DATE: 03-02-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Modern Pharmaceutical Analytical Techniques	Dr. G.Prasanthi	3 units	G.Prasanthi
2.	Drug Delivery System	Ms. Y.Vishnu Vandana	4 units	Y.V.Vandana
3.	Modern Pharmaceutics	Mr. M.Suresh Kumar	3 units	Suresh Kumar
4.	Regulatory Affairs	Mrs. B. Bhagya sri	2 Units	B.Bhagya sri
5.	Pharmaceutics Practical I	Dr. G.Prasanthi	4 experiments	G.Prasanthi
6.	Pharmaceutics Practical II	Ms. Y.Vishnu Vandana	4 experiments	Y.V.Vandana

**M PHARM (PHARMACEUTICAL TECHNOLOGY) SEM I**

**DATE: 03-02-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Modern Pharmaceutical Analytical Techniques	Dr.M.Pavani	3 units	M.Pavani
2.	Drug Delivery System	Mr.S.Chandra Sekhar	4 units	S.Chandra sekhar
3.	Modern Pharmaceutics	Mr.S.Ramakrishna	3 units	Ramakrishna
4.	Regulatory Affairs	Mrs.B.Sravani	2 units	Sravani
5.	Pharmaceutics Practical I	Dr.M.Pavani	4 Experiments	M.Pavani
6.	Pharmaceutics Practical II	Mrs.B.Sravani	4 Experiments	Sravani



Principal

**PRINCIPAL**  
 Avanthi Institute of Pharmaceutical Sciences  
 Cherukupally (V), Bhogapuram Mandal  
 Vizianagaram Dt., - 531162





**AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES**  
(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), izianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**M PHARM (PHARMACEUTICAL ANALYSIS) SEM I**

**DATE: 31-03-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Modern Pharmaceutical Analytical Techniques	Dr.M.B.V.Raju	3 units	<i>Dr. M.B.V. Raju</i>
2.	Advanced Pharmaceutical Analysis	Mrs B.Chaitanya	3 units	<i>B. Chaitanya</i>
3.	Pharmaceutical Validation	Mrs.A.H.V.Santhoshi	2.5 units	<i>A.H.V. Santhoshi</i>
4.	Food Analysis	Mr.A.N.Srinivas	2.5 units	<i>A. Srinivas</i>
5.	Pharmaceutical Analysis Practical I	Dr.M.B.V.Raju	7 experiments	<i>Dr. M.B.V. Raju</i>
6.	Pharmaceutical Analysis Practical II	Mrs B.Chaitanya	6 Experiments	<i>B. Chaitanya</i>

**M PHARM (PHARMACOLOGY) SEM I**

**DATE: 31-03-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Modern Pharmaceutical Analytical Techniques	Dr.K.Murali Krishna	3 units	<i>Dr. K. Murali Krishna</i>
2.	Advanced Pharmacology-I	Mrs.M.Madhavi Kumari	2.5 units	<i>M. Madhavi Kumari</i>
3.	Pharmacological and Toxicological Screening Methods-I	Mr.Ch.Madhu	2.5 units	<i>Ch. Madhu</i>
4.	Cellular and Molecular Pharmacology	Mrs.B.Ramavathi	2.5 units	<i>B. Ramavathi</i>
5.	Pharmacology Practical I	Dr.K.Murali Krishna	7 experiments	<i>Dr. K. Murali Krishna</i>
6.	Pharmacology Practical II	Mrs.M.Madhavi Kumari	8 experiments	<i>M. Madhavi Kumari</i>



*Principal*  
**Principal**

**PRINCIPAL**  
Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES**  
(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**M PHARM (PHARMACEUTICS) SEM I**

**DATE: 31-03-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Modern Pharmaceutical Analytical Techniques	Dr. G.Prasanthi	3 units	G. Prasanthi
2.	Drug Delivery System	Ms. Y.Vishnu Vandana	3 units	Y. V. Vandana
3.	Modern Pharmaceutics	Mr. M.Suresh Kumar	2 units	Suresh Kumar
4.	Regulatory Affairs	Mrs. B. Bhagya sri	2 units	B. Bhagya sri
5.	Pharmaceutics Practical I	Dr. G.Prasanthi	5 Experiments	G. Prasanthi
6.	Pharmaceutics Practical II	Ms. Y.Vishnu Vandana	5 Experiments	Y. V. Vandana

**M PHARM (PHARMACEUTICAL TECHNOLOGY) SEM I**

**DATE: 31-03-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Modern Pharmaceutical Analytical Techniques	Dr.M.Pavani	3 units	M. Pavani
2.	Drug Delivery System	Mr.S.Chandra Sekhar	3 units	S. Chandra Sekhar
3.	Modern Pharmaceutics	Mr.S.Ramakrishna	2 units	Ramakrishna
4.	Regulatory Affairs	Mrs.B.Sravani	2 units	Sravani
5.	Pharmaceutics Practical I	Dr.M.Pavani	5 Experiment	M. Pavani
6.	Pharmaceutics Practical II	MrsB.Sravani	5 Experiment	Sravani



  
Principal

**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E., PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

A.Y. 2022 – 2023

### SYLLABUS COMPLETION STATUS FOR MID – I

#### M PHARM (PHARMACEUTICAL ANALYSIS) SEM II

DATE: 23-06-2023

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Advanced Instrumental Analysis	Mrs B.Chaitanya	2.5 units	B.Chaitanya
2.	Modern Bio-Analytical Techniques	Mrs.A.H.V.Santhoshi	2.5 units	A.H.V.Santhoshi
3.	Quality Control and Quality Assurance	Dr.M.B.V.Raju	2.5 units	Dr.M.B.V.Raju
4.	Herbal and Cosmetic Analysis	Mr.A.N.Srinivas	2.5 units	A.N.Srinivas
5.	Pharmaceutical Analysis Practical III	Mrs B.Chaitanya	6 experiments	B.Chaitanya
6.	Pharmaceutical Analysis Practical IV	Dr.M.B.V.Raju	7 Experiments	Dr.M.B.V.Raju

#### M PHARM (PHARMACOLOGY) SEM II

DATE: 23-06-2023

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Advanced Pharmacology II	Mrs.M.Madhavi Kumari	2.5 units	M.Madhavi
2.	Pharmacological and Toxicological Screening Methods-II	Dr.K.Murali Krishna	2.5 units	Dr.K.Murali Krishna
3.	Principles of Drug Discovery	Mrs.B.Ramavathi	2.5 units	B.Ramavathi
5.	Pharmacology Practical III	Mrs.M.Madhavi Kumari	5 Experiments	M.Madhavi
6.	Pharmacology Practical IV	Mr.Ch.Madhu	6 Experiments	Ch.Madhu



Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**M PHARM (PHARMACEUTICS) SEM II**

**DATE: 23-06-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Molecular Pharmaceutics (Nano Tech and Targeted DDS)	Ms. Y.Vishnu Vandana	2 units	Y.V. Vandana
2.	Advanced Biopharmaceutics & Pharmacokinetics	Mrs. B. Bhagya sri	2.5 units	B. Bhagya sri
3.	Computer Aided Drug Delivery System	Dr. G.Prasanthi	2.5 units	G. prasanthi
4.	Formulation Development Cosmetic and Cosmeceuticals	Mr. M.Suresh Kumar	2.5 units	Suresh Kumar
5.	Pharmaceutics Practical III	Ms. Y.Vishnu Vandana	6 Experiments	Y.V. Vandana
6.	Pharmaceutics Practical IV	Dr. G.Prasanthi	5 Experiments	G. prasanthi

**M PHARM (PHARMACEUTICAL TECHNOLOGY) SEM II**

**DATE: 23-06-2023**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Molecular Pharmaceutics (Nano Tech and Targeted DDS)	Mrs.M.K.Rekha	2 units	M. K. Rekha
2.	Advanced Biopharmaceutics & Pharmacokinetics	Mrs.B.Sravani	2.5 Units	Sravani
3.	Computer Aided Drug Delivery System	Dr.M.Pavani	2.5 Units	M. pavani
4.	Formulation Development Cosmetic and Cosmeceuticals	Mr.S.Ramakrishna	2.5 Units	Ramakrishna
5.	Pharmaceutics Practical III	Mrs.M.K.Rekha	6 Experiments	M. K. Rekha
6.	Pharmaceutics Practical IV	Dr.M.Pavani	5 Experiments	M. pavani



**Principal**

**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





## AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), Vizianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

A.Y. 2022 – 2023

### SYLLABUS COMPLETION STATUS FOR MID – II

#### M PHARM (PHARMACEUTICAL ANALYSIS) SEM II

DATE: 11-08-2023

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Advanced Instrumental Analysis	Mrs B.Chaitanya	2.5 units	B. Chaitanya
2.	Modern Bio-Analytical Techniques	Mrs.A.H.V.Santhoshi	2.5 Units	A.H.V. Santhoshi
3.	Quality Control and Quality Assurance	Dr.M.B.V.Raju	2.5 Units	Dr. M. B. V. Raju
4.	Herbal and Cosmetic Analysis	Mr.A.N.Srinivas	2.5 Units	A. Srinivas
5.	Pharmaceutical Analysis Practical III	Mrs. B. Chaitanya	5 Experiments	B. Chaitanya
6.	Pharmaceutical Analysis Practical IV	Dr. M. B. V. Raju	7 Experiments	Dr. M. B. V. Raju

#### M PHARM (PHARMACOLOGY) SEM II

DATE: 11-08-2023

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Advanced Pharmacology II	Mrs.M.Madhavi Kumari	2.5 Units	M. Madhavi
2.	Pharmacological and Toxicological Screening Methods-II	Dr.K.Murali Krishna	2.5 Units	Dr. K. Murali Krishna
3.	Principles of Drug Discovery	Mrs.B.Ramavathi	2.5 Units	B. Ramavathi
5.	Pharmacology Practical III	Mrs.M.Madhavi Kumari	5 Experiments	M. Madhavi
6.	Pharmacology Practical IV	Mr.Ch.Madhu	5 Experiments	Ch. Madhu



  
Principal

PRINCIPAL

Avanathi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



# AVANTHI INSTITUTE OF PHARMACEUTICAL SCIENCES

(Approved by A.I.C.T.E, PCI, New Delhi, Recognized by the Govt. of A.P. & Affiliated to JNTUGV, Vizianagaram)  
Cherukupally (Village), Chittivalasa (SO), Bhogapuram (Mandal), izianagaram (Dist) -531162.

[www.avanthipharma.ac.in](http://www.avanthipharma.ac.in), [principal@avanthipharma.ac.in](mailto:principal@avanthipharma.ac.in)

A.Y. 2022 – 2023

## SYLLABUS COMPLETION STATUS FOR MID – II

### M PHARM (PHARMACEUTICS) SEM II

DATE: 11-08-2023

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Molecular Pharmaceutics (Nano Tech and Targeted DDS)	Ms. Y.Vishnu Vandana	3 units	Y.V. Vandana
2.	Advanced Biopharmaceutics & Pharmacokinetics	Mrs. B. Bhagya sri	2.5 Units	B. Bhagya sri
3.	Computer Aided Drug Delivery System	Dr. G.Prasanthi	2.5 units	G. Prashanthi
4.	Formulation Development Cosmetic and Cosmeceuticals	Mr. M.Suresh Kumar	2.5 units	Suresh Kumar
5.	Pharmaceutics Practical III	Ms. Y.Vishnu Vandana	5 Experiments	Y.V. Vandana
6.	Pharmaceutics Practical IV	Dr. G.Prasanthi	6 Experiments	G. Prashanthi

### M PHARM (PHARMACEUTICAL TECHNOLOGY) SEM II

DATE: 11-08-2023

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Molecular Pharmaceutics (Nano Tech and Targeted DDS)	Mrs.M.K.Rekha	3 units	M. Krishna
2.	Advanced Biopharmaceutics & Pharmacokinetics	Mrs.B.Sravani	2.5 Units	Sravani
3.	Computer Aided Drug Delivery System	Dr.M.Pavani	2.5 Units	M. pavani
4.	Formulation Development Cosmetic and Cosmeceuticals	Mr.S.Ramakrishna	2.5 Units	Ramakrishna
5.	Pharmaceutics Practical III	Mrs.M.K.Rekha	5 Experiments	M. Krishna
6.	Pharmaceutics Practical IV	Dr.M.Pavani	6 Experiments	M. pavani



  
Principal

PRINCIPAL

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162





**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – I**

**M PHARM (PHARMACEUTICAL ANALYSIS) SEM III**

**DATE: 14-11-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Research Methodology and Biostatistics	B.Poornima	3 - units	B.Poornima

**PHARMACOLOGY) SEM III**

**DATE: 14-11-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Research Methodology and Biostatistics	Ms.M.Divya	2 - Units	Ms.M.Divya

**M PHARM (PHARMACEUTICS) SEM III**

**DATE: 14-11-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Research Methodology and Biostatistics	Mr.P.Sandeep	2.5 Units	P Sandeep

**M PHARM (PHARMACEUTICAL TECHNOLOGY) SEM III**

**DATE: 14-11-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Research Methodology and Biostatistics	Mr.P.Sandeep	3 - Units	P Sandeep



  
Principal

**PRINCIPAL**  
Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162



**A.Y. 2022 – 2023**  
**SYLLABUS COMPLETION STATUS FOR MID – II**

**M PHARM (PHARMACEUTICAL ANALYSIS) SEM III**

**DATE: 14-11-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Research Methodology and Biostatistics	B. Poornima	2 units	B. Poornima

**M PHARM (PHARMACOLOGY) SEM III**

**DATE: 14-11-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Research Methodology and Biostatistics	Mrs. M. Divya	3-Units	Divya

**M PHARM (PHARMACEUTICS) SEM III**

**DATE: 14-11-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Research Methodology and Biostatistics	Mr.P.Sandeep	2.5 Units	P. Sandeep

**M PHARM (PHARMACEUTICAL TECHNOLOGY) SEM III**

**DATE: 14-11-2022**

S.No	Name of The Subject	Name of The Faculty	Syllabus Covered	Signature
1.	Research Methodology and Biostatistics	Mr.P.Sandeep	2- Units	P. Sandeep



  
Principal

**PRINCIPAL**

Avanthi Institute of Pharmaceutical Sciences  
Cherukupally (V), Bhogapuram Mandal  
Vizianagaram Dt., - 531162