DEPARTMENT OF PHARMACY

Program : M Pharmacy (Pharmaceutical Analysis)

Regulation : PCI (R16) **No. of Courses : 14**

COURSE OUTCOMES

I – I Sem	**Course: Modern Pharmaceutical Analytical Techniques (MPA101T)**
CO101.1	Recall principle, operation and applications of selected instrumental spectroscopic, chromatographic analysis.
CO101.2	Gain knowledge on interpretation of NMR spectra for determination of molecular structure of compounds.
CO101.3	Build the analytical understanding in the level of ion, atom, group and molecular structure of organic and inorganic compounds with different functional groups by Mass spectroscopy and their applications in pharmacy.
CO101.4	Understand the concept of seperation and identification of compounds by chromatographic techniques.
CO101.5	Categorize different anions and cations by using suitable electrophoresis techniques.
CO101.6	Elaborate principle, theory and instruments employed for the analysis of drugs by thermal techniques.
I – I Sem	**Course: Advanced Pharmaceutical Analysis (MPA102T)**
CO102.1	Gain basic knowledge on Impurities in new drug products and residual solvents. Analyze the stability studies of products.
CO102.2	Describe the potential sources for elemental impurities. Summarize the protocols for conducting stability testing of drug substances and products.
CO102.3	Analyze the identification and quantification of Impurity profiling and degradant characterization.
CO102.4	Understand the basic principles of Stability testing of phytopharmaceuticals.
CO102.5	Summarize the Principles and Procedures involved in Biological tests and assays of Vaccines, Hormones and Blood Products.
CO102.6	Elaborate principle, instrumentation and applications of various types of Immunoassays in Pharmaceutical Field.
I – I Sem	**Course: Pharmaceutical Validation (MPA103T)**
CO103.1	Illustrate the importance of Qualification and Validation of instruments and equipments.
CO103.2	Outline the process of Qualification of analytical instruments.
CO103.3	Understand the methods of Validation of Utility systems.
CO103.4	Know the methods of cleaning validation.
CO103.5	Outline ICH and USP guidelines of Analytical method validation. Enlighten the significance of usage of Computerized system validation.
CO103.6	Compile the General Principles, role and responsibilities of Intellectual Property.

I – I Sem	**Course: Food Analysis (MPA104T)**
CO104.1	Understand the concepts of classification, properties, analysis and applications of food carbohydrates and Proteins.
CO104.2	Understand the concepts of classification, properties, analysis and applications of food Lipids and Vitamins.
CO104.3	Outline the applications and applications of Food additives.
CO104.4	Summarize the importance of Pigments and synthetic dyes in food preparations and know the principles of analysis.
CO104.5	Identify the purity of milk, milk constituents and milk products by various Analytical techniques.
CO104.6	Understand the concepts of Pesticide analysis. Acquire basic knowledge on food regulations and legislations.
I – I Sem	**Course: Pharmaceutical Analysis Practical - I (MPA105PA)**
CO105.1	Able to perform the calibration of Glassware and Instruments.
CO105.2	Estimate the amount of Impurity for the given drugs.
CO105.3	Examine the purity of official compounds by instrumental techniques and different titrations.
CO105.4	Identify the Quantitative determination of functional groups and drugs by using different reagents.
I – I Sem	**Course: Pharmaceutical Analysis Practical – II (MPA105PB)**
CO106.1	Estimate the drug content by using UV spectroscopy, GC and HPLC.
CO106.2	Able to determine Carbohydrate, Protein, Vitamin and Lipid content in food products.
CO106.3	Determine preservatives, pesticide residue in food products.
CO106.4	Analysis of vitamin content in food products
I – II Sem	**Course: Advanced Pharmaceutical Analysis - II (MPA201T)**
CO201.1	Recall principle, operation and applications of HPLC.
CO201.2	Gain knowledge on Biochromatography for the separation of compounds.
CO201.3	Understand the concept of seperation and identification of compounds by Gas chromatographic techniques.
CO201.4	Elaborate the Principles, instrumentation, pharmaceutical applications of Supercritical fluid chromatography
CO201.5	Build the analytical understanding in the level of ion, atom, group and molecular structure of organic and inorganic compounds with different functional groups by Mass spectroscopy and their applications in pharmacy.
CO201.6	Elaborate principle, theory and instruments employed for the analysis of drugs by NMR Spectroscopy.
I – II Sem	**Course: Modern Bio-Analytical Techniques (MPA202T)**
CO202.1	Appreciate the importance of Extraction of drugs and metabolites from biological matrices.

CO202.2	Illustrate Biopharmaceutical Factors Affecting Drug Bioavailability.
CO202.3	Understand drug interactions involved in the design of dosage regimen.
CO202.4	Understand the Importance and applications of toxicokinetic studies.
CO202.5	Understand various types of Cell culture techniques.
CO202.6	Compile the importance and applications of In Vivo Bioavailability and Bioequivalence studies.
I – II Sem	**Course: Quality Control And Quality Assurance (MPA203T)**
CO203.1	Understand the Concept and Evolution of Quality Control and Quality Assurance.
CO203.2	Remember cGMP guidelines according to schedule M.
CO203.3	Know the Analysis of raw materials, finished products, packaging materials, in process quality control.
CO203.4	Summarize Quality control test for containers, closures and secondary packing materials.
CO203.5	Assess the Documentation process in pharmaceutical industry.
CO203.6	Appreciate the importance of the role of Manufacturing operations and controls in product development.
I – II Sem	**Course: Herbal and Cosmetic Analysis (MPA204T)**
CO204.1	Determine herbal remedies and regulations.
CO204.2	Identify Adulterants and Deterioration products.
CO204.3	Demonstrate Testing of natural products and drugs.
CO204.4	Understand Analysis of natural products and monographs.
CO204.5	Appraise various methods of Herbal drug-drug interactions.
CO204.6	Predict principles and concepts of Evaluation of cosmetic products as per BSI.
I – II Sem	**Course: Pharmaceutical Analysis Practical - III (MPA205PA)**
CO205.1	Interpretation of organic compounds by FT-IR, NMR.
CO205.2	Determine purity by DSC in pharmaceuticals.
CO205.3	Study the Quantitative analysis of components by gel electrophoresis, HPLC.
CO205.4	Record Protocol preparation for the conduct of BA/BE studies according to guidelines.
I – II Sem	**Course: Pharmaceutical Analysis Practical - IV (MPA205PB)**
CO206.1	Perform Quality control tests for Primary and secondary packing materials.
CO206.2	Study the Preparation of Master Formula Record.
CO206.3	Determine of Quality control tests for cosmetics.

CO206.4	Interpret Quantitative analysis of rancidity in lipsticks and hair oil.
II – I Sem	**Course: Research Methodology & Biostatistics (MRM301T)**
CO301.1	Recall the concepts of research methodology which includes study design, type of studies, stratifies and different design techniques.
CO301.2	Infer the data using biostatistics technique like "t" test, ANOVA and chi square tests as well as recognize the importance of samples size and its significances.
CO301.3	Learn the history of medical research for understanding the values of clinical ethics.
CO301.4	Appraise the importance of communication and sociological relationships in medical research.
CO301.5	Understand CPCSEA guidelines for laboratory animal facilities which include handling, maintenance, record keeping and transportation of lab animals.
CO301.6	Discuss the history and basic principles of Declaration of Helsinki for medical research.
II-II Sem	**Research Work**
CO401.1	Define the fundamentals, carry out the literature review on the proposed research work and identify the problem.
CO401.2	Develop the research hypothesis.
CO401.3	Summarise the requirements in the proposed research.
CO401.4	Take part in research experiments and documented.
CO401.5	Evaluate the work done by applying statistic tools.
CO401.6	Appraise societal application and appreciation.