

## **M. PHARMACY PROGRAM**

### **PROGRAM OBJECTIVES**

- To ensure high level of performance in teaching, research and practice.
- To develop the scientific and technical manpower of the highest quality to cater the needs of the industry.
- To provide a broad grasp of the fundamental principles of the sciences and scientific and Technological methods through its curriculum.
- To provide a deep understanding of the area of specialization.
- To provide an innovative ability to solve new problems.
- To provide a capacity to learn continually and interact with multidisciplinary groups.
- To develop the students with a capability for:
  - Free and objective enquiry
  - Courage and integrity
- Awareness and sensitivity to the needs and aspirations of society

### **PROGRAM SPECIFIC OBJECTIVES**

- To produce Pharma professionals of high competence who can serve the Industry and current need of the society.
- To produce Pharma professionals who can work hand in hand with the medical profession effectively.

## COURSE OBJECTIVES

<b>M. PHARM. PHARMACEUTICAL CHEMISTRY</b>	
<b>Semester-1</b>	
<b>Modern Pharmaceutical Analytical Techniques</b>	The analysis of various drugs in single and combination dosage forms
	Theoretical and practical skills of the instruments
<b>Advanced Organic Chemistry-1</b>	The principles and applications of retero-synthesis
	The mechanism & applications of various named reactions
	The concept of disconnection to develop synthetic routes for small target molecule.
	The various catalysts used in organic reactions
	The chemistry of heterocyclic compounds
<b>Advanced Medicinal Chemistry</b>	Different stages of drug discovery
	Role of medicinal chemistry in drug research
	Different techniques for drug discovery
	Various strategies to design and develop new drug like molecules for biological targets
	Peptidomimetics
<b>Chemistry of Natural Products</b>	Different types of natural compounds and their chemistry and medicinal importance
	The importance of natural compounds as lead molecules for new drug discovery
	The concept of rDNA technology tool for new drug discovery
	General methods of structural elucidation of compounds of natural origin
	Isolation, purification and characterization of simple chemical constituents from natural source
<b>Semester-2</b>	
<b>Advanced Spectral Analysis</b>	Interpretation of the NMR, Mass and IR spectra of various organic compounds
	Theoretical and practical skills of the hyphenated instruments
	Identification of organic compounds
<b>Advanced Organic Chemistry–II</b>	The principles and applications of Green chemistry
	The concept of peptide chemistry.
	The various catalysts used in organic reactions

	The concept of stereochemistry and asymmetric synthesis.
<b>Computer Aided Drug Design</b>	Role of CADD in drug discovery
	Different CADD techniques and their applications
	Various strategies to design and develop new drug like molecules.
	Working with molecular modeling softwares to design new drug molecules
	The <i>in silico</i> virtual screening protocols
<b>Pharmaceutical Process Chemistry</b>	The strategies of scale up process of APIs and intermediates
	The various unit operations and various reactions in process chemistry
<b>M. PHARM. PHARMACOGNOSY</b>	
<b>Semester-1</b>	
<b>Modern Pharmaceutical Analytical Techniques</b>	The analysis of various drugs in single and combination dosage forms
	Theoretical and practical skills of the instruments
<b>Advanced Pharmacognosy-1</b>	Know the advances in the cultivation and production of drugs
	Know the various phyto-pharmaceuticals and their source & utilization and medicinal value.
	Know the various nutraceuticals/herbs and their health benefits
<b>Phytochemistry</b>	Know the different classes of phytoconstituents and their properties and general process of natural product drug discovery
	Know the process isolation, purification and identification of phytoconstituents
<b>Industrial Herbal Drug Technology</b>	Know the requirements for setting up the herbal/natural drug industry.
	To know and understand the guidelines for quality of herbal/natural medicines and regulatory issues.
	To know patenting/IPR of herbals/natural drugs and trade of raw and finished materials.
<b>Semester-2</b>	
<b>Medicinal Plant Biotechnology</b>	Know the process like genetic engineering in medicinal plants for higher yield of Phytopharmaceuticals.
	Use the biotechnological techniques for obtaining and improving the quality of natural products/medicinal plants
<b>Advanced Pharmacognosy-II</b>	Know the validation of herbal remedies
	Know the methods of detection of adulteration and evaluation

	techniques for the herbal drugs
	To know the methods of screening of herbals for various biological properties
<b>Indian Systems of Medicine</b>	To understand the basic principles of various Indian systems of medicine
	To know the clinical research of traditional medicines, Current Good Manufacturing
	Practice of Indian systems of medicine and formulation.
<b>Herbal Cosmetics</b>	Understand the basic principles of various herbal/natural cosmetic preparations
	Current Good Manufacturing Practices of herbal/natural cosmetics as per the regulatory authorities
<b>M. PHARM. PHARMACOLOGY</b>	
<b>Semester-1</b>	
<b>Modern Pharmaceutical Analytical Techniques</b>	The analysis of various drugs in single and combination dosage forms
	Theoretical and practical skills
<b>Advanced Pharmacology-I</b>	Discuss the pathophysiology and pharmacotherapy of certain diseases
	Explain the mechanism of drug actions at cellular and molecular level
	Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases
<b>Pharmacological And Toxicological Screening Methods-I</b>	Appraise the regulations and ethical requirement for the usage of experimental animals.
	Describe the various animals used in the drug discovery process and good laboratory practices in maintenance and handling of experimental animals
	Describe the various newer screening methods involved in the drug discovery process
	Appreciate and correlate the preclinical data to humans
<b>Cellular And Molecular Pharmacology</b>	Explain the receptor signal transduction processes.
	Explain the molecular pathways affected by drugs.
	Appreciate the applicability of molecular pharmacology and biomarkers in drug discovery process.
	Demonstrate molecular biology techniques as applicable for pharmacology
<b>Semester-2</b>	
<b>Advanced Pharmacology-II</b>	Explain the mechanism of drug actions at cellular and molecular level

	Discuss the Pathophysiology and pharmacotherapy of certain diseases
	Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases
<b>Pharmacological and Toxicological Screening Methods-II</b>	Explain the various types of toxicity studies.
	Appreciate the importance of ethical and regulatory requirements for toxicity studies.
	Demonstrate the practical skills required to conduct the preclinical toxicity studies.
<b>Principles of Drug Discovery</b>	Explain the various stages of drug discovery.
	Appreciate the importance of the role of genomics, proteomics and bioinformatics in drug discovery
	Explain various targets for drug discovery.
	Explain various lead seeking method and lead optimization
	Appreciate the importance of the role of computer aided drug design in drug discovery
<b>Clinical Research and Pharmacovigilance</b>	Explain the regulatory requirements for conducting clinical trial
	Demonstrate the types of clinical trial designs
	Explain the responsibilities of key players involved in clinical trials
	Execute safety monitoring, reporting and close-out activities
	Explain the principles of Pharmacovigilance
	Detect new adverse drug reactions and their assessment
	Perform the adverse drug reaction reporting systems and communication in Pharmacovigilance
<b>M.PHARM. DRUG REGULATORY AFFAIRS (DRA)</b>	
<b>Semester-1</b>	
<b>Good Pharmaceutical Practices</b>	The key elements of current Good Manufacturing Practices, Good Laboratory Practices, Good Automated Laboratory Practices, Good Documentation Practices
	The check lists for various Good Regulatory Practices and
	Prepare SOPs for Good Pharmaceutical Practices
	Implement Good Regulatory Practices in the Health care Industries and
	Prepare for the Audit of the Pharmaceutical Industries.
	Prepare for the rediness and conduct of the audit/inspections
<b>Pharmaceutical Regulations In India</b>	Know different Acts and guidelines that regulate PMBC industry in India.
	Understand the approval process and regulatory requirements for

	drugs and medical devices
<b>International Pharmaceutical Regulations-I</b>	Regulatory registration and landscape
<b>Clinical Research Regulations</b>	Clinical drug development process and different phases of clinical trials, investigations
	History, origin and ethics of clinical research
	Regulatory requirements for conducting clinical trials investigations and research
	Regulations and guidance governing the conduct of clinical research
<b>Semester-2</b>	
<b>Documentation And Regulatory Writing</b>	Know the various documents pertaining to drugs in pharmaceutical industry
	Understand the basics of regulatory compilation
	Create and assemble the regulation submission as per the requirements of agencies
	Follow up the submissions and post approval document requirements
<b>Biologicals Regulations</b>	Know the regulatory Requirements for Biologics and Vaccines
	Understand the regulation for newly developed biologics and Biosimilars
	Know the pre-clinical and clinical development considerations of biologics
	Understand the Regulatory Requirements of Blood and/or Its Components Including Blood Products and label requirements
<b>International Pharmaceutical Regulations – II</b>	Know the regulatory Requirements for drug and medical device registration in emerging market
	Understand the registration requirements of emerging market by comparison
	Prepare dossiers for the registration of the products in emerging market.
<b>Medical Device Regulations</b>	Basics of medical devices, process of development, ethical and quality considerations
	Harmonization initiatives for approval and marketing medical devices
	Regulatory approval process for medical devices in US, EU and asia
	Clinical aspects of medical devices
<b>M. PHARM. INDUSTRIAL PHARMACY</b>	

<b>Semester-1</b>	
<b>Modern Pharmaceutical Analytical Techniques</b>	The analysis of various drugs in single and combination dosage forms
	Theoretical and practical skills of the instruments
<b>Pharmaceutical Formulation Development</b>	The scheduled activities in a Pharmaceutical firm.
	The pre formulation studies of pilot batches of pharmaceutical industry.
	The significance of dissolution and product stability
<b>Customized Drug Delivery Systems</b>	The need, concept, design and evaluation of various customized, sustained and controlled release dosage forms.
	To formulate and evaluate various customized/novel drug delivery systems
<b>Drug Regulations And Intellectual Property Rights</b>	Assist in Regulatory Audit process.
	Establish regulatory guidelines for drug and drug products
	The Regulatory requirements for contract research organization
<b>Semester-2</b>	
<b>Advanced Biopharmaceutics &amp; Pharmacokinetics</b>	The basic concepts in Biopharmaceutics and pharmacokinetics.
	The use of raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination.
	To critically evaluate Biopharmaceutics studies involving drug product equivalency.
	To design and evaluate dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.
<b>Scale Up And Technology Transfer</b>	Manage the scale up process in pharmaceutical industry.
	Assist in technology transfer.
	To establish safety guidelines, which prevent industrial hazards.
<b>Pharmaceutical Production Technology</b>	Handle the scheduled activities in a Pharmaceutical firm.
	Manage the production of large batches of pharmaceutical formulations.
<b>Entrepreneurship Management</b>	The Role of enterprise in national and global economy
	Dynamics of motivation and concepts of entrepreneurship
	Demands and challenges of Growth Strategies And Networking.