

## B. Pharmacy Program

### PROGRAM OBJECTIVES

- To produce Pharmacy graduates with strong fundamental concepts and high technical competence in pharmaceutical sciences and technology.
- To provide students with a strong and well defined concepts in the various fields of pharmaceutical sciences viz., Pharmaceutics, Pharmaceutical chemistry, Pharmacognosy, Pharmacology and Pharmacy Practice according to the requirement of pharmaceutical industries, community and hospital pharmacy.
- To develop a sense of teamwork and awareness amongst students towards the importance of interdisciplinary approach for developing competence in solving complex problems in the area of Pharmaceutical Sciences.
- To encourage the students to participate in lifelong learning process for a highly productive career and to relate the concepts of Pharmaceutical Sciences towards serving the cause of the society.

### PROGRAM SPECIFIC OBJECTIVES

- To produce Pharma professionals of high competence who can serve the Industry and society.
- To produce Pharma professionals who can become the support to the medical profession effectively.

### COURSE OBJECTIVES

<b>Semester -1</b>	
<b>Human Anatomy And Physiology-I (Theory)</b>	Explain the gross morphology, structure and functions of various organs of the human body.
	Describe the various homeostatic mechanisms and their imbalances.
	Identify the various tissues and organs of different systems of human body.
	Perform the various experiments related to special senses and nervous system.
	Appreciate coordinated working pattern of different organs of each system.
<b>Pharmaceutical Analysis-I (Theory)</b>	Understand the principles of volumetric and electro chemical analysis
	Carryout various volumetric and electrochemical titrations
	Develop analytical skills

<b>Pharmaceutics- I (Theory)</b>	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
<b>Pharmaceutical Inorganic Chemistry (Theory)</b>	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
<b>Communication Skills (Theory)</b>	Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
	Communicate effectively (Verbal and Non Verbal)
	Effectively manage the team as a team player
	Develop interview skills
	Develop Leadership qualities and essentials
<b>Remedial Biology (Theory)</b>	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
<b>Remedial Mathematics (Theory)</b>	Know the theory and their application in Pharmacy
	Solve the different types of problems by applying theory
	Appreciate the important application of mathematics in Pharmacy
<b>SEMESTER-II</b>	
<b>Human Anatomy And Physiology-II (Theory)</b>	Explain the gross morphology, structure and functions of various organs of the human body.
	Describe the various homeostatic mechanisms and their imbalances.
	Identify the various tissues and organs of different systems of human body.
	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.
	Appreciate coordinated working pattern of different organs of each system
	Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.
<b>Pharmaceutical organic Chemistry –I (Theory)</b>	Write the structure, name and the type of isomerism of the organic compound
	Write the reaction, name the reaction and orientation of reactions
	Account for reactivity/stability of compounds,
	Identify/confirm the identification of organic compound
<b>Biochemistry (Theory)</b>	Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
	Understand the metabolism of nutrient molecules in physiological and pathological conditions.
	Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
<b>Computer Applications In Pharmacy</b>	Know the various types of application of computers in pharmacy
	Know the various types of databases
	Know the various applications of databases in pharmacy

<b>(Theory)</b>	
<b>Environmental Sciences (Theory)</b>	Create the awareness about environmental problems among learners.
	Impart basic knowledge about the environment and its allied problems.
	Develop an attitude of concern for the environment.
	Motivate learner to participate in environment protection and environment improvement.
	Acquire skills to help the concerned individuals in identifying and solving environmental problems.
	Strive to attain harmony with Nature.
<b>Semester-III</b>	
<b>Pharmaceutical Organic Chemistry –II (Theory)</b>	write the structure, name and the type of isomerism of the organic compound
	write the reaction, name the reaction and orientation of reactions
	account for reactivity/stability of compounds, prepare organic compounds
<b>Physical Pharmaceutics-I (Theory)</b>	Understand various physicochemical properties of drug molecules in the designing the dosage forms
	Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations
	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.
<b>Pharmaceutical Microbiology (Theory)</b>	Understand methods of identification, cultivation and preservation of various microorganisms
	To understand the importance and implementation of sterilization in pharmaceutical processing and industry
	Learn sterility testing of pharmaceutical products.
	Carried out microbiological standardization of Pharmaceuticals.
	Understand the cell culture technology and its applications in pharmaceutical industries.
<b>Pharmaceutical Engineering (Theory)</b>	To know various unit operations used in Pharmaceutical industries.
	To understand the material handling techniques.
	To perform various processes involved in pharmaceutical manufacturing process.
	To carry out various test to prevent environmental pollution.
	To appreciate and comprehend significance of plant lay out design for optimum use of resources.
	To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.
<b>Semester-IV</b>	
<b>Pharmaceutical Organic Chemistry –III (Theory)</b>	Understand the methods of preparation and properties of organic compounds
	Explain the stereo chemical aspects of organic compounds and stereo chemical reactions
	Know the medicinal uses and other applications of organic compounds
<b>Medicinal Chemistry – I (Theory)</b>	Understand the chemistry of drugs with respect to their pharmacological activity
	Understand the drug metabolic pathways, adverse effect and

	therapeutic value of drugs
	Know the Structural Activity Relationship (SAR) of different class of drugs
	Write the chemical synthesis of some drugs
<b>Physical Pharmaceutics-II (Theory)</b>	Understand various physicochemical properties of drug molecules in the designing the dosage forms
	Know the principles of chemical kinetics & to use them for stability testing nad determination of expiry date of formulations
	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.
<b>Pharmacology-I (Theory)</b>	Understand the pharmacological actions of different categories of drugs
	Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.
	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
	Observe the effect of drugs on animals by simulated experiments
	Appreciate correlation of pharmacology with other bio medical sciences
<b>Pharmacognosy-I (Theory)</b>	To know the techniques in the cultivation and production of crude drugs
	To know the crude drugs, their uses and chemical nature
	Know the evaluation techniques for the herbal drugs
	To carry out the microscopic and morphological evaluation of crude drugs
<b>Semester-V</b>	
<b>Medicinal Chemistry-II</b>	Understand the chemistry of drugs with respect to their pharmacological activity
	Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
	Know the Structural Activity Relationship of different class of drugs
	Study the chemical synthesis of selected drugs
<b>Industrial Pharmacy-I (Theory)</b>	Know the various pharmaceutical dosage forms and their manufacturing techniques.
	Know various considerations in development of pharmaceutical dosage forms
	Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality
<b>Pharmacology-II (Theory)</b>	Understand the mechanism of drug action and its relevance in the treatment of different diseases
	Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
	Demonstrate the various receptor actions using isolated tissue preparation
	Appreciate correlation of pharmacology with related medical sciences
<b>Pharmacognosy-II (Theory)</b>	To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
	To understand the preparation and development of herbal

	formulation.
	To understand the herbal drug interactions
	To carryout isolation and identification of phytoconstituents
<b>Pharmaceutical Jurisprudence (Theory)</b>	The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
	Various Indian pharmaceutical Acts and Laws
	The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
	The code of ethics during the pharmaceutical practice
<b>Semester-VI</b>	
<b>Medicinal Chemistry-III (Theory)</b>	Understand the importance of drug design and different techniques of drug design.
	Understand the chemistry of drugs with respect to their biological activity.
	Know the metabolism, adverse effects and therapeutic value of drugs.
	Know the importance of SAR of drugs.
<b>Pharmacology-III (Theory)</b>	Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
	Comprehend the principles of toxicology and treatment of various poisoningsand
	Appreciate correlation of pharmacology with related medical sciences.
<b>Herbal Drug Technology (Theory)</b>	Understand raw material as source of herbal drugs from cultivation to herbal drug product
	Know the WHO and ICH guidelines for evaluation of herbal drugs
	Know the herbal cosmetics, natural sweeteners, nutraceuticals
	Appreciate patenting of herbal drugs, GMP .
<b>Biopharmaceutics And Pharmacokinetics (Theory)</b>	Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.
	Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
	To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
	Understand various pharmacokinetic parameters, their significance & applications. Course Content:
<b>Pharmaceutical Biotechnology (Theory)</b>	Understanding the importance of Immobilized enzymes in Pharmaceutical Industries
	Genetic engineering applications in relation to production of pharmaceuticals
	Importance of Monoclonal antibodies in Industries
<b>Quality Assurance (Theory)</b>	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
<b>Semester-VII</b>	
<b>Instrumental Methods</b>	Understand the interaction of matter with electromagnetic radiations

<b>Of Analysis (Theory)</b>	and its applications in drug analysis
	Understand the chromatographic separation and analysis of drugs.
	Perform quantitative & qualitative analysis of drugs using various analytical instruments.
<b>Industrial Pharmacy-II (Theory)</b>	Know the process of pilot plant and scale up of pharmaceutical dosage forms
	Understand the process of technology transfer from lab scale to commercial batch
	Know different Laws and Acts that regulate pharmaceutical industry
	Understand the approval process and regulatory requirements for drug products
<b>Pharmacy Practice (Theory)</b>	Know various drug distribution methods in a hospital
	Appreciate the pharmacy stores management and inventory control
	Monitor drug therapy of patient through medication chart review and clinical review
	Obtain medication history interview and counsel the patients
	Identify drug related problems
	Detect and assess adverse drug reactions
	Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states
	Know pharmaceutical care services
	Do patient counseling in community pharmacy;
	Appreciate the concept of Rational drug therapy.
<b>Novel Drug Delivery System (Theory)</b>	To understand various approaches for development of novel drug delivery systems.
	To understand the criteria for selection of drugs and polymers for the development of
<b>Semester-VIII</b>	
<b>Biostatistics And Research Methodology (Theory)</b>	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.
<b>Social And Preventive Pharmacy</b>	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
<b>Pharmaceutical Marketing (Theory)</b>	The course aims to provide an understanding of marketing concepts and techniques and their applications in the pharmaceutical industry.
<b>Pharmaceutical Regulatory Science (Theory)</b>	Know about the process of drug discovery and development
	Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
	Know the regulatory approval process and their registration in Indian and international markets
<b>Pharmacovigilance (Theory)</b>	Why drug safety monitoring is important?
	History and development of pharmacovigilance
	National and international scenario of pharmacovigilance

	Dictionaries, coding and terminologies used in pharmacovigilance
	Detection of new adverse drug reactions and their assessment
	International standards for classification of diseases and drugs
	Adverse drug reaction reporting systems and communication in pharmacovigilance
	Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle
	Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation
	Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India
	ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning
	CIOMS requirements for ADR reporting
	Writing case narratives of adverse events and their quality.
<b>Quality Control And Standardization Of Herbals (Theory)</b>	Know who guidelines for quality control of herbal drugs
	Know quality assurance in herbal drug industry
	Know the regulatory approval process and their registration in Indian and international markets
<b>Computer Aided Drug Design (Theory)</b>	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
<b>Cell And Molecular Biology</b>	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	
<b>Experimental Pharmacology-Theory</b>	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
<b>Advanced Instrumentation Techniques</b>	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.