Program outcomes

M.PHARM

Upon completion of the program, student shall be able to understand:

PO	Description
PO1	1. Demonstrate understanding of basic sciences relevant to specialty.
PO2	2. Acquire the detailed knowledge about the fundamentals and advances of the respective specialty.
PO3	3. Update knowledge by self-study and by attending courses, conferences and seminars relevant to specialty.
PO4	4. Undertake audit, use information and carryout research both basics and professional with the aim of publishing or presenting the work at various scientific gatherings.
PO5	5. Acquire adequate skills and competence in performing various tasks as required in the specialty.
PO6	6. Adopt ethical principles in all aspects of the professional practice.
PO7	7. Foster, professional honesty and integrity.
PO8	8. Discharge the duties irrespective of social status, caste, creed or religion of the customers/clients.
PO9	9. Develop oral and written communication skills
PO10	10. Provide leadership and get the best out of his or her team in a congenial working atmosphere.
PO11	11. Apply high moral and ethical standard while carrying out human and animal research.

Course outcomes

Program: I-M.Pharm. -Pharmacology

Course: MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

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

CO	Description
CO1	1. Chemicals and Excipients
CO2	2. The analysis of various drugs in single and combination dosage forms
CO3	3. Theoretical and practical skills of the instruments

Course: ADVANCED PHARMACOLOGY-I

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

CO	Description
CO1	1. Discuss the pathophysiology and pharmacotherapy of certain diseases
CO2	2. Explain the mechanism of drug actions at cellular and molecular level
CO3	3. Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases

Course: PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS-I

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

CO	Description
CO1	1. Appraise the regulations and ethical requirement for the usage of experimental animals.
CO2	2. Describe the various animals used in the drug discovery process and good laboratory practices in maintenance and handling of experimental
CO3	3. Describe the various newer screening methods involved in the drug discovery process
CO4	4. Appreciate and correlate the preclinical data to humans

Course: CELLULAR AND MOLECULAR PHARMACOLOGY

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

CO	Description
CO1	1. Explain the receptor signal transduction processes.
CO2	2. Explain the molecular pathways affected by drugs.
CO3	3. Appreciate the applicability of molecular pharmacology and biomarkers in drug discovery process.
CO4	4. Demonstrate molecular biology techniques as applicable for pharmacology

Course: ADVANCED PHARMACOLOGY - II

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

CO	Description
CO1	1. Explain the mechanism of drug actions at cellular and molecular level
CO2	2. Discuss the Pathophysiology and pharmacotherapy of certain diseases
CO3	3. Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases

Course: PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS-II

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

CO	Description
CO1	Explain the various types of toxicity studies.
CO2	Appreciate the importance of ethical and regulatory requirements for toxicity studies.
CO3	Demonstrate the practical skills required to conduct the preclinical toxicity studies.

Course: PRINCIPLES OF DRUG DISCOVERY

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

CO	Description
CO1	Explain the various stages of drug discovery.
CO2	Appreciate the importance of the role of genomics, proteomics and bioinformatics in drug discovery
CO3	Explain various targets for drug discovery.
CO4	Explain various lead seeking method and lead optimization
CO5	Appreciate the importance of the role of computer aided drug design in drug discovery

Course: CLINICAL RESEARCH AND PHARMACOVIGILANCE

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

CO	Description
CO1	Explain the regulatory requirements for conducting clinical trial
CO2	Demonstrate the types of clinical trial designs
CO3	Explain the responsibilities of key players involved in clinical trials
CO4	Execute safety monitoring, reporting and close-out activities
CO5	Explain the principles of Pharmacovigilance
CO6	Detect new adverse drug reactions and their assessment
CO7	Perform the adverse drug reaction reporting systems and communication in Pharmacovigilance

Program: I.M.Pharm. -Pharmaceutics

Course: MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES

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

CO	Description
CO1	Chemicals and Excipients
CO2	The analysis of various drugs in single and combination dosage forms
CO3	Theoretical and practical skills of the instruments

Course: MODIFIED RELEASE DRUG DELIVERY SYSTEM (MPH101T)

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

CO	Description
CO1	The various approaches for development of novel drug delivery systems.
CO2	The criteria for selection of drugs and polymers for the development of delivery systems
CO3	The formulation and evaluation of Novel drug delivery systems.

Course: MODERN PHARMACEUTICS (MPH102T)

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

CO	Description
CO1	To understand Preformulation studies –Drug Excipient interactions, Stability testing, Theories of dispersion, Large and small volume parentral .
CO2	To study Optimization techniques and their application in formulation.
CO3	To learn Pharmaceutical Validation, like ICH & WHO guidelines for validation of equipment’s, Validation of specific dosage form, Types of validation

CO4	To learn cGMP considerations and Industrial Management like Materials management, Inventory management and control, Production and planning control and TQM.
CO5	To study physics of tablet compression, forces, solubility enhancement technique.
CO6	Study the parameters like Diffusion, Dissolution and Pharmacokinetic, Similarity factors – f2 and f1

Course: REGULATORY AFFAIRS (MPH103T)

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

CO	Description
CO1	The Concepts of innovator and generic drugs, drug development process
CO2	The Regulatory guidance's and guidelines for filing and approval process
CO3	Preparation of Dossiers and their submission to regulatory agencies in different Countries.
CO4	Post approval regulatory requirements for actives and drug products
CO5	Submission of global documents in CTD/ eCTD formats
CO6	Clinical trials requirements for approvals for conducting clinical trials
CO7	Pharmacovigilence and process of monitoring in clinical trails

Course: MOLECULAR PHARMACEUTICS (NANO TECH AND TARGETED DDS) (MPH201T)

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

CO	Description
CO1	The various approaches for development of novel drug delivery systems.
CO2	The criteria for selection of drugs and polymers for the development of
CO3	The formulation and evaluation of novel drug delivery systems.

Course: ADVANCED BIOPHARMACEUTICS&PHARMACOKINETICS (MPH202T)

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

CO	Description
CO1	The basic concepts in biopharmaceutics and pharmacokinetics.
CO2	The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination
CO3	The critical evaluation of biopharmaceutic studies involving drug product equivalency.
CO4	The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters
CO5	The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic

Course: COMPUTER AIDED DRUG DELIVERY SYSTEM (MPH203T)

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

CO	Description
CO1	History of Computers in Pharmaceutical Research and Development
CO2	Computational Modeling of Drug Disposition
CO3	Computers in Preclinical Development
CO4	Optimization Techniques in Pharmaceutical Formulation
CO5	Computers in Market Analysis
CO6	Computers in Clinical Development
CO7	Artificial Intelligence (AI) and Robotics
CO8	Computational fluid dynamics(CFD)

Course: COSMETIC AND COSMECEUTICALS (MPH 204T)

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

CO	Description
CO1	Key ingredients used in cosmetics and cosmeceuticals.
CO2	Key building blocks for various formulations.
CO3	Current technologies in the market
CO4	Various key ingredients and basic science to develop cosmetics and cosmeceuticals
CO5	Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.

BPHARM PROGRAM OUTCOME

PO1: Adequate knowledge and scientific information regarding basic principles of Pharmaceutical chemistry, Pharmaceutics including cosmetics, Pharmacology/ and Pharmacognosy including Herbal drugs

PO2: Adequate knowledge of practical aspects of synthesis, formulation and analysis of various pharmaceutical and Herbal medicinal agents

PO3: Adequate knowledge of practical aspects of delivering a quality assured product as per pharmacopoeia, WHO and ISO standards

PO4: Adequate knowledge of practical aspects of pharmacological screening, standardization biological and *in-vivo* drug interactions.

PO5: Adequate knowledge of clinical studies for patient counseling leading to physical and social well being of patients.

PO6: Adequate knowledge of practical aspects of product detailing and marketing of Pharmaceutical products.

PO7: Able to synthesize purify, identify and analyze medicinal agents.

PO8: Able to formulate, store, dispense, analyze the prescriptions and / or manufacture the medicinal agents at commercial level.

PO9: Able to learn and apply the quality assurance principles including legal and ethical aspects involving drugs.

PO10: Able to extract, purify, identify and know the therapeutic value of herbal / crude / natural products.

PO11: Able to screen various medicinal agents using animal models for pharmacological activity.

PO12: Willing to apply the current knowledge of pharmacy in the best interest of patients and the community.

PO13: Maintain a high standard of professional ethics in discharging professional obligations.

PO14: Continuously upgrade professional information and be conversant with latest advances in Pharmacy field to serve the community better.

PO15: Willing to participate in continuing education programmes of PCI and AICTE to upgrade knowledge and professional skills.

PO16: To help and to participate in the implementation of National Health programs.

B.PHARM. PROGRAMS

Program: I Sem BPHARM

Course: HUMAN ANATOMY AND PHYSIOLOGY-I

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

CO	Description
CO1	Explain the gross morphology, structure and functions of various organs of the human body.
CO2	Describe the various homeostatic mechanisms and their imbalances
CO3	Identify the various tissues and organs of different systems of human body.
CO4	Perform the various experiments related to special senses and nervous system.
CO5	Appreciate coordinated working pattern of different organs of each system

Course: PHARMACEUTICAL ANALYSIS

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

CO	Description
CO1	understand the principles of volumetric and electro chemical analysis
CO2	carryout various volumetric and electrochemical titrations
CO3	develop analytical skills

Course: PHARMACEUTICS

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

CO	Description
CO1	Know the history of profession of pharmacy
CO2	Understand the basics of different dosage forms, pharmaceutical incompabilities and pharmaceutical calculations.
CO3	Understand the professional way of handling the prescription.
CO4	Preparation of various conventional dosage form

Course: PHARMACEUTICAL INORGANIC CHEMISTRY
Upon completion of the course, student shall be able to understand:

CO	Description
CO1	know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals
CO2	understand the medicinal and pharmaceutical importance of inorganic compounds

Course: COMMUNICATION SKILLS
Upon completion of the course, student shall be able to understand:

CO	Description
CO1	Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
CO2	2. Communicate effectively (Verbal and Non Verbal)
CO3	3. Effectively manage the team as a team player
CO4	4. Develop interview skills
CO5	5. Develop Leadership qualities and essentials

Course: REMEDIAL BIOLOGY

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

CO	Description
CO1	know the classification and salient features of five kingdoms of life
CO2	understand the basic components of anatomy & physiology of plant
CO3	know understand the basic components of anatomy & physiology animal with special reference to human

Course: REMEDIAL MATHEMATICS

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

CO	Description
CO1	Know the theory and their application in Pharmacy
CO2	**2.** Solve the different types of problems by applying theory
CO3	**3.** Appreciate the important application of mathematics in Pharmacy

Program: II Sem BPHARM

Course: HUMAN ANATOMY AND PHYSIOLOGY-II

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

CO	Description
CO1	1. Explain the gross morphology, structure and functions of various organs of the human body.
CO2	2. Describe the various homeostatic mechanisms and their imbalances.
CO3	3. Identify the various tissues and organs of different systems of human body.
CO4	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.
CO5	5. Appreciate coordinated working pattern of different organs of each system
CO6	6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.

Course: PHARMACEUTICAL ORGANIC CHEMISTRY-I

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

CO	Description
CO1	1. write the structure, name and the type of isomerism of the organic compound
CO2	2. write the reaction, name the reaction and orientation of reactions
CO3	3. account for reactivity/stability of compounds,

CO4	4. identify/confirm the identification of organic compound

Course: BIOCHEMISTRY

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

CO	Description
CO1	1. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
CO2	2. Understand the metabolism of nutrient molecules in physiological and pathological conditions.
CO3	3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins

Course: PATHOPHYSIOLOGY

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

CO	Description
CO1	1. Describe the etiology and pathogenesis of the selected disease states;
CO2	2. Name the signs and symptoms of the diseases; and
CO3	3. Mention the complications of the diseases.

Course: COMPUTER APPLICATIONS IN PHARMACY

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

CO	Description
CO1	Know The Various Types Of Application Of Computers In Pharmacy
CO2	Know The Various Types Of Databases
CO3	Know The Various Applications Of Databases In Pharmacy

Course: ENVIRONMENTAL SCIENCES

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

CO	Description
CO1	Create the awareness about environmental problems among learners.
CO2	Impart basic knowledge about the environment and its allied problems.
CO3	Develop an attitude of concern for the environment.
CO4	Motivate learner to participate in environment protection and environment improvement.
CO5	Acquire skills to help the concerned individuals in identifying and solving environmental problems.
CO6	Strive to attain harmony with Nature.

Program: III Sem BPHARM

Course: PHARMACEUTICAL ORGANIC CHEMISTRY-II

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

CO	Description
CO1	1. write the structure, name and the type of isomerism of the organic compound
CO2	2. write the reaction, name the reaction and orientation of reactions
CO3	3. account for reactivity/stability of compounds,
CO4	4. prepare organic compounds

Course: Physical pharmaceutics I

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

CO	Description
CO1	Understand various physicochemical properties of drug molecules in the designing the dosage form
CO2	Know the principles of chemical kinetics & to use them in assigning expiry date for formulation

CO3	Demonstrate use of physicochemical properties in evaluation of dosage forms.
CO4	Appreciate physicochemical properties of drug molecules in formulation research and development

Course: PHARMACEUTICAL MICROBIOLOGY

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

CO	Description
CO1	1. Understand methods of identification, cultivation and preservation of various microorganisms
CO2	2. Importance of sterilization in microbiology. and pharmaceutical industry
CO3	3. Learn sterility testing of pharmaceutical products.
CO4	4. Microbiological standardization of Pharmaceuticals.
CO5	5. Understand the cell culture technology and its applications in pharmaceutical industries.

Course: PHARMACEUTICAL ENGINEERING

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

CO	Description
CO1	1. To know various unit operations used in Pharmaceutical industries.
CO2	2. To understand the material handling techniques.
CO3	3. To perform various processes involved in pharmaceutical manufacturing process.
CO4	4. To carry out various test to prevent environmental pollution.
CO5	5. To appreciate and comprehend significance of plant lay out design for optimum use of resources.
CO6	6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.

Program: IV Sem BPHARM

Course: PHARMACEUTICAL ORGANIC CHEMISTRY-III

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

CO	Description
CO1	Understand the method of preparation and properties of organic compounds
CO2	Explain the steriochemical aspects of organic compounds and sterio chemical reactions
CO3	Know the medical uses and other applications of organic compounds

Course: MEDICINAL CHEMISTRY-I

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

CO	Description
CO1	understand the chemistry of drugs with respect to their pharmacological activity
CO2	understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
CO3	know the Structural Activity Relationship (SAR) of different class of drugs
CO4	write the chemical synthesis of some drugs

Course: PHYSICAL PHARMACEUTICS II

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

CO	Description
CO1	Understand various physicochemical properties of drug molecules in the designing the dosage form
CO2	Know the principles of chemical kinetics & to use them in assigning expiry date for formulation
CO3	Demonstrate use of physicochemical properties in evaluation of dosage forms.
CO4	Appreciate physicochemical properties of drug molecules in formulation research and development

Course: PHARMACOLOGY-I

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

CO	Description
CO1	1. Understand the pharmacological actions of different categories of drugs
CO2	2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.

CO3	3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
CO4	4. Observe the effect of drugs on animals by simulated experiments
CO5	5. Appreciate correlation of pharmacology with other bio medical sciences

Course: PHARMACOGNOSY AND PHYTOCHEMISTRY I

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

CO	Description
CO1	1. to know the techniques in the cultivation and production of crude drugs
CO2	2. to know the crude drugs, their uses and chemical nature
CO3	3. know the evaluation techniques for the herbal drugs
CO4	4. to carry out the microscopic and morphological evaluation of crude drugs

Program: V Sem B.Pharm

Course: MEDICINAL CHEMISTRY-II

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

CO	Description
CO1	1. Understand the chemistry of drugs with respect to their pharmacological activity
CO2	2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
CO3	3. Know the Structural Activity Relationship of different class of drugs
CO4	4.Study the chemical synthesis of selected drugs

Course: INDUSTRIAL PHARMACY I

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

CO	Description
CO1	1. Know the various pharmaceutical dosage forms and their manufacturing techniques.
CO2	2. Know various considerations in development of pharmaceutical dosage forms
CO3	3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality

Course: PHARMACOLOGY-II
Upon completion of the course, student shall be able to understand:

CO	Description
CO1	1. Understand the mechanism of drug action and its relevance in the treatment of different diseases
CO2	2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments
CO3	3. Demonstrate the various receptor actions using isolated tissue preparation
CO4	4. Appreciate correlation of pharmacology with related medical sciences

Course: PHARMACOGNOSY AND PHYTOCHEMISTRY II
Upon completion of the course, student shall be able to understand:

CO	Description
CO1	1. To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
CO2	2. To understand the preparation and development of herbal formulation.
CO3	3. To understand the herbal drug interactions
CO4	4. To carryout isolation and identification of phytoconstituents

Course: PHARMACEUTICAL JURISPRUDENCE
Upon completion of the course, student shall be able to understand:

CO	Description
CO1	1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
CO2	2. Various Indian pharmaceutical Acts and Laws
CO3	3. The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
CO4	4. The code of ethics during the pharmaceutical practice

Program: VI Sem B.Pharm

Course: MEDICINAL CHEMISTRY-III

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

CO	Description
CO1	1. Understand the importance of drug design and different techniques of drug design.
CO2	2. Understand the chemistry of drugs with respect to their biological activity.
CO3	3. Know the metabolism, adverse effects and therapeutic value of drugs.
CO4	4. Know the importance of SAR of drugs.

Course: PHARMACOLOGY-III

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

CO	Description
CO1	1. Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases.
CO2	2. Comprehend the principles of toxicology and treatment of various poisonings.
CO3	3. Appreciate correlation of pharmacology with related medical sciences.

Course: HERBAL DRUG TECHNOLOGY

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

CO	Description
CO1	1.To understand raw material as source of herbal drugs from cultivation to herbal drug product
CO2	2. To know the WHO and ICH guidelines for evaluation of herbal drugs
CO3	3. To know the herbal cosmetics, natural sweeteners, nutraceuticals
CO4	4. To appreciate patenting of herbal drugs, GMP .

Course: BIOPHARMACEUTICS AND PHARMACOKINETICS

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

CO	Description

CO1	1. Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.
CO2	2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
CO3	3. To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
CO4	4. Understand various pharmacokinetic parameters, their significance & metabolism, excretion, elimination.

Course: PHARMACEUTICAL BIOTECHNOLOGY

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

CO	Description
CO1	1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries
CO2	2. Genetic engineering applications in relation to production of pharmaceuticals
CO3	3. Importance of Monoclonal antibodies in Industries
CO4	4. Appreciate the use of microorganisms in fermentation technology

Course: PHARMACEUTICAL QUALITY ASSURANCE

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

CO	Description
CO1	1. To understand the cGMP aspects in a pharmaceutical industry.
CO2	2. To appreciate the importance of documentation.
CO3	3.To understand the scope of quality certifications applicable to pharmaceutical industries.
CO4	4. To understand the responsibilities of QA & QC departments.

Program: VII Sem B.Pharm

Course: INSTRUMENTAL METHODS OF ANALYSIS

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

CO	Description
CO1	1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
CO2	2. Understand the chromatographic separation and analysis of drugs.
CO3	3. Perform quantitative & qualitative analysis of drugs using various analytical instruments

Course: INDUSTRIAL PHARMACY II

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

CO	Description
CO1	1. Know the process of pilot plant and scale up of pharmaceutical dosage forms
CO2	2. Understand the process of technology transfer from lab scale to commercial batch
CO3	3. Know different Laws and Acts that regulate pharmaceutical industry
CO4	4. Understand the approval process and regulatory requirements for drug products

Course: PHARMACY PRACTICE

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

CO	Description
CO1	1.To know various drug distribution methods in a hospital
CO2	2.Toappreciate the pharmacy stores management and inventory control
CO3	3.To monitor drug therapy of patient through medication chart review and clinical review
CO4	4.To obtain medication history interview and counsel the patients
CO5	5.To identify drug related problems
CO6	6. To detect and assess adverse drug reactions
CO7	7.To interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states
CO8	8.To know pharmaceutical care services
CO9	9.To do patient counseling in community pharmacy;

CO10	10. To appreciate the concept of Rational drug therapy.

Course: NOVEL DRUG DELIVERY SYSTEMS

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

CO	Description
CO1	1. To understand various approaches for development of novel drug delivery systems.
CO2	2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation

Program: VIII Sem B.Pharm

Course: BIOSTATISITCS AND RESEARCH METHODOLOGY

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

CO	Description
CO1	1. Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment)
CO2	2. Know the various statistical techniques to solve statistical problems
CO3	3. Appreciate statistical techniques in solving the problems.

Course: SOCIAL AND PREVENTIVE PHARMACY

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

CO	Description
CO1	1. Acquire high consciousness/realization of current issuesrelated to health and pharmaceutical problems within the country and worldwide.
CO2	2. Have a critical way of thinking based on current healthcare development.
CO3	3. Evaluate alternative ways of solving problems related tohealth and pharmaceutical issues

Course: PHARMA MARKETING MANAGEMENT

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

CO	Description
CO1	**1. To provide an understanding of marketing concepts and techniques and their applications in the pharmaceutical industry**

Course: PHARMACEUTICAL REGULATORY SCIENCE

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

CO	Description
CO1	1. Know about the process of drug discovery and development
CO2	2 .Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
CO3	3. Know the regulatory approval process and their registration in Indian and international markets

Course: PHARMACOVIGILANCE

At completion of this paper it is expected that students will be able to (know, do, and Appreciate):

CO	Description
CO1	1.Why drug safety monitoring is important?
CO2	2. History and development of pharmacovigilance
CO3	3. National and international scenario of pharmacovigilance
CO4	4. Dictionaries, coding and terminologies used in pharmacovigilance
CO5	5. Detection of new adverse drug reactions and their assessment
CO6	6. International standards for classification of diseases and drugs
CO7	7. Adverse drug reaction reporting systems and communication in pharmacovigilance
CO8	8. Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle
CO9	9. Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation
CO10	10. Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India
CO11	11. ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning
CO12	12. CIOMS requirements for ADR reporting

CO13	13. Writing case narratives of adverse events and their quality.

Course: QUALITY CONTROL AND STANDARDIZATION OF HERBALS

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

CO	Description
CO1	1.To know WHO guidelines for quality control of herbal drugs
CO2	2. To know Quality assurance in herbal drug industry
CO3	3. To know the regulatory approval process and their registration in Indian and international markets
CO4	4. To appreciate EU and ICH guidelines for quality control of herbal drugs

Course: COMPUTER AIDED DRUG DESIGN

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

CO	Description
CO1	1. Design and discovery of lead molecules
CO2	2. The role of drug design in drug discovery process
CO3	3. The concept of QSAR and docking
CO4	4. Various strategies to develop new drug like molecules.
CO5	5. The design of new drug molecules using molecular modeling software

Course: CELL AND MOLECULAR BIOLOGY (Elective subject)

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

CO	Description
CO1	1. Summarize cell and molecular biology history.
CO2	2. Summarize cellular functioning and composition.
CO3	3. Describe the chemical foundations of cell biology.
CO4	4. Summarize the DNA properties of cell biology.

CO5	5. Describe protein structure and function.
CO6	6. Describe cellular membrane structure and function.
CO7	7. Describe basic molecular genetic mechanisms.
CO8	8. Summarize the Cell Cycle

Course: COSMETIC SCIENCE

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

CO	Description
CO1	1. Key incredients used in Cosmetics and cosmeceutics
CO2	2. Key building blocks for various formulations
CO3	3. Current technologies in the market

Course: PHARMACOLOGICAL SCREENINGMETHODS

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

CO	Description
CO1	1. Appreciate the applications of various commonly used laboratory animals.
CO2	2. Appreciate and demonstrate the various screening methods used in preclinical research
CO3	3. Appreciate and demonstrate the importance of biostatistics and researchmethodology
CO4	4. Design and execute a research hypothesis independently

Course: ADVANCED INSTRUMENTATION TECHNIQUES

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

CO	Description
CO1	1.To understand the advanced instruments used and its applications in drug analysis
CO2	2. To understand the chromatographic separation and analysis of drugs.
CO3	3.To understand the calibration of various analytical instruments

CO4	4. To know analysis of drugs using various analytical instruments.

Course: DIETARY SUPPLEMENTS AND NUTRACEUTICALS

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 :

CO	Description
CO1	1. Understand the need of supplements by the different group of people to maintain healthy life.
CO2	2. Understand the outcome of deficiencies in dietary supplements.
CO3	3. Appreciate the components in dietary supplements and the application.
CO4	4. Appreciate the regulatory and commercial aspects of dietary supplements including health claims

Course: ELECTIVE COURSE ON PHARMACEUTICAL PRODUCT DEVELOPMENT

By the end of the course, students shall be able to :

CO	Description
CO1	1. Know the selection and application of Pharmaceutical excipients in pharmaceutical product development.
CO2	2. Know the optimization technique in pharmaceutical product development.
CO3	3. Know Quality control testing of packaging materials for pharmaceutical product development.