

Course Outcomes

First Year B. Pharm 2019 Pattern (Sem I)

HUMAN ANATOMY AND PHYSIOLOGY-I :

Student should be able to

| No. | Course Outcomes |
|------------|--|
| 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 and Appreciate coordinated working pattern of different organs of each system |
| 4 | Perform the various experiments related to special senses and nervous system |
| 5 | To verify physiological processes discussed in theory classes through experiments on living tissue, intact animals, models etc |

PHARMACEUTICAL ANALYSIS :

Student should be able to

| No. | Course Outcomes |
|------------|--|
| 1 | The principles of volumetric and electrochemical analysis. |
| 2 | Carry out various volumetric titrations. |
| 3 | Carry out various electrochemical titrations. |
| 4 | Develop analytical skills. |

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PHARMACEUTICS- I:

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | Know the history of profession of Pharmacy |
| 2 | Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations |
| 3 | Understand the professional way of handling the prescription |
| 4 | Prepare various conventional dosage forms |

PHARMACEUTICAL INORGANIC CHEMISTRY:

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | Know the sources of impurities and methods to determine the impurities in drugs and pharmaceuticals |
| 2 | Understand the medicinal and pharmaceutical importance of inorganic compounds |
| 3 | Perform Limit tests for chloride, sulfates and metals |
| 4 | Perform Identification tests for Inorganic salts |
| 5 | Prepare few inorganic pharmaceuticals |

COMMUNICATION SKILLS :

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 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 and Leadership qualities |
| 5 | Develop skills regarding Basic communication Pronunciations Advanced Learning like writing and presentations |

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REMEDIAL BIOLOGY:

Student should be able to

| No. | Course Outcomes |
|------------|--|
| 1 | Know the classification and salient features of five kingdoms of life |
| 2 | Understand the basic components of anatomy & physiology of plant |
| 3 | Understand the basic components of anatomy & physiology animal with special reference to human |
| 4 | Perform mounting and staining, permanent slide preparation |
| 5 | Determine blood group, blood pressure, tidal volume |

REMEDIAL MATHEMATICS:

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | Know the Partial fraction, Logarithm, matrices and Determinant, Analytical geometry and their application in Pharmacy |
| 2 | Know Calculus, differential equation and Laplace transform and their application in Pharmacy |
| 3 | Solve the different types of problems by applying theory |
| 4 | Appreciate the important application of mathematics in Pharmacy |

First Year B. Pharm 2019 Pattern (Sem II)

HUMAN ANATOMY AND PHYSIOLOGY-II :

Student should be able to

| No. | Course Outcomes |
|------------|--|
| 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 | Demonstrate nervous system endocrine system using specimen, models |
| 6 | Demonstrate the function of olfactory nerve, visual acuity, reflex activity |

PHARMACEUTICAL ORGANIC CHEMISTRY – I

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 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 compounds |

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BIOCHEMISTRY:

Student should be able to

| No. | Course Outcomes |
|------------|--|
| 1 | Understand the catalytic role of enzymes and importance of enzyme in biochemical process. |
| 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 |
| 4 | Perform Qualitative analysis of carbohydrates, Urine |
| 5 | Perform identification tests for protein, amino acids |
| 6 | Determine blood sugar, creatinine , cholesterol |

PATHOPHYSIOLOGY:

Student should be able to

| No. | Course Outcomes |
|------------|--|
| 1 | Understand Basic principles of Cell injury and Adaptation |
| 2 | Explain Basic mechanism involved in the process of inflammation and repair |
| 3 | Describe the etiology and pathogenesis of the selected disease states |
| 4 | Name the signs and symptoms of the diseases |

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COMPUTER APPLICATIONS IN PHARMACY:

Student should be able to

| No. | Course Outcomes |
|------------|--|
| 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 |
| 4 | Design a questionnaire using a word processing package |
| 5 | Create a HTML web page |

ENVIRONMENTAL SCIENCES:

Student should be able to

| No. | Course Outcomes |
|------------|--|
| 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 Outcomes

Second Year B. Pharm 2019 Pattern (Sem III)

PHARMACEUTICAL ORGANIC CHEMISTRY –II

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 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 small organic compounds |

PHYSICAL PHARMACEUTIS –I

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Investigate and apply various theories, laws and equations related to different states of matter |
| 2 | Distinguish the principles of complexation/ protein binding & to use them for calculations of drug release and stability constant |
| 3 | Demonstrate use of physicochemical properties of drugs in the formulation development and evaluation of dosage forms |

PHARMACEUTICAL MICROBIOLOGY

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|--|
| 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 | Carry out microbiological standardization of Pharmaceuticals |
| 5 | Understand the cell culture technology and its applications in pharmaceutical industries |

PHARMACEUTICAL ENGINEERING

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Know various unit operations used in Pharmaceutical industries. |
| 2 | Understand the material handling techniques |
| 3 | Perform various processes involved in pharmaceutical manufacturing process |
| 4 | Carry out various test to prevent environmental pollution |
| 5 | Appreciate and comprehend significance of plant lay out design for optimum use of resources |
| 6 | Appreciate the various preventive methods used for corrosion control in Pharmaceutical industries. |

Second Year B. Pharm 2019 Pattern (Sem IV)

PHARMACEUTICAL ORGANIC CHEMISTRY III

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Understand the methods of preparation and properties of organic compounds |
| 2 | Explain the stereochemical aspects of organic compounds and stereo chemical reactions |
| 3 | Know the medicinal uses and other applications of organic compounds |

MEDICINAL CHEMISTRY I

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 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 |

PHYSICAL PHARMACEUTICS-II

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Relate various physicochemical properties of drug and excipient molecules in designing the dosage forms |
| 2 | Distinguish the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations |
| 3 | Demonstrate the behavior and mechanism of drugs and excipients in the formulation development and evaluation of dosage forms. |

PHARMACOLOGY-I

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Understand the pharmacological actions of different categories of drugs |
| 2 | Explain the mechanism of 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 effects of drugs on animal by simulated experiments |
| 5 | Appreciate correlation of pharmacology with other bio medical sciences |

PHARMACOGNOSY AND PHYTOCHEMISTRY I

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Know the techniques in the cultivation and production of crude drugs |
| 2 | Know the crude drugs, their uses and chemical nature |
| 3 | Know the evaluation techniques for the herbal drugs |
| 4 | Carry out the microscopic and morphological evaluation of crude drugs |

Third Year B. Pharm 2018 Pattern (Sem V)

MEDICINAL CHEMISTRY – II

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 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 |

INDUSTRIAL PHARMACY I

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Illustrate various pharmaceutical dosage forms and their manufacturing techniques. |
| 2 | Describe various factors to be considered in development of pharmaceutical dosage forms |
| 3 | Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality |

PHARMACOLOGY-II

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|--|
| 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 |

PHARMACOGNOSY AND PHYTOCHEMISTRY-II

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Know the modern extraction techniques, characterization and identification of the herbal drugs and Phytoconstituents |
| 2 | Understand the production of Phytoconstituents /herbal formulation |
| 3 | Understand the metabolic pathways in formation of secondary metabolites and application of biogenetic studies |
| 4 | Carry out isolation and identification of Phytoconstituents |

PHARMACEUTICAL JURISPRUDENCE

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Understand the Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals. |
| 2 | Understand various Indian pharmaceutical Acts and Laws |
| 3 | Understand the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals. |
| 4 | Understand the code of ethics during the pharmaceutical practice |

Third Year B. Pharm 2018 Pattern (Sem VI)

MEDICINAL CHEMISTRY – III

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 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. |

PHARMACOLOGY-III

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 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 |
| 3 | Appreciate correlation of pharmacology with related medical sciences |

HERBAL DRUG TECHNOLOGY

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 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 |

BIOPHARMACEUTICS AND PHARMACOKINETICS

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance |
| 2 | Use plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination |
| 3 | Understand the concepts of bioavailability and bioequivalence of drug products and their significance. |
| 4 | Understand the concept of dissolution and application of in vitro in vivo correlation in drug product development |

PHARMACEUTICAL BIOTECHNOLOGY

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|--|
| 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 |

PHARMACEUTICAL QUALITY ASSURANCE

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Understand the cGMP aspects in a pharmaceutical industry |
| 2 | Appreciate the importance of documentation |
| 3 | Understand the scope of quality certifications applicable to pharmaceutical industries |
| 4 | Understand the responsibilities of QA & QC departments |

First Year Pharm D 2019 Pattern

HUMAN ANATOMY & PHYSIOLOGY

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Describe the structure (gross and histology) and functions of various organs of the human body |
| 2 | Describe the various homeostatic mechanisms and their imbalances of various systems |
| 3 | Identify the various tissues and organs of the different systems of the human body |
| 4 | Perform the hematological tests and also record blood pressure, heart rate, pulse and Respiratory volumes |
| 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 |

PHARMACEUTICS

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Know the formulation aspects of different dosage forms |
| 2 | Do different pharmaceutical calculation involved in formulation |
| 3 | Formulate different types of dosage forms |
| 4 | Appreciate the importance of good formulation for effectiveness |

MEDICINAL BIOCHEMISTRY

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Understand the catalytic activity of enzymes and importance of isoenzymes in diagnosis of diseases |
| 2 | Know the metabolic process of biomolecules in health and illness (metabolic disorders) |
| 3 | Understand the genetic organization of mammalian genome; protein synthesis; replication; mutation and repair mechanism |
| 4 | Know the biochemical principles of organ function tests of kidney, liver and endocrine gland |
| 5 | Do the qualitative analysis and determination of biomolecules in the body fluids |

PHARMACEUTICAL ORGANIC CHEMISTRY

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Know about IUPAC/Common system of nomenclature of simple organic compounds belonging to different classes of organic compounds |
| 2 | Know Some important physical properties of organic compounds |
| 3 | Understand 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 |
| 4 | Know Some named organic reactions with mechanisms |
| 5 | Explain Methods of preparation, test for purity, principle involved in the assay, important medicinal uses of some important organic compound |

PHARMACEUTICAL INORGANIC CHEMISTRY

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Understand the principles and procedures of analysis of drugs and also regarding the application of inorganic pharmaceuticals |
| 2 | Know the analysis of the inorganic pharmaceuticals their applications |
| 3 | Appreciate the importance of inorganic pharmaceuticals in preventing and curing the disease |

REMEDIAL MATHEMATICS

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Know Trigonometry, Analytical geometry, Matrices, Determinant, Integration, Differential equation, Laplace transform and their applications |
| 2 | Solve the problems of different types by applying theory |
| 3 | Appreciate the important applications of mathematics in pharmacy. |

REMEDIAL BIOLOGY

Upon completion of the course Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Know natural sources such as plant and animal origin. |
| 2 | Know various naturally occurring drugs and its history, sources, classification, distribution and the characters of the plants and animals. |

Course Outcomes

First Year M. Pharm 2019 Pattern (Sem I)

MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES:

Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Understand Analytical techniques for identification, characterization and quantification of drugs |
| 2 | Know Theoretical and practical skills of UV, IR, NMR instruments handling and use |
| 3 | Know Theoretical and practical skills of Mass spectrometer, HPLC, GC instruments handling and use |
| 4 | Perform Structural Elucidation of organic compounds using spectroscopic tools |

DRUG DELIVERY SYSTEM:

Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Know The various approaches for development of novel drug delivery systems. |
| 2 | Understand The criteria for selection of drugs and polymers for the development of delivering system |
| 3 | Explain formulation of Novel drug delivery systems |
| 4 | Explain evaluation of Novel drug delivery systems |

MODERN PHARMACEUTICS:

Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Know The elements of preformulation studies. |
| 2 | Know Industrial Management and GMP Considerations. |
| 3 | Explain Optimization Techniques & Pilot Plant Scale Up Techniques |
| 4 | Understand Stability Testing, sterilization process & packaging of dosage forms |
| 5 | Understand The Active Pharmaceutical Ingredients and Generic drug Product development |

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REGULATORY AFFAIRS:

Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Understand The Concepts of innovator and generic drugs, drug development process, The Regulatory guidance's and guidelines for filing and approval process |
| 2 | Know Post approval regulatory requirements for actives and drug products |
| 3 | Know Submission of global documents in CTD/ eCTD formats |
| 4 | Explain Clinical trials requirements for approvals for conducting clinical trials |
| 5 | Know Pharmacovigilence and process of monitoring in clinical trials. |
| 6 | Understand Preparation of Dossiers and their submission to regulatory agencies in different countries |

PHARMACEUTICS PRACTICALS – I

Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Perform Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer |
| 2 | Perform Experiments based on HPLC, fluorimetry, flame photometry |
| 3 | Formulate and evaluate sustained release matrix tablets, osmotically controlled DDS, Floating DDS– hydro dynamically balanced DDS |
| 4 | Formulate and evaluate Muco adhesive tablets., Trans dermal patches |
| 5 | Study Micromeritic properties of powders and granulation, effect of particle size on dissolution of a tablet |

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ADVANCED ORGANIC CHEMISTRY - I:

Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Understand the principles and applications of retrosynthesis |
| 2 | Know the mechanism & applications of various named reactions |
| 3 | Know The concept of disconnection to develop synthetic routes for small target molecule. |
| 4 | Know The various catalysts used in organic reactions |
| 5 | Understand the chemistry of heterocyclic compounds |

ADVANCED MEDICINAL CHEMISTRY:

Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Understand Different stages of drug discovery |
| 2 | Know Role of medicinal chemistry in drug research |
| 3 | Understand Different techniques for drug discovery |
| 4 | Know Various strategies to design and develop new drug like molecules for biological targets |
| 5 | Understand Peptidomimetics |

CHEMISTRY OF NATURAL PRODUCTS

Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Understand Different types of natural compounds and their chemistry and medicinal importance |
| 2 | Understand The concept of rDNA technology tool for new drug discovery |
| 3 | Understand General methods of structural elucidation of compounds of natural origin |
| 4 | Understand Isolation, Purification and characterization of simple chemical constituents from natural source |
| 5 | Understand The importance of natural compounds as lead molecules for new drug discovery |

PHARMACEUTICAL CHEMISTRY PRACTICAL – I

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | Perform Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer |
| 2 | Perform Experiments based on HPLC, fluorimetry, flame photometry |
| 3 | Perform Simultaneous estimation of multi component containing formulations by UV spectrophotometry |
| 4 | Perform the reactions of synthetic importance like Claisen–Schimidt reaction., Benzyllic acid rearrangement, Beckmann rearrangement |
| 5 | Perform the reactions of synthetic importance like Hoffmann rearrangement , Mannich reaction |
| 6 | Do purification and Characterization of synthesized compounds using TLC, melting point and IR spectroscopy |

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QUALITY MANAGEMENT SYSTEMS:

Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Understand The importance of quality |
| 2 | Understand Tools for quality improvement |
| 3 | Understand Analysis of issues in quality |
| 4 | Understand Quality evaluation of pharmaceuticals |
| 5 | Understand Stability testing of drug and drug substances |
| 6 | Understand Statistical approaches for quality |

QUALITY CONTROL AND QUALITY ASSURANCE

Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Understand the cGMP aspects in a pharmaceutical industry |
| 2 | Appreciate the importance of documentation |
| 3 | Understand the scope of quality certifications applicable to Pharmaceutical industries |
| 4 | Understand the responsibilities of QA & QC departments |

PRODUCT DEVELOPMENT AND TECHNOLOGY TRANSFER

Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | To understand the new product development process |
| 2 | To understand the necessary information to transfer technology from R&D to actual manufacturing by sorting out various information obtained during R&D |
| 3 | To elucidate necessary information to transfer technology of existing products between various manufacturing places |

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QUALITY ASSURANCE PRACTICAL - I

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | Perform Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer |
| 2 | Perform Experiments based on HPLC, fluorimetry, flame photometry |
| 3 | Perform Simultaneous estimation of multi component containing formulations by UV spectrophotometry |
| 4 | Perform Case studies on – Total Quality Management, Six Sigma, Change Management/ Change control. Deviations , Out of Specifications , Out of Trend |
| 5 | Do Assay of raw materials as per official monographs |
| 6 | Do Quality control tests for Primary and secondary packaging materials |

Bhujbal Knowledge City MET's Institute of Pharmacy, Nashik

ADVANCED PHARMACOLOGY – I

Student should be able to

| No. | Course Outcomes |
|------------|--|
| 1 | Discuss the pathophysiology and pharmacotherapy of certain diseases |
| 2 | Explain the mechanism of drug actions at cellular and molecular level |
| 3 | Understand the adverse effects, contraindications of drugs used in treatment of diseases |
| 4 | Understand clinical uses of drugs used in treatment of diseases |

PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS - I

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | Appraise the regulations and ethical requirement for the usage of experimental animals. |
| 2 | Describe the various animals used in the drug discovery process and good laboratory practices in maintenance and handling of experimental animals |
| 3 | Describe the various newer screening methods involved in the drug discovery process |
| 4 | Appreciate and correlate the preclinical data to humans |

CELLULAR AND MOLECULAR PHARMACOLOGY

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | Explain the receptor signal transduction processes. |
| 2 | Explain the molecular pathways affected by drugs. |
| 3 | Appreciate the applicability of molecular pharmacology and biomarkers in drug discovery process |
| 4 | Demonstrate molecular biology techniques as applicable for pharmacology |

PHARMACOLOGICAL PRACTICAL-I

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | Perform Analysis of pharmacopoeial compounds & their formulations by UV Vis spectrophotometer |
| 2 | Do Experiments based on HPLC, Fluorimetry, flame photometry |
| 3 | Perform Techniques of blood sampling, anesthesia and euthanasia of experimental animals. |
| 4 | Evaluate analgesic, anti-inflammatory, local anesthetic, mydriatic and miotic activity |
| 5 | Evaluate of antiulcer activity by pylorus ligation method and perform Oral glucose tolerance test |

First Year M. Pharm 2019 Pattern (Sem II)

MOLECULAR PHARMACEUTICS:

Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Know The various approaches for development of novel drug delivery systems |
| 2 | Know criteria for selection of drugs and polymers for the development of NTDS |
| 3 | Understand The formulation and evaluation of novel drug delivery systems |

ADVANCED BIOPHARMACEUTICS & PHARMACOKINETICS:

Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Understand The basic concepts in biopharmaceutics and pharmacokinetics |
| 2 | Understand The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination |
| 3 | Know The critical evaluation of biopharmaceutic studies involving drug product equivalency |
| 4 | Understand The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters |
| 5 | Understand The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic |

COMPUTER AIDED DRUG DEVELOPMENT:

Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Know History of Computers in Pharmaceutical Research and Development |
| 2 | Understand Computational Modeling of Drug Disposition |
| 3 | Understand Computers in Preclinical Development |
| 4 | Understand Optimization Techniques in Pharmaceutical Formulation |
| 5 | Know Computers in Market Analysis/Clinical Development |
| 6 | Understand Computational fluid dynamics(CFD) and Artificial Intelligence (AI) and Robotics |

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COSMETICS AND COSMECEUTICALS:

Student should be able to

| No. | Course Outcomes |
|------------|--|
| 1 | Know Key ingredients used in cosmetics and cosmeceuticals |
| 2 | Know Key building blocks for various formulations |
| 3 | Understand Current technologies in the market |
| 4 | Know Various key ingredients and basic science to develop cosmetics and cosmeceuticals |
| 5 | Know Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy |

PHARMACEUTICS PRACTICALS – II:

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | Study the effect of temperature change, non solvent addition, incompatible polymer addition in microcapsules preparation |
| 2 | Formulate and evaluate gelatin /albumin microspheres/ liposomes/niosomes/ spherules/microparticles |
| 3 | Explain Case studies of Bioavailability studies of Paracetamol in animals/ Pharmacokinetic and IVIVC data analysis/ In vitro cell studies for permeability and metabolism |
| 4 | Understand Quality-by-Design in Pharmaceutical Development |

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ADVANCED SPECTRAL ANALYSIS

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | Interpret of the NMR, Mass and IR spectra of various organic compounds |
| 2 | Understand Theoretical and practical skills of the hyphenated instruments |
| 3 | Identify organic compounds |

ADVANCED ORGANIC CHEMISTRY - II

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | Know the principles and applications of Green chemistry |
| 2 | Understand various catalysts used in organic reactions |
| 3 | Understand the concept of stereochemistry and asymmetric synthesis. |
| 4 | Know the concept of peptide chemistry. |

COMPUTER AIDED DRUG DESIGN

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | Understand Role of CADD in drug discovery |
| 2 | Understand Different CADD techniques and their applications |
| 3 | Understand Various strategies to design and develop new drug like molecules |
| 4 | Understand Working with molecular modeling softwares to design new drug molecules |
| 5 | Understand the in silico virtual screening protocols |

Bhujbal Knowledge City MET's Institute of Pharmacy, Nashik

PHARMACEUTICAL PROCESS CHEMISTRY:

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | Know The strategies of scale up process of APIs and intermediates |
| 2 | Understand various unit operations in process chemistry |
| 3 | Understand various reactions in process chemistry |

PHARMACEUTICAL CHEMISTRY PRACTICALS – II

Student should be able to

| No. | Course Outcomes |
|------------|--|
| 1 | Perform Synthesis of organic compounds by adapting different approaches involving Oxidation /Reduction/hydrogenation /Nitration |
| 2 | Do Assignments on regulatory requirements in API |
| 3 | Interpret of organic compounds by FT-IR/ NMR/ MS |
| 4 | Carry out the preparation of organic compounds like 4-chlorobenzhydrylpiperazine, 4-iodotoluene, vanillyl alcohol, umbelliferone |

HAZARDS AND SAFETY MANAGEMENT

Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Know basic knowledge about the environment and its allied problems |
| 2 | Develop an attitude of concern for the industry environment |
| 3 | Ensure safety standards in pharmaceutical industry |
| 4 | Provide comprehensive knowledge on the safety management |
| 5 | Empower an ideas to clear mechanism and management in different kinds of hazard management system |
| 6 | Understand the method of Hazard assessment, procedure, methodology for provide safe industrial atmosphere. |

PHARMACEUTICAL VALIDATION:

Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Understand the concepts of calibration, qualification and validation |
| 2 | Understand the qualification of various equipments and instruments |
| 3 | Understand Process validation of different dosage forms |
| 4 | Understand Validation of analytical method for estimation of drugs Cleaning validation of equipments employed in the manufacture of pharmaceuticals |

AUDITS AND REGULATORY COMPLIANCE

Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | To understand the importance of auditing |
| 2 | To understand the methodology of auditing |
| 3 | To carry out the audit process |
| 4 | To prepare the auditing report |
| 5 | To prepare the check list for auditing |

PHARMACEUTICAL MANUFACTURING TECHNOLOGY:

Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Know the common practice in the pharmaceutical industry developments, plant layout and production planning |
| 2 | Be familiar with the principles and practices of aseptic process technology, non sterile manufacturing technology and packaging technology |
| 3 | Have a better understanding of principles and implementation of Quality by design (QbD) and process analytical technology (PAT) in pharmaceutical manufacturing |

QUALITY ASSURANCE PRACTICAL – II PRACTICALS

Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Understand Validation of an analytical method for a drug |
| 2 | Understand Process validation of any non-sterile or sterile dosage form |
| 3 | Know Cleaning validation of one equipment |
| 4 | Prepare Check list for Bulk Pharmaceutical Chemicals vendors/ tableting production/ sterile production area/ Water for injection |
| 5 | Understand Design of plant layout: Sterile and non-sterile |

ADVANCED PHARMACOLOGY-II:

Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Explain the mechanism of drug actions at cellular and molecular level. |
| 2 | Discuss the pathophysiology and pharmacotherapy of certain diseases. |
| 3 | Understand the adverse effects, contraindications of drugs used in the treatment of diseases |
| 4 | Understand the clinical uses of drugs used in the treatment of diseases |

PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS-II

Student should be able to

| No. | Course Outcomes |
|-----|---|
| 1 | Explain the various types of toxicity studies. |
| 2 | Appreciate the importance of ethical and regulatory requirements for toxicity studies |
| 3 | Demonstrate the practical skills require conducting the preclinical toxicity studies |

PRINCIPLES OF DRUG DISCOVERY

Student should be able to

| No. | Course Outcomes |
|-----|--|
| 1 | Explain the various stages of drug discovery. |
| 2 | Explain various lead seeking method and lead optimization. |
| 3 | Appreciate the importance of the role of computer aided drug design in drug discovery |
| 4 | Explain various targets, biomarkers and in vitro screening techniques for drug discovery |
| 5 | Appreciate the importance of the role of genomics, proteomics and bioinformatics in drug discovery |

CLINICAL RESEARCH AND PHARMACOVIGILANCE:

Student should be able to

| No. | Course Outcomes |
|------------|--|
| 1 | Explain the regulatory requirements for conducting clinical trial and Demonstrate the types of clinical trial designs. |
| 2 | Execute safety monitoring, reporting and close-out activities |
| 3 | Explain the principles of Pharmacovigilance. |
| 4 | Detect new adverse drug reaction and their assessment. |
| 5 | Perform the adverse drug reaction reporting systems and communication in Pharmacovigilance |
| 6 | Explain the responsibilities of key players involved in clinical trials. |

PHARMACOLOGICAL PRACTICAL – II

Student should be able to

| No. | Course Outcomes |
|------------|---|
| 1 | To record the DRC of agonist using suitable isolated tissues preparation |
| 2 | To determine to the strength of unknown sample by matching bioassay/ interpolation / bracketing bioassay/ multiple point by using suitable tissue preparation |
| 3 | Estimate PA2 values of various antagonists using suitable isolated tissue preparations |
| 4 | Perform Drug absorption studies by averted rat ileum preparation |
| 5 | Perform Acute oral toxicity studies as per OECD guidelines |