



PROGRAM OUTCOMES B. PHARMACY PROGRAM

The following outcomes reflect the terminal skills that all B. Pharmacy graduates should be able to demonstrate upon program completion:

PO.1 Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.

PO.2 Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills, and organizational skills. Develop and implement plans and organize work to meet deadlines.

PO.3 Problem analysis: Utilize the principles of scientific inquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.

PO.4 Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.

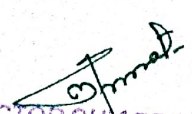
PO.5 Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership, and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.

PO.6 Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).

PO.7 Pharmaceutical Ethics: Honor personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication, and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.

PO.8 Communication: Communicate effectively with the pharmacy community and with society at large, such as being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.

PO.9 The Pharmacist and society: Apply to reason informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.


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PO.10 Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO.11 Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assesses and uses feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

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COURSE OUTCOMES

SEMESTER- I (B. Pharmacy)

BP101T: HUMAN ANATOMY AND PHYSIOLOGY-I (Theory)

Objectives: Upon completion of this course the student should be able to

- 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

BP 107P: HUMAN ANATOMY AND PHYSIOLOGY-I (PRACTICAL)

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


- Explain the histology of different tissues.
- Explain the anatomy of the human skeleton
- Explain the importance of different blood cells which is indicative of human disorders.
- Explain the importance of pathological changes which is indicative of human disorders.
- Know the different techniques of blood cell count of a human being.

BP102T: PHARMACEUTICAL ANALYSIS (Theory)

Objectives: Upon completion of the course student shall be able to

- understand the principles of volumetric and electro chemical analysis
- carry out various volumetric and electrochemical titrations
- develop analytical skills

BP 108P PHARMACEUTICAL ANALYSIS-I (PRACTICAL)


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

- Able to apply volumetric and electrochemical analytical techniques for analysis of chemical compounds.
- Able to identify and locate the impurities through a different technique like a limit test.
- The students will be able to apply the use of different reference books for different fundamental techniques of analysis
- By taking regular viva-voce we can analyze the achievements of practical knowledge.
- Expected to appraise the general characteristics of the analytical method in drug analysis.

BP103T: PHARMACEUTICS- I (Theory)

Objectives: Upon completion of this course the student should be able to:

- 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

BP 109P PHARMACEUTICS-I (PRACTICAL)

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

- Practical exercises are designed to make the student relate the theoretical aspects to practical application and acquire laboratory skills.
- The students should be able to classify different dosage forms and apply principles of pharmaceutical science in the formulation and dispensing of the various dosage forms.
- They should be able to know how to apply pharmacopoeial standards for the preparation of various dosage forms
- Describe the use of ingredients in the formulation and category of the formulation.
- Use equipment and apparatus needed for the preparation as per SOP.

BP104T: PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)

Objectives: Upon completion of course student shall be able to

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- 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

BP 110P PHARMACEUTICAL INORGANIC CHEMISTRY (PRACTICAL)

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

- Understand practically how can detect and control pharmaceutical impurities.
- Able to prepare and identify the inorganic pharmaceuticals by adopting proper skills.
- Able to assemble the apparatus and equipment necessary for the practical by proper communication.
- Use safety procedures for the handling of hazardous chemicals by using protective tools concerning human health and the environment.
- Able to communicate by expressing theoretical and practical knowledge through viva-voce.

BP105T: COMMUNICATION SKILLS (Theory)

Objectives: Upon completion of the course the student shall be able to


- 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

BP 111P COMMUNICATION SKILLS (PRACTICAL)

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

- How to improve communication skills
- To study and learn basics of communication skills
- Pronunciation
- Presentation skills
- E-Mail Etiquette

BP 106 RBT. REMEDIAL BIOLOGY (Theory)


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

- 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

BP 112 RBP REMEDIAL BIOLOGY (PRACTICAL)

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

- Students were able to understand the components of the living world, structure, and functional system of the plant and animal kingdom.
- Students were able to learn the classification and salient features of the five-kingdom of life.
- Students understand the basic components of the anatomy and physiology of the human body.
- Students were very well able to handle microscopes and identify human blood components and various tissue systems.
- Students learned the skeletal system of the human body.

BP 106 RMT. REMEDIAL MATHEMATICS (Theory)

Objectives: Upon completion of the course the student shall be able to:-

- 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

SEMESTER – II (B. Pharmacy)

BP 201T: HUMAN ANATOMY AND PHYSIOLOGY-II (Theory)

Objectives: Upon completion of this course the student should be able to:

- 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.

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- Appreciate coordinated working pattern of different organs of each system
- Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.

BP 207 P HUMAN ANATOMY AND PHYSIOLOGY-II (PRACTICAL)

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

- Perform the hematological tests like blood cell counts, hemoglobin estimation, bleeding/clotting time, etc.
- Perform the cardiovascular parameters like blood pressure, heart rate, and pulse rate.
- Identify the different tissues and organs of dissimilar systems of the human body.
- Explain the importance of various family planning devices for the human body.
- Discuss the gross morphology, structure, and functions of various organs of the human body.

BP202T: PHARMACEUTICAL ORGANIC CHEMISTRY –I (Theory)

Objectives: Upon completion of the course the student shall be able to

- 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

BP 208 P PHARMACEUTICAL ORGANIC CHEMISTRY-I (PRACTICAL)

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

- Predict atomic structure, chemical bonding, and molecular geometry based on the accepted model.
- Able to identify and characterize the organic compound by various qualitative tests.
- Follow the safety procedure to set up glassware and apparatus to conduct experiments in organic chemistry.
- Adopt proper skills to present the results of a practical investigation concisely by referring to the available resources.
- Able to communicate the hazardous effect of overuse of organic products in daily life.

BP203 T. BIOCHEMISTRY (Theory)

Objectives: Upon completion of course student shall be able to

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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.

BP 209 P BIOCHEMISTRY (PRACTICAL)

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

Understand the qualitative test for protein

Understand the determination of glucose, total cholesterol, and creatinine in the blood

Determine the salivary amylase activity and effect of temperature on it.

Quantitative analysis of reducing sugar and protein

Understand the effects of substrate concentration on salivary amylase activity.

BP 204T.PATHOPHYSIOLOGY (THEORY)

Objectives: Upon completion of the subject student shall be able to –

Describe the etiology and pathogenesis of the selected disease states;

Name the signs and symptoms of the diseases; and

Mention the complications of the diseases.

BP205 T. COMPUTER APPLICATIONS IN PHARMACY (Theory)

Objectives: Upon completion of the course the student shall be able to

know the various types of application of computers in pharmacy

know the various types of databases

know the various applications of databases in pharmacy

BP 210 P COMPUTER APPLICATIONS IN PHARMACY (PRACTICAL)

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

Understand different types of software for structural drawings and prepare tables and charts for presentations of chemical and biological data.

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Apply their knowledge by the access of various search engines, scientific journals, and databases, & various pharmaceutical websites for scientific information.

Understand the use of Computers in pharmacy for the information of drug data, records, and files, drug management.

Know the role of computer in Receiving the details, storing it and processing it and its dissemination and this continuous flow of information shows effective functioning of any system.

Know the use of computers for patient profile monitoring, medication, database management, and material management.

BP 206 T. ENVIRONMENTAL SCIENCES (Theory)

Objectives: Upon completion of the course the student shall be able to:

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.

SEMESTER- III (B. Pharmacy)

BP301T. PHARMACEUTICAL ORGANIC CHEMISTRY –II (Theory)

Objectives: Upon completion of the course the student shall be able to

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

BP 305 P PHARMACEUTICAL ORGANIC CHEMISTRY-II (PRACTICAL)

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

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Students should be able to evaluate the quality of fats and oils by determining acid value, saponification value, and iodine value as per pharmacopeia.

Students should be able to synthesize the various organic compounds and understands the reaction mechanism involved in the synthesis.

Calculate the percentage yields of the products obtained by synthesis.

Purify organic compounds using various procedures like recrystallization and steam distillation.

Apply recrystallization and steam distillation methods for the purification of synthesized organic compounds.

BP302T. PHYSICAL PHARMACEUTICS-I (Theory)

Objectives: Upon the completion of the course student shall be able to

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.

BP 306 P PHYSICAL PHARMACEUTICS- I (PRACTICAL)

Objectives: Upon completion of the course, the student will be able to

Operate different pharmaceutical laboratory instruments used in determining various physical properties such as surface tension, viscosity, adsorption, and solubility.

Calculate critical solution temperature & effect of the addition of electrolyte on CST of the phenol water system.

Demonstrate the partition Coefficient and distribution phenomena between immiscible liquid phases.

The learner should be able to calculate physical parameters such as stability constant, and critical micellar concentration.

Demonstrate miscible, partially miscible liquid and all practical aspects regarding the solubility of liquid.

BP 303 T. PHARMACEUTICAL MICROBIOLOGY (Theory)

Objectives: Upon completion of the subject student shall be able to;

Understand methods of identification, cultivation and preservation of various microorganisms

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- 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.

BP 307 P PHARMACEUTICAL MICROBIOLOGY (PRACTICAL)

Objectives: Upon completion of the course, the student will be able to

- Perform staining of bacteria and identification.
- Perform Subculturing of bacteria.
- Isolate pure cultures of bacteria by various techniques.
- Perform the microbial assay of antibiotics by various methods.
- Perform the sterility testing of pharmaceuticals.

BP 304 T. PHARMACEUTICAL ENGINEERING (Theory)

Objectives: Upon completion of the course student shall be able:

- 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.

BP 308 P PHARMACEUTICAL ENGINEERING (PRACTICAL)

Objectives: Upon completion of the course, the student will be able to

- Determine the radiation constant of brass, iron, unpainted, and painted glass calculate the efficiency of steam distillation.
- Determine the overall heat transfer coefficient by the heat exchanger
- Construct the drying curves and determine the moisture content and loss on drying

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- Describe the Construction working and application of Pharmaceutical Machinery such as rotary tablet machine, fluidized bed coater, fluid energy mill, and dehumidifier.
- Determine Factors affecting the rate of filtration, evaporation and Study the effect of time on the Rate of Crystallization.

SEMESTER- IV (B. Pharmacy)

BP401T. PHARMACEUTICAL ORGANIC CHEMISTRY –III (Theory)

Objectives: At the end of the course, the student shall be able to

- 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

BP402T. MEDICINAL CHEMISTRY – I (Theory)

Objectives: Upon completion of the course the student shall be able to

- 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

BP 406 P MEDICINAL CHEMISTRY- I (PRACTICAL)

Objectives: Upon completion of the course, the student will be able to

- Make correct use of various equipment and take safety measures while working in Medicinal Chemistry Laboratory.
- Demonstrate the understanding of general aspects of the design of the drugs by drawing the chemical structure of drugs.
- Characterize the synthetic compounds using melting point and Boiling point.
- Perform the pharmacopeia assay of drugs containing dosage forms and study the interpretation of UV spectra of unknown drugs.
- Able to Synthesize, recrystallize and understand reaction mechanisms involved in the synthesis of medicinally important organic compounds.

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BP 403 T. PHYSICAL PHARMACEUTICS-II (Theory)

Objectives: Upon the completion of the course student shall be able to

- 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.

BP 407 P PHYSICAL PHARMACEUTICS- I (PRACTICAL)

Objectives: Upon completion of the course, the student will be able to

- Demonstrate microscopic and micromeritics characteristics of the dosage form.
- The learner should be able to determine reaction rate constant, an order of reaction for a different reaction.
- The learner should be able to predict shelf life by carrying out accelerated stability studies.
- Calculate sedimentation volume of suspension.
- The learner should be able to calculate physical parameters Such as the molecular weight of the polymer.

BP 404 T. PHARMACOLOGY-I (Theory)

Objectives: Upon completion of this course the student should be able to

- 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

BP 408 P PHARMACOLOGY- I (PRACTICAL)

Objectives: Upon completion of the course, the student will be able to

- Explain the commonly used instruments, laboratory animals used in experimental pharmacology
- Describe the maintenance of laboratory animals as per CPCSEA guidelines

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- Explain the common laboratory techniques, blood withdrawal, serum and plasma separation, anesthetics, and euthanasia used for animal studies
- Understand the administration of the drug in mice/rats
- Explain the effect of the drug on the animal by simulated experiment.

BP 405 T.PHARMACOGNOSY AND PHYTOCHEMISTRY I (Theory)

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

- know the techniques in the cultivation and production of crude drugs
- know the crude drugs, their uses and chemical nature
- know the evaluation techniques for the herbal drugs
- carry out the microscopic and morphological evaluation of crude drugs

BP 409 P PHARMACOGNOSY & PHYTOCHEMISTRY- I (PRACTICAL)

Objectives: Upon completion of the course, the student will be able to

- To understand analysis of crude drug by chemical test.
- Demonstrate microscopic and micromeritics characteristics of the leaf.
- Determination of the size of starch grains, calcium oxalate crystals, length, and width by eyepiece micrometer.
- Determination of ash value, extractive values of crude moisture content, swelling index, and foaming index of the crude drug.
- Determination of several starch grains by Lycopodium spore method

SEMESTER- V (B. Pharmacy)

BP501T. MEDICINAL CHEMISTRY – II (Theory)

Objectives: Upon completion of the course the student shall be able to

- 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

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BP 502 T. Industrial Pharmacy I (Theory)

Objectives: Upon completion of the course the student shall be able to

- 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

BP 506 P INDUSTRIAL PHARMACY- I (PRACTICAL)

Objectives: Upon completion of the course the student shall be able to

- Practical exercises are designed to make the student relate the need for pre-formulation studies.
- Practical exercises are designed to make the student relate the correct use of various equipment in the Pharmaceutics laboratory relevant to tablets, capsules & coating.
- To understand the Rationale behind the evaluation of packaging material.
- To understand the rationale behind the use of formulation ingredients.
- To understand the filling & sealing of ampoules & vials.

BP503.T. PHARMACOLOGY-II (Theory)

Objectives: Upon completion of this course the student should be able to

- 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

BP 507 P PHARMACOLOGY- II (PRACTICAL)

Objectives: Upon completion of the course the student shall be able to

- Explain the in-vitro pharmacology and physiological salt solutions
- Explain the basic principles of bioassay, bioassay of various drugs
- Describe the effect of drugs on various isolated animal preparations
- Understand the preclinical screening of various drugs
- Explain the effect of the drug on the animal by simulated experiment

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BP504 T. PHARMACOGNOSY AND PHYTOCHEMISTRY II (Theory)

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

- know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents
- understand the preparation and development of herbal formulation.
- understand the herbal drug interactions
- carry out isolation and identification of phytoconstituents

BP 508 P PHARMACOGNOSY & PHYTOCHEMISTRY- II (PRACTICAL)

Objectives: Upon completion of the course the student shall be able to

- Identify the crude drug's morphological and microscopical characteristics.
- Isolate and analyze the phytoconstituents from crude drugs.
- Identify the crude drug by various chemical tests by observation.
- Apply the theoretical knowledge of Thin Layer Chromatography and Paper Chromatography to perform the practicals.
- Isolate and analyze the volatile oil.

BP 505 T. PHARMACEUTICAL JURISPRUDENCE (Theory)

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

- 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

SEMESTER- VI (B. Pharmacy)

BP601T. MEDICINAL CHEMISTRY – III (Theory)

Objectives: Upon completion of the course student shall be able to

- Understand the importance of drug design and different techniques of drug design.
- Understand the chemistry of drugs with respect to their biological activity.

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Know the metabolism, adverse effects and therapeutic value of drugs.

Know the importance of SAR of drugs.

BP 607 P MEDICINAL CHEMISTRY- III (PRACTICAL)

Objectives: Upon completion of the course the student shall be able to

Understand how to make correct use of various equipment & take safety measures while working in medicinal chemistry laboratory.

Synthesize, recrystallize and understand reaction mechanisms involved in the synthesis of medicinally important compounds and perform the Assay of drugs.

To study the interpretation of UV spectra of unknown drugs.

Comprehend the techniques of microwave-assisted synthesis and explain applications of microwave-assisted synthesis in pharmaceutical research.

Able to draw structures and reactions using Chem draw.

BP602 T. PHARMACOLOGY-III (Theory)

Objectives: Upon completion of this course the student should be able to:

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 poisonings and

appreciate correlation of pharmacology with related medical sciences.

BP 608 P PHARMACOLOGY- III (PRACTICAL)

Objectives: Upon completion of the course the student shall be able to

Calculate the dose of different drugs in different pharmacological experiments.

Calculate the lethal dose of different drugs from any given data.

Know the irritation-producing substances to the human body.

Calculate the pharmacokinetic parameters from any different category of drug.

Know the biostatistics method for research methodology.

BP 603 T. HERBAL DRUG TECHNOLOGY (Theory)

Objectives: Upon completion of this course the student should be able to:

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

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know the herbal cosmetics, natural sweeteners, nutraceuticals

appreciate patenting of herbal drugs, GMP.

BP 609 P HERBAL DRUG TECHNOLOGY (PRACTICAL)

Objectives: Upon completion of the course the student shall be able to

Perform the preliminary phytochemical screening of crude drugs.

Determine the alcohol content, phenol content, total alkaloids, and the alcohol content of Asava & Arishta.

Evaluate the excipients of natural origins.

Prepare the herbal formulations like Syrup, Mixtures, Shampoo's, etc

Analyze the herbal drugs from the Monographs.

BP 604 T. BIOPHARMACEUTICS AND PHARMACOKINETICS (Theory)

Objectives: Upon completion of the course student shall be able to:

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.

BP 605 T. PHARMACEUTICAL BIOTECHNOLOGY (Theory)

Objectives: Upon completion of the subject student shall be able to;

Understanding the importance of Immobilized enzymes in Pharmaceutical Industries

Genetic engineering applications in relation to production of pharmaceuticals

Importance of Monoclonal antibodies in Industries

Appreciate the use of microorganisms in fermentation technology

BP606T. PHARMACEUTICAL QUALITY ASSURANCE (Theory)

Objectives: Upon completion of the course student shall be able to:

understand the cGMP aspects in a pharmaceutical industry

appreciate the importance of documentation

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- understand the scope of quality certifications applicable to pharmaceutical industries
- understand the responsibilities of QA & QC departments

SEMESTER- VII (B. Pharmacy)

BP701T. INSTRUMENTAL METHODS OF ANALYSIS (Theory)

Objectives: Upon completion of the course the student shall be able to

- Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
- Understand the chromatographic separation and analysis of drugs.
- Perform quantitative & qualitative analysis of drugs using various analytical instruments.

BP705P. INSTRUMENTAL METHODS OF ANALYSIS (PRACTICAL)

Objectives: Upon completion of the course the student shall be able to

- To understand the practical technique of chromatography
- Understand the chromatographic separation like adsorption, partition, Colum, TLC, and electrophoreses in the analysis of drug
- Understand the chromatographic separation like GC, HPLC, Ion Exchange Gel in the analysis of drug
- Understand the chromatographic separation like paper, thin layer, Colom and demonstration of GC and HPLC instrumentation

BP 702 T. INDUSTRIAL PHARMACYII (Theory)

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

- 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

BP 703T. PHARMACY PRACTICE (Theory)

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

- know various drug distribution methods in a hospital
- appreciate the pharmacy stores management and inventory control

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- 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

BP 704T: NOVEL DRUG DELIVERY SYSTEMS (Theory)

Objectives: Upon completion of the course student shall be able

- 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 Novel drug delivery systems, their formulation and evaluation.

SEMESTER- VIII (B. Pharmacy)

BP801T. BIOSTATISTICS AND RESEARCH METHODOLOGY (Theory)

Objectives: Upon completion of the course the student shall be able to

- 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.

BP 802T: SOCIAL AND PREVENTIVE PHARMACY

Objectives:

After the successful completion of this course, the student shall be able to:

- 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

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BP803ET. PHARMA MARKETING MANAGEMENT (Theory)

Objective: The course aims to provide an understanding of marketing concepts and techniques and the applications in the pharmaceutical industry.

BP804 ET: PHARMACEUTICAL REGULATORY SCIENCE (Theory)

Objectives: Upon completion of the subject student shall be able to;

- 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


BP 805T: PHARMACOVIGILANCE (Theory)

Objectives:

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

- 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 preclinical, 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.

BP 806 ET. QUALITY CONTROL AND STANDARDIZATION OF HERBALS (Theory)


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Objectives: Upon completion of the subject student shall be able to;

- 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
- appreciate EU and ICH guidelines for quality control of herbal drugs

BP 807 ET. COMPUTER AIDED DRUG DESIGN (Theory)

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

- 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

BP808ET: CELL AND MOLECULAR BIOLOGY (Elective subject)

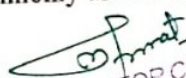
Objectives: Upon completion of the subject student shall be able to:

- 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

BP809ET. COSMETIC SCIENCE (Theory)

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

- Appreciate the applications of various commonly used cosmetic excipients.


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- Appreciate and demonstrate the various formulation methods used in cosmetic formulations
- Appreciate and demonstrate the importance of analytical methods used in cosmetics

BP810 ET. PHARMACOLOGICAL SCREENING METHODS

Objectives: 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
- Design and execute a research hypothesis independently

BP 811 ET. ADVANCED INSTRUMENTATION TECHNIQUES

Objectives: Upon completion of the course the student shall be able to

- 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.

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PROGRAM OUTCOMES FOR M. PHARMACY PROGRAM

PO.1.1 Postgraduates will acquire adequate scientific information regarding basic principles of Pharmaceutical and Medicinal chemistry, Pharmaceutics including Cosmetology, Pharmacology and Pharmacognosy. They will also have hands on training of practical aspects of Synthesis of APIs and its intermediates along with Formulation and Development, Analysis and Quality assurance of various pharmaceutical dosage forms including those of herbal origin as per standards of official books, WHO, and other regulatory agencies.


PO.1.2 Postgraduates will develop an ability to plan, visualize and work on multidisciplinary tasks. They will be able to demonstrate necessary skills (eg. working independently, time management and organizational skills). They will demonstrate an adaptable, flexible and effective approach towards organizational development.

PO.1.3 Postgraduates will be able to think logically and solve the problems, will develop an ability to conduct, analyze and interpret data of pharmaceutical experiments in various departments (Eg: Drug discovery, Formulation & Development, Production, Quality control & Quality assurance etc) as per the needs of pharmaceutical industries.

PO.1.4 Postgraduates will master the key concepts in the discipline of their interest in pharmaceutical sciences. They will demonstrate these skills to use modern pharmaceutical tools, software, and equipments to analyze & solve problems.

PO.1.5 Postgraduates will develop leadership and interpersonal skills such as influencing others, negotiating and working with others, conflict management and leading others through the problem-solving process. They will be able to lead and function both individually and as a member of a team.

PO.1.6 Postgraduates will apply theoretical and practical skills developed through classroom, laboratories and team project experiences and thus will develop confidence and will be able to i) do specialized research in the core and applied areas of pharmaceutical sciences. ii) manufacture, analyse and assure the drug based formulations. iii) promote and market the pharmaceuticals and iv) train the budding pharmacist to become self-reliant pharmacist and a health care professional.


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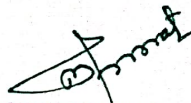
PO.1.7 Postgraduates will demonstrate knowledge of professional and ethical responsibilities as per pharmaceutical jurisprudence. The graduates will swear by a code of ethics of Pharmacy Council of India in relation to community and shall act as integral part of a health care system. They will demonstrate honesty, integrity, ethical understanding, and respect for others and will carry out their professional responsibilities by adhering to high ethical standards.

PO.1.8 Postgraduates will acquire excellent interpersonal oral communication and writing skills. They will be able to demonstrate knowledge and proficiency with current audio-visual presentation technologies and develop an ability to communicate scientific knowledge in non-expert/lay term by adopting various modes of scientific communications (e.g., abstract, manuscripts, project reports, oral and poster presentations etc). This will allow effective exchange of professional information.

PO.1.9 Postgraduates will demonstrate the impact of pharmacy knowledge on the society and also will be aware of modern issues. They will create awareness of healthcare issues through interactions with others and will gain a sense of self-respect towards community and citizenship.

PO.1.10 Postgraduates will be able to demonstrate a high-level of understanding of the key stages in drug discovery, development, and commercialization. This will lead to the manufacturing of drugs and pharmaceuticals considering its impact on the environment and surrounding.

PO.1.11 Postgraduates will be able to demonstrate knowledge and skills in all disciplines of Pharmaceutical sciences and develop a sound pharmaceutical care plan to manage medication-related problems. They will retrieve, evaluate, and apply current drug information in the delivery of pharmaceutical care and assure safe and accurate preparation and dispensing of medications.


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M. PHARMACY (PHARMACEUTICS)

SEMESTER I

MPH 101 T. MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (Common for All PG Pharmacy Courses)

Objectives : After completion of course, student is able to know,

- Chemicals and Excipients
- The analysis of various drugs in single and combination dosage forms
- Theoretical and practical skills of the instruments

MPH 102T. DRUG DELIVERY SYSTEMS

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

- The various approaches for development of novel drug delivery systems.
- The criteria for selection of drugs and polymers for the development of delivering system
- The formulation and evaluation of Novel drug delivery systems.

MPH 103T. MODERN PHARMACEUTICS

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

- The elements of preformulation studies.
- The Active Pharmaceutical Ingredients and Generic drug Product development
- Industrial Management and GMP Considerations.
- Optimization Techniques & Pilot Plant Scale Up Techniques
- Stability Testing, sterilization process & packaging of dosage forms.

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MPH 104T. REGULATORY AFFAIRS

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

- The Concepts of innovator and generic drugs, drug development process
- The Regulatory guidance's and guidelines for filing and approval process
- Preparation of Dossiers and their submission to regulatory agencies in different countries
- Post approval regulatory requirements for actives and drug products
- Submission of global documents in CTD/ eCTD formats
- Clinical trials requirements for approvals for conducting clinical trials
- Pharmacovigilance and process of monitoring in clinical trials.

MPH105P. PHARMACEUTICS PRACTICAL I

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

- The students shall be able to understand analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
- The students shall be able to carry out preformulation studies of tablets
- The students shall be able to understand experiments based on HPLC

Semester II

MPH 201T. MOLECULAR PHARMACEUTICS (NANO TECHNOLOGY & TARGETED DDS) (NTDS)

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

- The various approaches for development of novel drug delivery systems.
- The criteria for selection of drugs and polymers for the development of NTDS
- The formulation and evaluation of novel drug delivery systems.

MPH 202T. ADVANCED BIOPHARMACEUTICS & PHARMACOKINETICS

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

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

MPH 203T. COMPUTER AIDED DRUG DEVELOPMENT


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

- History of Computers in Pharmaceutical Research and Development
- Computational Modeling of Drug Disposition
- Computers in Preclinical Development
- Optimization Techniques in Pharmaceutical Formulation
- Computers in Market Analysis
- Computers in Clinical Development
- Artificial Intelligence (AI) and Robotics
- Computational fluid dynamics(CFD)

MPH 204T. COSMETICS AND COSMECEUTICALS

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

- Key ingredients used in cosmetics and cosmeceuticals.
- Key building blocks for various formulations.
- Current technologies in the market
- Various key ingredients and basic science to develop cosmetics and cosmeceuticals


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→ Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.

MPH205P. PHARMACEUTICS PRACTICAL-II

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

- The students shall be able to understand the effect of temperature change , non solvent addition, incompatible polymer addition in microcapsules preparation
- The students shall be able to understand Quality-by-Design in Pharmaceutical Development
- The students shall be able to understand DoE Using Design Expert® Software

PHARMACEUTICAL ANALYSIS & QUALITY ASSURANCE (PA&QA)

Semester I

MPAQA 102T. ADVANCED PHARMACEUTICAL ANALYSIS AND QUALITY MANAGEMENT

Objectives: At the completion of this subject, it is expected that the student shall be able to know

- Modern Analysis method protocols
- Basic principles of Immunoassays
- The TQM aspects in a pharmaceutical industry
- To understand the scope IPQC applicable to pharmaceutical industries

MPAQA 103T. QUALITY CONTROL AND QUALITY ASSURANCE

Objectives: At the completion of this subject, it is expected that the student shall be able to know

- The cGMP aspects in a pharmaceutical industry
- To appreciate the importance of documentation
- To understand the scope of quality certifications applicable to pharmaceutical industries
- To understand the responsibilities of QA & QC departments

MPAQA 104T. HERBAL AND COSMETIC ANALYSIS

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Objectives: At completion of this course student shall be able to understand

- Determination of herbal remedies and regulations
- Analysis of natural products and monographs
- Determination of Herbal drug-drug interaction
- Principles of performance evaluation of cosmetic products.

MPAQA 105 P PHARMACEUTICAL PAQA PRACTICAL I

Objectives: At completion of this course student shall be able

- To perform analysis of drugs/drug products using suitable analytical techniques
- To undertake suitable pre-formulation studies to optimize the process of drug development
- To evaluate the pharmaceutical dosage forms and their stability testing
- To apply the quality tools for effective quality improvement of pharmaceuticals

Semester II

MPAQA 201T. ADVANCED INSTRUMENTAL ANALYSIS

Objectives: After completion of course, student is able to know,


- interpretation of the NMR, Mass and IR spectra of various organic compounds
- theoretical and practical skills of the hyphenated instruments
- identification of organic compounds

MPAQA 202T. MODERN BIO-ANALYTICAL TECHNIQUES

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

- Extraction of drugs from biological samples
- Separation of drugs from biological samples using different techniques
- Guidelines for BA/BE studies.

MPAQA 203T. PHARMACEUTICAL VALIDATION


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Objectives: At completion of this course, it is expected that students will be able to understand –
The concepts of calibration, qualification and validation

- The qualification of various equipment and instruments
- Process validation of different dosage forms
- Validation of analytical method for estimation of drugs
- Cleaning validation of equipment employed in the manufacture of pharmaceuticals

MPAQA 204T. PHARMACEUTICAL MANUFACTURING TECHNOLOGY

Objectives: At completion of this course, it is expected that students will be able to understand, –
The common practice in the pharmaceutical industry developments, plant layout and production planning

- Will be familiar with the principles and practices of aseptic process technology, non-sterile manufacturing technology and packaging technology.
- Have a better understanding of principles and implementation of Quality by design (QbD) and process analytical technology (PAT) in pharmaceutical manufacturing

MPAQA 205P PHARMACEUTICAL PAQA PRACTICAL II

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


- To perform analysis of contaminants and related substances in pharmaceuticals
- To perform qualifications of instruments and processes in pharmaceutical manufacturing and analysis
- To prepare checklists and design layouts
- To apply the quality tools (QbD and PAT) for effective quality improvement of pharmaceuticals

PHARMACOLOGY

MPL 102T: ADVANCED PHARMACOLOGY - I

Objectives: Upon completion of the course the student shall be able to :

- Discuss the pathophysiology and pharmacotherapy of certain diseases


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- 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

MPL 103T: PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS - I

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

- 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

MPL 104T: CELLULAR AND MOLECULAR PHARMACOLOGY

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

- 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

MPL105P PHARMACOLOGY PRACTICAL I

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

- The students shall be able to understand Analysis of pharmacopoeial compounds and their formulations by UV Vis spectrophotometer
- The students shall be able to handle laboratory animals.
- The students shall be able to understand various routes of drug administration

MPL 201T: ADVANCED PHARMACOLOGY - II

OBJECTIVES: Upon completion of the course the student shall be able to:

- Explain the mechanism of drug actions at cellular and molecular level


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- Discuss the Pathophysiology and pharmacotherapy of certain diseases
- Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases

MPL 202T: PHARMACOLOGICAL AND TOXICOLOGICAL SCREENING METHODS-II

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

- 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.

MPL 203T: PRINCIPLES OF DRUG DISCOVERY

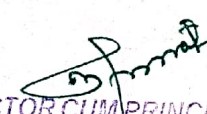
Objectives: Upon completion of the course, the student shall be able to,

- 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

MPL 204T: CLINICAL RESEARCH AND PHARMACOVIGILANCE

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

- 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


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MPL205P PHARMACOLOGY PRACTICAL II

OBJECTIVES: Upon completion of the course the student shall be able to:

- The students shall be able to understand drug absorption studies by averted rat ileum preparation
- The students shall be able to understand acute oral toxicity studies as per OECD guidelines
- The students shall be able to understand ADR reporting


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