

2.6: Student Performance and Learning Outcomes

2.6.1: Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website and attainment of POs and COs are evaluated



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Response:

- 1) To provide essential knowledge pertaining to key principles involved in various physicochemical and biological aspects of drugs and their implications.
- 2) To explore the knowledge of the principles of Inorganic and organic chemistry in the design and synthesis of active pharmaceutical ingredients along with their structure-activity relationships.
- 3) To highlight the importance of pharmacogenetic and phytochemical aspects of various natural drug products.
- 4) To inculcate fundamental aspects about the genesis and importance of various materials used in formulation development and also for their pre-formulation and biopharmaceutical assessment.
- 5) To impart essential skills required for the development of various formulations and to provide necessary training on basic skills to handle machinery and instruments needed for their fabrication, evaluation and marketing.
- 6) To ensure sustainability and perfection in aspects relating to pharmacodynamic and pharmacokinetic drug screening, usage of simulated practices for studying the therapeutic ability of drugs.
- 7) To imbibe the prominence of a pharmacist in the health care sector as a clinical pharmacist, community pharmacist etc. powered with good communication skills, hospital training and also by conducting health awareness programs for the general public.
- 8) To enhance knowledge of Research methodology and Statistical applications at all levels of pharmaceutical research along with ethics involved in research.
- 9) To highlight the importance of Regulatory aspects, Marketing and Management skills in the Pharmaceutical Industry.
- 10) To understand fundamental aspects of pharmacotherapy based on pathological abnormalities that occur in various diseases and disorders.
- 11) To impart basic knowledge regarding the rational use of various drugs in treating the patient with a view to individualize drug therapy for a specific diagnosis.



- 12) Identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effect/s)
- 13) To ensure effective communication of health-related information to all healthcare professionals by providing patient counselling, identification and management of adverse drug reactions, conducting medication history interviews and reporting of medication errors.
- 14) Impart knowledge of the drug development process, various phases of clinical trials and also the ethical issues involved in the conduct of clinical research.
- 15) To ensure that effective, integrated and critically analyzed medicine and poison information is provided to healthcare professionals, which helps in efficient patient care.



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Program Name: B. Pharmacy

Year: First Year

Semester: I

Course Name: Human anatomy and physiology-I

Course Code: BP101T

COURSE OUTCOMES

By the end of the course, students shall be able

- 1) To understand the basic concept of anatomy and physiology, its scopes and various homeostasis mechanisms.
- 2) To get the knowledge of basic structure and function of cells and tissues, their various types, general principles, signaling pathways etc.
- 3) To get the knowledge of structure and function of skin, skeleton system and joint.
- 4) To know the composition, function and various mechanisms of blood and lymphatic system.
- 5) To know the structure and function of various special senses and peripheral nervous system.
- 6) To understand the anatomy of the heart, conduction of heart, regulation of blood pressure and its related disorders.

Course Name: Pharmaceutical Analysis-I

Course Code: BP102T

COURSE OUTCOMES

By the end of the course, Students shall be able to;

- 1) acquire analytical skills related with analytical chemistry and principles of electrochemical analysis of drugs.
- 2) acquire fundamental knowledge necessary to understand the basic principles of Different techniques pharmaceutical analysis, concept of errors, Pharmacopoeia, Sources of impurities in medicinal agents & limit tests.
- 3) gain the knowledge of Acid-Base Titration & Non-aqueous Titration.
- 4) learn about to Precipitation titrations, Complexometric titration, Gravimetric analysis, application of diazotization titration.
- 5) understand concept of Redox titrations, its principles and applications.
- 6) get proficiency in performing electrochemical methods of analysis like Conductometry, Potentiometry & Polarography.


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Course Name: Pharmaceutics-I

Course Code: BP103T

Course Outcome

- 1) Students will be able to learn about the history of the profession of pharmacy and various dosage forms.
- 2) Students will gain the knowledge on the professional ways of handling prescription and posology.
- 3) Students will be able to know the various pharmaceutical calculations, powders & liquid dosage forms
- 4) Students will be able to understand the monophasic and biphasic liquid dosage forms.
- 5) Students will gain the knowledge on pharmaceutical incompatibilities and suppositories as dosage form.
- 6) Students will be able to understand the semisolid dosage form.

Course Name: Pharmaceutical Inorganic Chemistry

Course Code: BP104T

COURSE OUTCOME

By the end of the course, Students shall be able to;

- 1) To study Sources of Impurities and methods to determine the impurities in Inorganic pharmaceutical substances
- 2) To study Acids, Bases and Buffers and Importance of Major Intra and Extra cellular Electrolytes and uses of **Dental** products.
- 3) To study Gastrointestinal Agents, Cathartics and Antimicrobials
- 4) To know properties and uses of Expectorant, Emetics and Hematinic
- 5) To know Poison and its Anti dotes, Astringents and their properties and uses.
- 6) To understand Radiopharmaceuticals and its Application.

Course Name: Communication Skills

Course Code: BP105T

COURSE OUTCOME

By the end of the course, Students shall be able to;


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- 1) The student will be able to understand communication skills with barriers and perspectives
- 2) The student will be able to understand elements of communication (Verbal and Non-Verbal)
- 3) The student will be able to develop basic listening skills.
- 4) The student will be able to understand writing skills.
- 5) The student will be able to develop interview skills.
- 6) The student will be able to understand skills in the group discussion.

Course Name: Remedial biology

Course Code: BP 106 RBT

COURSE OUTCOMES

The main aim of this course is to make aware the students to understand and learn about

- 1) To understand the characters of living organisms and classification of kingdoms
- 2) To develop basic knowledge on morphology and functions of various plant parts such as root, stem, leaf, flower, fruit and seed
- 3) To analyze functions of organs in the cardiovascular, digestive and respiratory systems of human body
- 4) To assess the physiology of brain and spinal cord, and role of kidney in regulation of body fluids
- 5) To determine role of hormones in regulation of various organs functioning in the body and process of *oogenesis* and *spermatogenesis*.
- 6) To elaborate the physiology, nutrient requirements for plants and to predict plant/animal tissues.

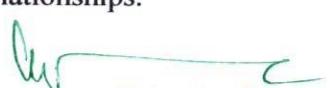
Course Name: Remedial mathematics

Course Code: BP 106 RMT

Course Outcome

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

- 1) Apply mathematical concepts and principles to perform computations for Pharmaceutical Sciences.
- 2) Create, use and analyze mathematical representations and mathematical relationships.


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- 3) Communicate mathematical knowledge and understanding to help in the field of Clinical Pharmacy.
- 4) Perform abstract mathematical reasoning.

Course Name: Human anatomy and physiology-I

Course Code: BP107P

COURSE OUTCOME

By the end of the course, Students shall be able to;

- 1) learn handling of microscope and helps the students to understand the microscopic study of various tissues of human body.
- 2) identifies the various axial and appendicular bones.
- 3) knowledge of various haemocytic methods of estimation of blood cell count like RBCs and WBCs count and erythrocyte sedimentation rate etc.
- 4) learn what is bleeding and clotting time and how it is calculated along with their normal and abnormal ranges and associated disorders.
- 5) knowledge that how to estimate the actual hemoglobin content, blood group detection its ranges and importance.
- 6) understand the various physiological process like heart rate, pulse rate, blood pressure

Course Name: Pharmaceutics-I

Course Code: BP109 P

Course Outcome

- 1) Students will able to study about the preparation and dispensing of syrup and elixir.
- 2) Students will able to understand the preparation and dispensing of linctus and solutions.
- 3) Students will gain knowledge on the preparation and dispensing of suspension and emulsion.
- 4) Students will able to study about preparation and dispensing of powder, granules and suppositories.
- 5) Students will able to understand the preparation and dispensing of semisolids.
- 6) Students will gain knowledge on the preparation and dispensing of gargles and mouthwashes.


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Course Name: Pharmaceutical Inorganic Chemistry

Course Code: BP110P

COURSE OUTCOME

By the end of the course, Students shall be able to;

- 1) To learn Limit tests for Chlorides and Sulphates
- 2) To learn Limit test for Iron
- 3) To learn Limit test for Heavy metals
- 4) To know Identification tests for Inorganic Pharmaceuticals.
- 5) To know Test for purity of certain Inorganic Pharmaceuticals.
- 6) To Understand Preparation of Inorganic Pharmaceuticals

Program Name: B. Pharmacy **Year:** First Year

Semester: II

Course Name: Human anatomy and physiology-II

Course Code: BP201T

COURSE OUTCOMES

- 1) Identify the gross structure and function of neuron, brain and spinal cord along with their basic physiology.
- 2) knowledge of structure and function of various organs of digestive system with their respective physiological functions and disorder.
- 3) knowledge of anatomy and physiology of respiratory systems, regulation of respiration and its related terms.
- 4) understand the structure and function of kidney and urinary tract and its related homeostatic mechanism.
- 5) know the anatomy and physiology of male and female reproductive system and related concepts.
- 6) know the concepts of chromosomes and gene, process of protein synthesis and all related concepts.

Course Name: Pharmaceutical Organic Chemistry

Course Code: BP202T

COURSE OUTCOMES

- 1) Write the Classification, IUPAC nomenclature and the type of isomerism of the organic compounds.

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- 2) Learn important physical properties and methods of preparation of organic compounds. assign in course
- 3) Write the reaction, name the reaction and orientation of reactions of organic compounds assign in course.
- 4) Write the structure and uses of organic compounds assign in course.
- 5) Account for reactivity and stability of organic compounds.
- 6) Identify/confirm the identification of organic compound.

Course Name: Biochemistry

Course Code: BP203T

COURSE OUTCOMES

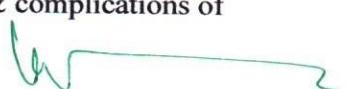
- 1) acquire fundamental knowledge necessary to understand molecular logics of biochemical processes in living organisms.
- 2) learn about to recognize dynamics in the synthesis and degradation of the natural bio macromolecules: proteins, carbohydrates, polysaccharides, lipids and nucleic acids,
- 3) gain the knowledge of Describing and applying basic biochemical principles related to structure and function of the protein macromolecules;
- 4) learn about to Determine key enzymes regulating reaction rate in the metabolic pathways and asses what diagnostically measurable biochemical changes might indicate disorders in the particular enzyme systems. Estimate what genetic factors might be relevant to diseases and relate enzyme kinetics to regulatory enzyme characteristics;
- 5) explain biochemical mechanism of the DNA replication, generation and repair of the DNA mutations, recognize role of all elements in the process of transcription and protein synthesis,
- 6) get proficiency in performing biochemical experiments based on grasped experimental and technical skills

Course Name: Pathophysiology

Course Code: BP204T

COURSE OUTCOMES

- 1) Student will be able to learn the Basic principles of Cell injury and Adaptation.
- 2) Student will be able to know the etiology, pathogenesis, signs and symptoms & complications of Various Cardiovascular, Respiratory & Renal system diseases.


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- 3) Student will be able to understand the etiology, pathogenesis signs and symptoms & complications of Various Hematological, Endocrine, Nervous & Gastrointestinal system diseases.
- 4) Student will be able to know the etiology, pathogenesis signs and symptoms & complications of inflammatory bowel diseases, jaundice, hepatitis alcoholic liver, Rheumatoid arthritis, osteoporosis, gout disease & cancer.
- 5) Student will be able to understand the etiology, pathogenesis signs and symptoms & complications of Various Infectious and Sexually transmitted diseases.
- 6) Student will be able to understand the Basic mechanism involved in the process of inflammation and repair & Pathophysiology of Atherosclerosis.

Course Name: Environmental Sciences

Course Code: BP206T

COURSE OUTCOMES

- 1) gain sufficient Knowledge about plant cell and tissue culture with the help of its Introduction, Historical development of plant tissue culture, types of culture, cell culture techniques, cellular toti potency, Laboratory Organization (Nutritional requirements, growth & maintenance) and Application of plant tissue culture in pharmacognosy and pharmacobiotechnology.
- 2) learn about Genetics as Applied to Medicinal Herbs, Mutation, Polyploidy, Chemical races, Artificial Mutations, Hybridization, genetic engineering of plants.
- 3) impart sufficient knowledge about Introduction of Recombinant DNA- Technology, transgenic plants, recombinant DNA techniques (Gene Splicing), DNA-Ligase, Cloning vector, Hybridization probes.
- 4) learn about Gene Transfer, their objectives of gene therapy, diseases & gene therapy.
- 5) gain knowledge regarding Enzymes its Introduction, classification, types of inhibition, isolation techniques, Immobilization of enzymes.
- 6) gain impart knowledge about Application of enzymes to plant biotechnology.


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Course Name: Human anatomy and physiology-II

Course Code: BP207P

COURSE OUTCOMES

- 1) gets basic knowledge of integumentary system and special sense organ.
- 2) get knowledge of various basic system of body like nervous system, endocrine system, digestive, respiratory system etc and examination of various neurological function.
- 3) get knowledge that how to estimate the different type of taste, body temperature and reflex activity.
- 4) learn the various physiologic processes like function of olfactory nerve, visual acuity, vital capacity, tidal volume etc.
- 5) gets knowledge that how to determine basal metabolic rate and also gets the knowledge of various family planning devices and estimation of total blood count.
- 6) gets knowledge to identify the microscopic permanent slides of various organs like tissue, ovary, small intestine etc

Course Name: Pharmaceutical organic Chemistry-I

Course Code: BP208P

Course Outcome

Upon completion of the course the student shall be able to

- 1) Knowledge of safety measures in organic chemistry laboratory and various laboratory techniques.
- 2) Understanding of steps involved in identification of unknown organic compound.
- 3) Ability to prepare suitable solid derivatives from organic compounds.
- 4) Develop skills to prepare stereo models containing various.

Program Name: B. Pharmacy

Year: Second Year

Semester: III

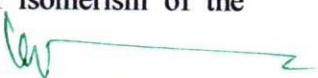
Course Name: Pharmaceutical Organic Chemistry-II

Course Code: BP 301T

Course Outcome

Upon completion of the course the student shall be able to

- 1) Knowledge of the classification, nomenclature, structure and the type of isomerism of the organic compound


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- 2) Understanding of important physical properties, reactions (and underlying mechanisms) and methods of preparation of various functional groups
- 3) Account for reactivity/stability of compounds and intermediates forming in reactions
- 4) Identify/confirm the identification of organic compound
- 5) Understand the theory of cycloalkanes.

Course Name: Physical pharmaceutics-I

Course Code: BP 302T

Course Outcome

- 1) Students will able to learn about the ideal solubility parameter & its mechanism of solute solvent interaction for the better implementation of the various distribution and diffusion laws with its principles in biological system.
- 2) Students will gain the knowledge on the basic phenomenon about states of matter and its properties for better determination of crystalline and amorphous nature of drug & polymorphism of drug.
- 3) Students will able to know the various physicochemical properties of drug molecules in the designing the dosage forms.
- 4) Students will able to understand the basic principles of surface and interfacial tension, chemical kinetics and their uses in stability testing and determination of expiry date of the formulation.
- 5) Students will able to understand the complexation and protein binding for its use in thermodynamic treatment of stability constant.
- 6) Students will gain the knowledge on pH, buffers and isotonic solutions for better explanation of their application in pharmaceutical and biological system.

Course Name: Pharmaceutical microbiology

Course Code: BP 303T

Course Outcomes

- 1) Students shall understand the history of microbiology along with classification and scope of pharmaceutical microbiology and how to grow, isolate and cultivate to the bacteria.
- 2) Students shall gain the knowledge about identification technique of bacteria and importance and implementation of sterilization in pharmaceutical processing and industry.



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- 3) Students To know the introduction of fungi along with its industrial importance and morphology & reproduction and learn about disinfectant and its evaluation parameters.
- 4) Students shall be able to know about designed of aseptic area and how to carried out microbiological standardization of antibiotics, vitamins, and amino acids.
- 5) Students shall understand all information about pharmaceutical spoilage and preservation of pharmaceutical product its evaluation parameters.
- 6) Students know the cell culture technology and its applications in pharmaceutical industries and study about viruses.

Course Name: Pharmaceutical Organic Chemistry-II

Course Code: BP 305P

Course Outcome

Upon completion of the course the student shall be able to

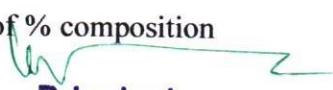
- 1) Demonstration of recrystallisation and Steam distillation.
- 2) Perform separation and identification of qualitative analysis of solid-solid organic binary mixtures.
- 3) Determine the saponification value of oil sample.
- 4) Synthesize the different organic compounds and understand the reaction mechanisms.

Course Name: Physical pharmaceutics-I

Course Code: BP 306P

Course Outcome

- 1) Students will able to study about the determination the solubility of drug at room temperature and also determination of stability constant and donor acceptor ratio of PABA-Caffeine complex by solubility method.
- 2) Students will able to understand the surface tension of given liquids by drop count and drop weight method and determination of critical micellar concentration of surfactants.
- 3) Students will able to understand the design and determination of Partition co- efficient of Iodine in CCl_4 and water, benzoic acid in benzene and water and also determination of % composition of NaCl in a solution using phenol-water system by CST method.


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- 4) Students will able to understand the determination of pKa value by Half Neutralization/ Henderson Hassel Balch equation.
- 5) Students will able to understand the determination of HLB number of a surfactant by saponification method
- 6) Students will able to understand the Freundlich and Langmuir constants using activated charcoal and the stability constant and donor acceptor ratio of Cupric-Glycine complex by pH titration method.

Course Name: Pharmaceutical microbiology

Course Code: BP 307P

Course Outcomes

- 1) Students will able to study about different equipment and their processing used in laboratory of microbiology and Sterilization of glassware and preparation & sterilization of culture media.
- 2) Students know about Sub culturing of bacteria and fungus Nutrient stabs and slants preparations.
- 3) Students shall be able to know about fixing microbes sample and Staining methods Simple, Grams staining and acid-fast staining.
- 4) Students gain the knowledge about Microbiological assay of antibiotics by cup plate method and other methods and Motility determination by Hanging drop method.
- 5) Students know the isolation technique of microbe from mixed culture by using various techniques and Sterility testing of pharmaceuticals.
- 6) Students know about Bacteriological analysis of water by demonstration practical and Biochemical test.

Program Name: B. Pharmacy

Year: Second Year

Semester: IV

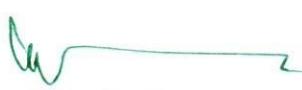
Course Name: Pharmaceutical Organic Chemistry-III

Course Code: BP 401T

Course Outcome

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

- 1) Explain the stereo chemical aspects of organic compounds and stereo chemical reaction
- 2) Understand the basic terminologies in stereochemistry and organic reactions


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- 3) Know the synthesis, chemical properties, medicinal uses and other applications of heterocyclic compounds
- 4) Understand the synthesis, chemical properties, medicinal uses and other applications of heterocyclic compounds
- 5) Understand the important named reactions

Course Name: Medicinal chemistry-I

Course Code: BP 402T

Course Outcome

- 1) Students should be able to understand the introduction, history and development of medicinal chemistry, physicochemical properties in relation to biological action and drug metabolism.
- 2) Students should gain the knowledge about the classification, chemistry, structure – activity relationship, mechanism of action, medicinal uses, adverse effects and synthesis of the drugs acting on autonomic nervous system including adrenergic neurotransmitters, sympathomimetic agents and adrenergic antagonists.
- 3) Students should be able to know the classification, chemistry, structure – activity relationship, mechanism of action, medicinal uses, adverse effects and synthesis of the drugs belonging to the class cholinergic neurotransmitters including parasympathomimetic agents and cholinolytic agents.
- 4) Students should be able to learn about the classification, chemistry, structure – activity relationship, mechanism of action, medicinal uses, adverse effects and synthesis of the drugs belonging to the class sedatives and hypnotics.
- 5) Students should be able to demonstrate the classification, chemistry, structure – activity relationship, mechanism of action, medicinal uses, adverse effects and synthesis of the drugs belonging to the class antipsychotics and anticonvulsants.
- 6) Students should be aware of the classification, chemistry, structure – activity relationship, mechanism of action, medicinal uses, adverse effects and synthesis of the drugs belonging to the class general anesthetics and narcotic and non-narcotic analgesics.


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Course Name: Physical pharmaceutics-II

Course Code: BP 403T

Course Outcome

- 1) Students will able to learn about the colloidal dispersions and their general characteristics in the formulation of various dosage forms.
- 2) Students will gain the knowledge on the basic phenomenon of rheology by using various inter related laws.
- 3) Students will able to know the various physicochemical properties of drug molecules in the deformation of solids.
- 4) Students will able to understand the basic principles of suspension and emulsion and their rheological properties by using HLB method.
- 5) Students will able to understand the micromeritics and use of physicochemical properties in the formulation development and evaluation of dosage forms
- 6) Students will gain the knowledge on chemical kinetics and their uses in stability testing and determination of expiry date of the formulation.

Course Name: Pharmacology-I

Course Code: BP 404T

Course Outcome

- 1) Define the basic terms of Medical Pharmacology
- 2) Select the appropriate dose and routes for drugs administration
- 3) Describe the pattern of absorption, distribution, metabolism and excretion of various drugs
- 4) Classify the drugs based on the mechanism of action and indications
- 5) Identify the types of adverse drug reactions, drug-drug interactions, food-drug interactions and contraindications
- 6) Apply the pharmacological knowledge in therapeutic aspects.


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Course Name: Medicinal chemistry- I

Course Code: BP 406P

COURSE OUTCOMES

- 1) Students shall know about preparation intermediates like 1,3 pyrazole, 1,3 oxazole & benzimidazole
- 2) Students shall be able to prepare Benzotriazole 2,3 diphenyl quinoxaline, benzocaine.
- 3) Students To know about the preparation of drug such as phenytoin, phenothiazine & barbiturate.
- 4) Students shall be able to perform assay of drug like chlorpromazine, phenobarbitone, & atropine
- 5) Students learn about perform assay of intermediates like ibuprofen, aspirin, furosemide.
- 6) Students know about the determination of partition coefficient for any two drugs.

Course Name: Physical pharmaceutics- II

Course Code: BP 407P

Course Outcome

- 1) Students will able to understand the determination of viscosity of liquid using Ostwald's viscometer & viscosity of semisolid by using Brookfield viscometer
- 2) Students will able to study about the determination of particle size, particle size distribution using sieving method & microscopic method.
- 3) Students will able to understand the determination of bulk density, true density, porosity and angle of repose and influence of lubricant on angle of repose.
- 4) Students will able to understand the determination of sedimentation volume with effect of different suspending agent.
- 5) Students will able to understand the determination of sedimentation volume with effect of different concentration of single suspending agent and the Accelerated stability studies.
- 6) Students will able to gain knowledge on Determination of reaction rate constant first order and second order.


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Program Name: B. Pharmacy **Year:** Third Year

Semester: V

Course Name: Medicinal Chemistry-II

Course Code: BP 501T

Course Outcome

- 1) Students should be able to understand the classification, chemistry, structure – activity relationship, mechanism of action, medicinal uses, adverse effects and synthesis of the drugs belonging to the class anti-histaminic and anti-neoplastic.
- 2) Students should gain the knowledge about the classification, chemistry, structure – activity relationship, mechanism of action, medicinal uses, adverse effects and synthesis of the drugs belonging to the class anti-anginal and diuretics.
- 3) Students should be able to know the classification, chemistry, structure – activity relationship, mechanism of action, medicinal uses, adverse effects and synthesis of the drugs belonging to the class anti-hypertensive and anti-arrhythmic.
- 4) Students should be able to learn about the classification, chemistry, structure – activity relationship, mechanism of action, medicinal uses, adverse effects and synthesis of the drugs belonging to the class anti-hyperlipidemic, coagulant & anticoagulants and drugs used in Congestive heart failure.
- 5) Students should be able to demonstrate the classification, chemistry, structure – activity relationship, mechanism of action, medicinal uses, adverse effects and synthesis of the drugs acting on the endocrine system and thyroid and anti-thyroid drugs.
- 6) Students should be aware of the classification, chemistry, structure – activity relationship, mechanism of action, medicinal uses, adverse effects and synthesis of the drugs belonging to the class anti-diabetic and local anesthetics.

Course Name: Industrial pharmacy-I

Course Code: BP 502T

COURSE OUTCOMES

- 1) Know the various pharmaceutical dosage forms and their manufacturing techniques.
- 2) Know various considerations in development of pharmaceutical dosage forms.
- 3) Know various considerations in method development & evolution of tablet and capsule.
- 4) Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality.


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- 5) To study the Formulation and manufacturing consideration of syrups and elixirs suspensions and emulsions as per official pharmacopoeia
- 6) To study the Introduction, formulation requirements, of palletization process pharmaceutics.

Course Name: Pharmacology-II

Course Code: BP 503T

Course Outcome

- 1) Understand the pharmacology and mechanism of drug action and its relevance in the treatment of cardio vascular diseases.
- 2) Understand the pharmacology and mechanism of drug action and its relevance in the treatment of Urinary system's diseases.
- 3) To learn the pharmacological actions of autocoids with their agonists and antagonists.
- 4) To gain the knowledge of endocrine system analogues and their inhibitors.
- 5) Understand the pharmacology of steroids, hormones, and oral contraceptives. Learn the principle, types and applications of various bioassays.

Course Name: Pharmaceutical Jurisprudence

Course Code: BP 505T

Course outcomes

- 1) Understand the Indian regulatory legislation for drug, Pharmaceutical Industries, Code of Pharmaceutical Ethics and Intellectual property Rights.
- 2) Understand and recall laws and acts depicted in Pharmacy act 1948, Poisons Act 1919 and Medical Termination of Pregnancy Act, 1971
- 3) Understand and recall laws and acts depicted in The Drugs and Magic Remedies (objectionable Advertisement) Act, 1954, Narcotic Drugs and psychotropic substances Act,1985, Right to Information Act.
- 4) Understand and recall laws and acts depicted in Drug and Cosmetic act 1940
- 5) Learn the Drugs (price control) order-2013 and Prevention of Cruelty to Animals Act-1960.
- 6) Know the Medicinal and Toilet preparations (excise Duties) Act, 1955.


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Program Name: B. Pharmacy **Year:** Third Year

Semester: VI

Course Name: Medicinal Chemistry-III

Course Code: BP 601T

Course Outcome

- 1) Students will be able to study about the importance of drug design and different techniques of drug design.
- 2) Students will be able to understand the chemistry of drugs with respect to their biological activity.
- 3) Students will know the metabolism, adverse effects and therapeutic value of drugs.
- 4) Students will know the importance of SAR of drugs.
- 5) Students will gain knowledge on the classification, Structure activity relationship of selective class of drugs, Mechanism of Action etc.

Course Name: Pharmacology-III

Course Code: BP 602T

Course Outcome

- 1) Understand the pharmacology and mechanism of drug action and its relevance in the treatment of respiratory system diseases.
- 2) Understand the pharmacology and mechanism of drug action and its relevance in the treatment of Gastrointestinal system's diseases.
- 3) To learn the pharmacological actions or mechanisms of drugs used in the treatment of cancer or chemotherapy.
- 4) To gain the knowledge of immunostimulants and immunosuppressants.
- 5) Understand the basic concepts of toxicology, General principles of treatment of poisoning, Clinical symptoms and management of poisoning.
- 6) To understand the basic knowledge of Chronopharmacology.

Course Name: Pharmaceutical biotechnology

Course Code: BP 605T

COURSE OUTCOMES

- 1) Students shall understand the introduction of biotechnology along with the importance of Immobilized enzymes in pharmaceutical industry
- 2) Students shall gain the knowledge about genetic engineering applications in relation to production of pharmaceuticals
- 3) Students learn about immunity & structure of immunoglobulins and preparations of vaccines.

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- 4) Students shall be able to know about immune blotting techniques and microbial biotransformation.
- 5) Students shall understand all information about appreciate use of microorganism in fermentation technology.
- 6) Students know about the production of penicillin, Vitamin B12, Glutamic acid and storage of blood products.

Course Name: Quality assurance

Course Code: BP 606T

Course Outcome

- 1) Students will able to study about good laboratory practices.
- 2) Students will able to understand the cGMP aspects in pharmaceutical industry.
- 3) Students will gain knowledge on importance of documentation.
- 4) Students will ably understand the scope quality certification applicable for pharmaceutical industry.
- 5) Students will able to understand the responsibilities of QA and QC department.
- 6) Students will gain knowledge on the preparation and maintenance of documents in pharmaceutical industry.

Course Name: Medicinal chemistry-III

Course Code: BP 607P

Course Outcome

- 1) Students will able to study and preparation of drugs and their intermediates.
- 2) Students will able to understand and perform Assay of Drugs.
- 3) Students will gain knowledge on Preparation of medicinally important compounds or intermediates by Microwave irradiation technique.
- 4) Students will able to draw structures and reactions using chem. draw.
- 5) Students will understand the determination of physicochemical properties such as log P, clog P, etc. for class of drugs.


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Program Name: B. Pharmacy

Year: Final Year

Semester: VII

Course Name: Industrial Pharmacy -II

Course Code: BP 702T

COURSE OUTCOME

- 1) Know the process of pilot plant and scale up of pharmaceutical dosage forms.
- 2) Understand the process of technology transfer from lab scale to commercial batch.
- 3) Know different Laws and Acts that regulate pharmaceutical industry.
- 4) Understand the approval process and regulatory requirements for drug products.
- 5) To understand roll and responsibilities of quality management system in industry pharmacy.
- 6) To know approval procedures for New Drugs and certification of pharmaceutical product.

Course Name: Pharmacy practice

Course Code: BP 703 T

Course Outcome

- 1) Students will able to learn about the hospital, hospital pharmacy & its organization and also how to detect and assess the adverse drug reactions.
- 2) Students will gain the knowledge on know various drug distribution methods in a hospital, hospital formulary and therapeutic drug monitoring.
- 3) Students will able to understand the monitor drug therapy of patient through medication history interview to counsel the patient and community pharmacy management.
- 4) Students will learn about the pharmacy and therapeutic committee and drug information services and to do patient counselling, education and training program in the hospital sand Prescribed medication order and communication skill.
- 5) Students will able to understand the basic Budget preparation and implementation, clinical pharmacy and Over the Counter sales.
- 6) Students will able to understand how to appreciate the pharmacy stores management and inventory control and to interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease state.

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Course Name: Instrument methods of analysis

Course Code: BP 705 P

Course outcome

- 1) Student will get proficiency in Instrumental techniques & its types.
- 2) Student will able to learn about UV spectrophotometric methods & able to analyze sample by using this method.
- 3) Students will able to practice analysis of compound by using Colorimeter.
- 4) Students will able to analyses compound by using Flame Photometer.
- 5) To understand Chromatographic technique with principle, Operational Technique and Applications of Paper Chromatography, Column Chromatography and Thin Layer Chromatography (TLC).
- 6) Student will able to gain the knowledge, principle and instrumentation of. HPLC & Gas Chromatography.

Program Name: B. Pharmacy

Year: Final Year

Semester: VIII

Course Name: Pharmaceutical Regulatory Science

Course Code: BP 804 ET

Course Outcome

- 1) Students will able to learn about the process of new drug discovery and development
- 2) Students will gain the knowledge on the various regulatory approval processes.
- 3) Students will able to understand the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
- 4) Students will learn about Registration of Indian drug product in overseas market
- 5) Students will able to understand the basic of Clinical trials
- 6) Students will able to understand the various Regulatory Concepts to impart the fundamental knowledge on the regulatory requirements.


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Program Name: M. Pharmacy

Year: First Year

Semester: I

Course Name: Regulatory Affairs

Course Code: MPH 104T

Course Outcome

- 1) Students will able to learn about the Concepts of innovator and generic drugs, drug development process
- 2) Students will gain the knowledge on the Regulatory guidance's and guidelines for filing and approval process and their submission to regulatory agencies in different countries.
- 3) Students will able to understand the Regulation for combination products and medical devices
- 4) Students will learn about Post approval regulatory requirements for actives and drug products
- 5) Students will able to understand the basic of Preparation of Dossiers
- 6) Students will able to understand the various Clinical trials requirements for approvals for conducting clinical trials Pharmacovigilance and process of monitoring in clinical trials.

Program Name: M. Pharmacy

Year: First Year

Semester: II

Course Name: Cosmetics & Cosmeceuticals

Course Code: MPH 204T

Course Outcome

- 1) Students will able to learn about the Key ingredients used in cosmetics & cosmeceuticals and various regulatory aspects.
- 2) Students will gain the knowledge on the biological aspects of cosmetics.
- 3) Students will able to understand the basic science to develop cosmetics & cosmeceuticals.
- 4) Students will learn about perfumes and controversial ingredients.
- 5) Students will able to understand the basic designing of cosmeceutical product.
- 6) Students will able to understand the various Regulatory Concepts of herbal cosmetics.



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Program Name: M. Pharmacy **Year:** First Year

Semester: I

Course Name: Advanced organic Chemistry

Course Code: MPC 102 T

Course Outcome

- 1) Understand Basic Aspects of Organic Chemistry.
- 2) Study of Mechanisms and Synthetic Applications of Various Named Reactions.
- 3) Study Different Synthetic Reagents and its Applications.
- 4) Study Concepts of Heterocyclic Chemistry
- 5) Synthesis of few named Representative Drugs containing these Heterocyclic Nucleus
- 6) Understand Synthon Approach and Retrosynthesis Applications.

Course Name: Advanced Medicinal Chemistry

Course Code: MPC 103 T

Course Outcome

- 1) Students should be able to understand the principles of drug discovery, stages of drug discovery, lead discovery and biological drug targets.
- 2) Students should gain the knowledge about the basic concept of prodrug design, carrier linked prodrugs, bio precursors, prodrugs of functional group and prodrugs to improve patient acceptability.
- 3) Students should be able to know the Causes for drug resistance, strategies to combat drug resistance in antibiotics and anticancer therapy, analog design and bio isosteric replacement strategies.
- 4) Students should be able to learn about the systematic study, SAR, mechanism of action and synthesis of new generation molecules anti-hypertensive drugs, psychoactive drugs, anticonvulsant drugs, H1 & H2 receptor antagonist, COX1 & COX2 inhibitors, adrenergic & cholinergic agents, antineoplastic and antiviral agents and relation between stereochemistry and drug action.
- 5) Students should be able to demonstrate the enzyme kinetics & principles of enzyme inhibitors, enzyme inhibitors in medicine, enzyme inhibitors in basic research and rational design of non-covalently and covalently binding enzyme inhibitors.
- 6) Students should be aware of the therapeutic values of peptidomimetics, design of peptidomimetics by manipulation of the amino acids, modification of the peptide backbone and chemistry of prostaglandins, leukotrienes and thromboxane.



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Program Name: M. Pharmacy **Year:** First Year

Semester: II

Course Name: Computer Aided Drug Design

Course Code: MPC 203 T

Course Outcome

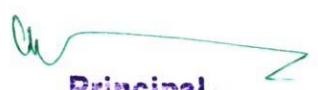
- 1) Students should be able to understand the history and development of QSAR, physicochemical parameters and methods to calculate physicochemical parameters, Hammett equation and electronic parameters (sigma), lipophilicity effects and parameters ($\log p$, π -substituent constant), steric effects (Taft steric and MR parameters) experimental and theoretical approaches for the determination of these physicochemical parameters.
- 2) Students should gain the knowledge about the applications of QSAR, 3D-QSAR approaches and contour map analysis, statistical methods used in QSAR analysis and importance of statistical parameters.
- 3) Students should be able to know the molecular and quantum mechanics in drug design, energy minimization methods and molecular docking and drug receptor interactions.
- 4) Students should be able to learn about the prediction and analysis of ADMET properties of new molecules and its importance in drug design, de novo drug design and homology modeling and generation of 3D-structure of protein.
- 5) Students should be able to demonstrate the concept of pharmacophore, pharmacophore mapping, identification of pharmacophore features and pharmacophore modeling and conformational search used in pharmacophore mapping.
- 6) Students should be aware of the in-silico drug design and virtual screening techniques, similarity-based methods and pharmacophore-based screening and structure based in-silico virtual screening protocols

Course Name: Pharmaceutical Process Chemistry

Course Code: MPC 204 T

Course Outcome

- 1) Know the Concepts of Process Chemistry
- 2) Study of Unit Operations, Extraction, Filtration, Distillation, Evaporation and Crystallization.
- 3) Study of Unit Processes-I, Nitration, Halogenation and Oxidation.


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- 4) Study of Unit Processes-II, Reduction, Fermentation,
- 5) Study of Unit Processes-II, Reaction Progress Kinetic Analysis
- 6) Know Industrial Safety, MSDS, Fire Hazards, OHSAS-1800, ISO-14001

Program Name: M. Pharmacy **Year:** First Year

Semester: I

Course Name: Quality Management System

Course Code: MQA 102 T

Course Outcome

- 1) Understand the Importance of Quality
- 2) Know the ISO Management System in Pharmaceutical Quality Management
- 3) Analyze the Issues in Quality by Different Quality Inspection Models
- 4) Quality Evaluation of Pharmaceuticals by using Stability Guidelines.
- 5) Study Statistical process Control for Quality
- 6) Regulatory Compliance through Quality Management and Development of Quality Culture.

Course Name: Product Development and Technology Transfer

Course Code: MQA 104 T

Course Outcome

- 1) Students should be able to understand the principles of drug discovery and development including investigational new drugs application (IND), new drug application (NDA), abbreviated new drug application (ANDA), supplemental new drug application (SNDA), scale up post approval changes (SUPAC) and bulk active chemical post approval changes (BACPAC), post marketing surveillance, product registration guidelines – CDSCO, USFDA.
- 2) Students should gain the knowledge about the pre-formulation studies, solubility, methods to improve solubility of drugs, surfactants & its importance, co-solvency and stability testing during product development.
- 3) Students should be able to know the pilot plant scale-up, large scale manufacturing techniques (formula, equipment, process, stability and quality control) of solids, liquids, semisolid and parenteral dosage forms.


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- 4) Students should be able to learn about the pharmaceutical packaging materials, medical device packaging, enteral packaging, aseptic packaging systems, selection and evaluation of pharmaceutical packaging materials.
- 5) Students should be able to demonstrate the quality control tests of containers, closures and secondary packing materials.
- 6) Students should be aware of the technology transfer and documentation in technology transfer.

Program Name: M. Pharmacy **Year:** First Year

Semester: II

Course Name: Hazards and Safety Management

Course Code: MQA 201 T

Course Outcome

- 1) Understand Multidisciplinary nature of Environmental Studies.
- 2) Know the Air Based Hazards.
- 3) Study Different chemical-based Hazards.
- 4) Study of Hazards from fire and Explosion.
- 5) Study of Hazards and Self Protection.
- 6) In detail study of Risk Management

Course Name: Audit and Regulatory Compliance

Course Code: MQA 203 T

Course Outcome

- 1) Students should be able to understand Importance of Audit and its Concepts.
- 2) Students should be able to know the Role of Quality system and Audits in Pharmaceutical Manufacturing Environment.
- 3) Students should be aware of Audit Process and Preparation of Audit Check Lists for Drug Industries.
- 4) Students should be aware of Auditing of Vendors and Production Management.
- 5) Students should be able to know Auditing of Microbiological Laboratory.
- 6) Students should know Auditing of Quality Assurance and Engineering Department.


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Course Name: Pharmaceutical Manufacturing Technology

Course Code: MQA 204 T

Course Outcome

- 1) Students should be able to understand the legal requirements and licenses for API and formulation industry, plant layout and production planning.
- 2) Students should gain the knowledge about the aseptic process technology, in process-quality control tests for ointment, suspension and emulsion, dry powder and solution (small volume & large volume) and advanced sterile product manufacturing technology.
- 3) Students should be able to know the process automation in pharmaceutical industry, monitoring of parenteral manufacturing facility and lyophilization technology.
- 4) Students should be able to learn about the non-sterile manufacturing process technology, advance non-sterile solid product manufacturing technology and coating technology.
- 5) Students should be able to demonstrate the containers and closures for pharmaceuticals and evaluation of stability of packaging material.
- 6) Students should be aware of the quality by design (QbD) and process analytical technology (PAT)

Program Name: M. Pharmacy

Year: Second Year

Semester: III

Course Name: Research Methodology and Biostatistics

Course Code: MRM 301 T

Course Outcomes

- 1) know General Research Methodology i.e., Research, objective, requirements, practical difficulties, review of literature, study design, types of studies, strategies to eliminate errors/bias, controls, randomization, crossover design, placebo, blinding techniques.
- 2) Understand Biostatistics and its Definition, application, sample size, importance of sample size, factors influencing sample size, dropouts, statistical tests of significance, type of significance tests.
- 3) Learn parametric tests, non-parametric tests, ANOVA, correlation, chi square test, null hypothesis, P values, degree of freedom, interpretation of P values.
- 4) Study Medical Research i.e., it's Guidelines and concepts.


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- 5) Study of CPCSEA guidelines for laboratory animal facility.
- 6) Study Declaration of Helsinki i.e. History, introduction, basic principles for all medical research, and additional principles for medical research combined with medical care.

Program Name: Pharm. D.

Year: First Year

Course Name: Human anatomy and physiology

COURSE OUTCOMES

By the end of the course, students shall be able

- 1) Define the basic concepts in Human Anatomy & Physiology.
- 2) Apply concepts and knowledge of Human Anatomy & Physiology to clinical scenarios.
- 3) Explain how the separate systems interact to yield integrated physiological responses.
- 4) Link the physiology and pathophysiology of several diseases.
- 5) Critically interpret the common laboratory values in medicine.
- 6) Use scientific laboratory equipment in order to gather and analyse data on human anatomy and physiology.

Course Name: Pharmaceutical Inorganic Chemistry

Course Outcome

- 1) Students should be able to understand errors, volumetric analysis, acid base titration.
- 2) Students should gain the knowledge about the redox titrations, non-aqueous titrations, precipitation titration, complexometric titrations
- 3) Students should be able to know theory of indicators, gravimetry and limit tests
- 4) Students should be able to understand medicinal gases, acidifiers, antacids, cathartics.
- 5) Students should be aware of the electrolyte replenisher, essential trace elements, antimicrobials and pharmaceutical aids.
- 6) Students should gain the knowledge about the dental products, miscellaneous compounds, radio pharmaceuticals and its diagnostic and clinical applications.


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Program Name: Pharm. D.

Year: Second Year

Course Name: Pharmacology

COURSE OUTCOMES

By the end of the course, students shall be able

- 1) Define the basic terms of Medical Pharmacology
- 2) Select the appropriate dose and routes for drugs administration
- 3) Describe the pattern of absorption, distribution, metabolism and excretion of various drugs
- 4) Classify the drugs based on the mechanism of action and indications
- 5) Identify the types of adverse drug reactions, drug-drug interactions, food-drug interactions and contraindications
- 6) Apply the pharmacological knowledge in therapeutic aspects

Course Name: Pharmacognosy & Phytopharmaceuticals

Course Outcome

By the end of the course, students shall be able

- 1) To understand concept of pharmacognosy, history and scope of Pharmacognosy and Classifications of crude drugs.
- 2) To understand the basic principles of Cultivation, Collection and Storage of crude drugs & Method of Cultivation of crude drugs.
- 3) To understand the Study of cell wall constituents and cell inclusions.
- 4) To understand the Method of Adulteration of crude drugs. Microscopical and powder Microscopical study of crude drugs and various Cell Constituents.
- 5) To learn pharmacogenetic study of Carbohydrates, Lipid, volatile oils And Protein.
- 6) To understand Study of plants fibers used in surgical dressings and related products.


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Program Name: Pharm. D.

Year: Third Year

Course Name: Pharmacology II (3.1)

COURSE OUTCOMES

By the end of the course, students shall be able

- 1) To understand the pharmacological aspects of drugs acting on blood and blood forming agents and pharmacology of drugs acting on renal system
- 2) To study pharmacology of chemotherapeutic agents used in various diseases.
- 3) Explain the pharmacology of immunosuppressant and principles of animal toxicology
- 4) Student should understand the dynamic cell the structure and function components of the cell.
- 5) Illustrate the Gene: Genome structure and function
- 6) Analyze the principles and processes of Recombinant DNA technology

Course Name: Pharmacotherapeutics-II

Course Outcome

By the end of the course, students shall be able

- 1) Students will be able to describe the pathophysiology and management of infectious, cancer, renal failure and diseases
- 2) Students will be developing Patient case-based Assessment Skills
- 3) Students will be able to describe the quality use of medicines issues surrounding the therapeutic agents in the treatment of diseases
- 4) Students will have developed clinical skills in the therapeutic management of these conditions.
- 5) Continue to develop communication skills.
- 6) Students will provide patient – centered care to diverse patients using the evidence-based medicine


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Course Name: Pharmacology II practical

Course Outcome

- 1) Student will able to learn the effects of drugs using rat uterus preparation & able to antihistaminic, agonistic & antagonistic effect of drug using histamine induced anaphylactic reaction in guinea pigs.
- 2) Student will able to learn to the effects of drugs on intestinal motility using frog's esophagus model & able to the anticonvulsant property of drugs.
- 3) Student will able to learn about the apomorphine-induced compulsive behaviors in mice & able to the muscle relaxant property of diazepam in mice using rotarod apparatus.
- 4) Student will able to learn about the effect of anthelmintics on earthworms & able to the taming effect of chlorpromazine & the effects of drugs on vas deference of the male rat.
- 5) Student will able to gain the knowledge of the anti-inflammatory property of indomethacin against carrageenan-induced paw oedema. & The anxiolytic effect of diazepam in mice using mirrored-chamber apparatus.
- 6) Student will able to learn about the effect of drugs on pesticide toxicity using rats as model & will able to the effect of drugs on heavy metal toxicity.

Program Name: Pharm. D.

Year: Fourth Year

Course Name: Clinical Toxicology (Practical)

COURSE OUTCOMES

By the end of the course, students shall be able

- 1) Demonstrate the basic understanding of general principles and fundamentals of poisoning
- 2) Evaluate and categorize the type of poisoning based on clinical presentation and Toxic syndrome
- 3) Assess the type of management applicable to poison
- 4) Estimate the antidote and its application for specific poison
- 5) Provide awareness to the public to prevent Accidental poisoning
- 6) Student will gain knowledge of Antidote

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Course Name: Clinical Toxicology (Theory)

Course Outcome

By the end of the course, students shall be able

- 1) Student will be able to demonstrate the basic understanding of general principal and fundamental of poisoning.
- 2) Student will be gain Evaluate and categorize the type of poisoning based on clinical Presentation and Toxic syndrome.
- 3) Student will be Assess the type of management applicable to poison.
- 4) Student will be Estimate the antidote and its application for specific poison.
- 5) Student will be Provide awareness to the public to prevent Accidental poisoning.
- 6) Proposing several preventive approaches to reduce unintentional poisonings.
- 7) Enabling the pharmacist to function as contributing health care team

Course Name: Hospital Pharmacy

Course Outcome

- 1) Student should understand the importance of various Drug distribution methods.
- 2) Be acquainted with Professional Practice Management Skills in Hospital Pharmacies.
- 3) Understand the professional responsibilities of hospital pharmacist and continuous professional development.
- 4) Know manufacturing practices of various formulations in Hospital setup
- 5) Appreciate the importance of various committees and their roles in Hospital
- 6) Appreciate the stores management and inventory control.

Course Name: Biostatistics and Research Methodology (4.4)

Course Outcome

- 1) Students should be able to understand Research Methodology, Types of Clinical Study Designs, Designing the Methodology.
- 2) Students should be able to know the Sample Size Determination and Power of a Study.



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- 3) Students should be able to know what is Bio statistics, Types of Data Distribution, Central Tendency Distribution, Average and Median Mode, Spread of Data Range Data Graphics, Graphs, Histograms, Pie Charts, Scatter Plots, Semi logarithm Plots.
- 4) Students should be aware of the, Basis for Testing Hypothesis, Null, Level of Significance, ANOVA, Linear Regression, Intro to statistical Software SPSS, Epi Info, SAS, Statistical Methods in Epidemiology.
- 5) Students should be able to know the Computer System in Hospital Pharmacy.
- 6) Students should be able to know the Computer in Community Pharmacy, Drug Information Retrieval and Storage.


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Programme Outcomes

B. Pharmacy

- 1) The Pharmacy graduates are required to learn and acquire adequate knowledge, necessary skills to practice the profession of pharmacy. Adequate knowledge and scientific information regarding basic principles of Pharmaceutical & Medicinal Chemistry, Pharmaceutics including Cosmetology, Pharmacology, Pharmacognosy including herbal medicines.
- 2) The graduate should have adequate knowledge of synthesis & analysis of medicinal agents, their mode and mechanism of action, drug interactions, patient counselling and adequate technical information to be exchanged with the physician and other health professionals.
- 3) Adequate knowledge of practical aspects of Synthesis of APIs & its intermediates and analysis of various pharmaceutical dosage forms Formulation developments & quality assurance of various pharmaceutical dosage forms including those of herbal origin as per standards of official books, WHO and other regulatory agencies like USFDA, MHRA etc., pharmacological screening and biological standardization and in-vivo drug interactions, preparation & analysis of suitable plants material/extracts of medicinal importance for various herbal formulations, Clinical studies, patient counselling leading to physical and social well-being of the patients, Product detailing, marketing, distribution and selling of pharmaceutical products.
- 4) A graduate should be able to demonstrate skills necessary for practice of a Pharmacy viz. able to synthesize, purify, identify and analyze medicinal agents, able to formulate, store, dispense, manufacture the pharmaceutical products and analyze the prescriptions, able to learn and apply the quality assurance principles in regulatory and ethical aspects, able to extract, purify, identify and understand the therapeutic value of herbal/crude/natural products, able to screen various medicinal agents using animal models for pharmacological activity.
- 5) A graduate should develop the attitudes during the course which includes willing to apply the current knowledge of Pharmacy in the best interest of the patients and the community, maintain high standards of professional ethics in discharging professional obligations, continuously upgrade professional information and be conversant with latest advances in the field of pharmacy to serve community better, willing to participate in continuing education programs of PCI/AICTE/ S. R. T. M. University



Nanded to upgrade the knowledge and professional skills, to help and participate in the implementation of National Health Programs.

- 6) The graduates are required to acquire in depth knowledge of formulation, quality assurance and storage of various pharmaceutical dosage forms including herbal medicines.
- 7) The graduates should also understand the concept of community pharmacy and be able to participate in health care programs.
- 8) They are also required to detail the physicians and market the medicinal agents for diagnosis, prevention and therapeutic purposes.

Programme Outcomes

M. Pharmacy [Pharmaceutics]

- 1) Imparting theoretical knowledge and practical skills with the use of various advanced analytical instruments including NMR, Mass spectrometer, IR, HPLC, GC etc. It shall be applicable for identification, characterization, qualitative and quantitative analysis of various drugs in single and combination dosage forms.
- 2) In depth knowledge in the area of advances in novel drug delivery systems. This shall enable students to know the approaches for development of novel drug delivery systems, criteria for selection of drugs and polymers for the development of delivering system and about the formulation and evaluation of Novel drug delivery systems.
- 3) Imparting knowledge on various aspects viz. manufacturing of bulk, formulations in pharmaceutical industries. To understand the system as whole component wise studies is dispensed i.e., about preformulation studies, Active Pharmaceutical Ingredients, Generic drug Product development, Industrial Management, GMP Considerations, Optimization Techniques, Pilot Plant Scale Up Techniques, Stability Testing, sterilization process and packaging of dosage forms.
- 4) The information on regulatory affairs serves to gain advanced knowledge and skills required to learn the concept of generic drug and their development, various regulatory filings in different countries, different phases of clinical trials and submitting regulatory documents: filing process of IND, NDA and ANDA.
- 5) The knowledge of Biopharmaceutics & Pharmacokinetics is for development of skills necessary for dose calculations, dose adjustments and to apply biopharmaceutics theories in practical problem solving. Basic theoretical discussions of the principles of



biopharmaceutics and pharmacokinetics are provided to help the students to clarify the concepts.

- 6) Necessary training is imparted on computer applications in pharmaceutical research and development, it helps to understand the application of computers across the entire drug research and development process. Basic theoretical discussions of the principles of more integrated and coherent use of computerized information (informatics) in the drug development process are provided to help the students to clarify the concepts.
- 7) Appreciable knowledge and exercise is imparted on Biostatistics and Research Methodology to make the students understand the applications like descriptive statistics, Graphics, Correlation, Regression, logistic regression Probability theory, Sampling technique, Parametric tests, Non Parametric tests, ANOVA of Biostatics in Pharmacy

Programme Outcomes

M. Pharmacy [Pharmaceutical chemistry]

- 1) Develop analytical instrumental techniques for identification, characterization and quantification of drugs.
- 2) Describe different techniques of organic synthesis, mechanisms, their application to process chemistry and drug discovery.
- 3) Design and develop lead molecules using CADD.
- 4) Isolate, elucidate and characterize medicinal compounds from natural origin.
- 5) Operate equipment / instruments required for the characterisation and quantification of organic compounds.
- 6) Design new techniques of organic synthesis using green chemistry.
- 7) Design and implement research projects independently

Programme Outcomes

M. Pharmacy [Quality assurance]

- 8) Perform various advanced instrumental techniques for identification, characterization and quantification of drugs to ensure quality (safety, efficacy and purity) assessment.
- 9) Understand validation studies and its application in pharmaceutical and food industries, different methodologies and application in manufacturing processes.
- 10) Understand the basic concepts of formulation and development, pharmaceutical analysis.



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- 11) Obtain knowledge on pharmaceutical regulatory affairs and patents, recent guidelines set by WHO, ICH and ISO for good manufacturing practices (GMPs) as well as good laboratory practices (GLPs).



Principals
Indira College of Pharmacy
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