COURSE OUTCOMES

PROGRAMME: B. PHARMACY

SEMESTER-I

Course Name- HUMAN ANATOMY AND PHYSIOLOGY-I (Theory)

Course Code: BP101T, I Year B. Pharmacy

CO 1	Understand the basic terminology, cell signaling pathways and types of tissues.
CO 2	Gain Knowledge on structure & classifications of skeletal system, joints and neuromuscular functions.
CO 3	Interpret the types & functions of Blood and blood cells with mechanism of blood circulation & lymphatic circulation.
CO 4	Describe the Peripheral nervous system and its functions and to know about the structure and functions of Organs of special senses.
CO 5	Improve knowledge on Cardiovascular organs, functions with special emphasis on circulatory mechanism, conducting systems and diseases of cardio vascular system.

Course Name: PHARMACEUTICAL ANALYSIS I (Theory)

Course Code: BP102T, I Year B. Pharmacy

Upon completion of the course student will be able to

CO 1	Understand the principles of volumetric/gravimetric and gasometric analytical techniques.
CO 2	Gain knowledge of sources of errors and minimizing techniques.
CO 3	Explain about accuracy, precision and significant figure error concepts.
CO 4	Compute analytical results and understand the physiochemical concepts of analysis, theories of acids and bases, stoichiometry etc.,
CO 5	Analyze various electro chemical titrations.

Course Name: PHARMACEUTICS I (Theory)

Course Code: BP103T, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Know the historical background and profession of pharmacy and basics of pharmaceutical dosage forms and understand the importance of prescription and posology.
CO 2	Solve pharmaceutical calculations and understand the formulation of powders and liquid dosage forms.
CO 3	Develop monophasic and biphasic liquid dosage forms.
CO 4	Explain the concepts of suppositories and pharmaceutical incompatibilities.
CO 5	Formulate and evaluate semi solid dosage forms.

Course Name: PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)

Course Code: BP104T, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Explain the sources of impurities and methods to determine the impurities in inorganic pharmaceuticals.
CO 2	Understand the basic concepts of acidity /basicity, buffers and tonicity applicable in pharmaceuticals.
CO 3	Explain the method of preparation, assay, and properties of inorganic compounds.
CO 4	Understand the medicinal and pharmaceutical importance of inorganic compounds.
CO 5	Describe the properties, storage condition and application of radiopharmaceuticals.

Course Name: COMMUNICATION SKILLS (Theory)

Course Code: BP105T, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Understand and apply knowledge of human communication and language processes as they occur across various contexts, e.g., interpersonal, intrapersonal, small group, organizational, media, gender, family, intercultural communication, technologically mediated communication.
CO 2	Find, use, and evaluate primary academic writing associated with the communication discipline.
CO 3	Develop knowledge, skills, and job-ready skills in Pharmaceutical industry that facilitate their ability to work collaboratively with others.
CO 4	Enhance communication competencies such as managing conflict, understanding small group processes, active listening, appropriate self- Disclosure, and other work place norms.
CO 5	Learn interview skills.

Course Name: REMEDIAL BIOLOGY (Theory)

Course Code: BP106RBT, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Understand living world and kingdoms of classification& Morphology of different parts of flowering plants.
CO 2	Gain knowledge on human circulatory system, digestive system & respiratory system.
CO 3	Understand basics of human excretory system, neural control, glands and hormones and human reproductive system.
CO 4	Gain knowledge on plants and mineral nutrition and photosynthesis.
CO 5	Understand about plant cell, tissues, plant respiration and Phases of plant growth and development.

Course Name: REMEDIAL MATHEMATICS (Theory)

Course Code: BP106RMT, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Know the concepts of mathematics and their application in pharmacy.
CO 2	Correlate the mathematical tools in wide professional views and solve problems of matrices.
CO 3	Apply both conventional and creative techniques to solve problems of calculus.
CO 4	Know the Analytical geometry different types of problems by applying mathematics.
CO 5	Know the Differential equation, Laplace transform to solving Pharmacokinetic equations and their applications.

Course Name- HUMAN ANATOMY AND PHYSIOLOGY I (Practical)

Course Code: BP107P, I. B. Pharmacy

Upon completion of the course student will be able to

CO 1	Understand the usage of compound microscope.
CO 2	Classify various tissues based on their characteristics by observing them under microscope.
CO 3	Identify different types of bones in human skeletal system.
CO 4	Estimate the physiological conditions of human body by recording heart rate, pulse rate, blood pressure, bleeding and clotting time.
CO 5	Determine the RBC and WBC in human blood.
CO 6	Estimate the DLC and ESR of human blood sample.

Course Name: PHARMACEUTICAL ANALYSIS I (Practical)

Course Code: BP108P, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Understand the importance of calibration, calibration of weights, pipette and burette.
CO 2	Demonstrate standardization of solutions with different strengths.
CO 3	Experiment with volumetric analysis such as acidimetry and alkalimetry, oxidation and reduction reactions, iodometry, complexometry, precipitation and non-aqueous titration.
CO 4	Analyze gravimetric analytical techniques.
CO 5	Analyze various electro chemical titrations.

Course Name: PHARMACEUTICS I (Practical)

Course Code: BP109P, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Recall the principles used in the preparation of solid, liquid and semi solid dosage forms.
CO 2	Experiment with monophasic liquid dosage forms for internal and external administration.
CO 3	Prepare biphasic liquid dosage forms, semi solid dosage forms and powders.
CO 4	Formulate suppositories.

Course Name PHARMACEUTICAL INORGANIC CHEMISTRY (Practical)

Course Code: BP110P, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Recall the sources of limit tests, preparation and identification of compounds.
CO 2	Apply knowledge to perform modified limit tests.
CO 3	Analyze various inorganic pharmaceutical compounds.
CO 4	Select suitable method for the preparation of inorganic pharmaceuticals.
CO 5	Assess quality of inorganic pharmaceuticals.

Course Name: COMMUNICATION SKILLS (Practical)

Course Code: BP111P, I B. Pharmacy

Upon completion of the course student will be able to

CO 1 Use contextual expressions in English and sounds in English language.

CO 2 Improve communication skills develop the knowledge of letters and sounds in English language.

CO 3 Improve listening skills.

CO 4 Improve and use the language skills.

CO 5 Improve writing skills.

CO 6 Apply listening, reading and writing skills while facing interviews.

Course Name: REMEDIAL BIOLOGY (Practical)

Course Code: BP112RBP, I B. Pharmacy

Upon completion of the course student will be able to

CO 1 Gain Knowledge on Microscope and its types, section cutting and preparation of permanent slide.

CO 2 Understand the parts and structure of the cell and its inclusions.

CO 3 Learn microscopic examination of tissues & different parts of the plant along with their modifications.

CO 4 Detailed study of frog using computer models.

SEMESTER-II

Course Name- HUMAN ANATOMY AND PHYSIOLOGY II (Theory)

Course Code: BP201T, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Relate the basic knowledge about central nervous system including nervous tissue, brain and spinal cord.
CO 2	Illustrate the structure and functions of gastrointestinal tract and to learn about ATP/CTP/BMR.
CO 3	Learn about structure and functions of respiratory system and various mechanisms involved in regulation of respiration.
CO 4	Categorize the anatomy of urinary system and physiology of urine formation/micturition.
CO 5	Appraise the essentiality of endocrine glands and their hormones.

Course Name: PHARMACEUTICAL ORGANIC CHEMISTRY I (Theory)

Course Code: BP202T, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Explain the nomenclature, properties, reactions and uses of organic compounds.
CO 2	Remember the orientation of reactions and influence products.
CO 3	Apply the knowledge for the identification of organic compounds.
CO 4	Elaborate the concepts of hybridization, electronic and steric effects of organic compounds.
CO 5	Appraise the applications of pharmaceutical organic compounds.

Course Name: BIOCHEMISTRY (Theory)

Course Code: BP203T, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Study biomolecules that gain knowledge on bio chemical organization of living organisms along with their role.
CO 2	Study of enzymes and iso enzymes emphasizes their role in therapeutic and diagnostic applications.
CO 3	Understand the concepts of mammalian genetic organization, concepts of DNA, RNA, Protein and mutations gives wide knowledge o the student community to face the future challenges in health care sector.
CO 4	Study metabolic reactions and deficiency diseases gives awareness to the students to develop new alternatives in pharmaceutical industries to face the challenges of nutritional sciences.

Course Name: PATHOPHYSIOLOGY (Theory)

Course Code: BP204 T, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Understand the process of cell injury, morphology of cell injury and cellular adaptations.
CO 2	Understand the etiopathogenesis of cardiovascular, respiratory and renal diseases mentioned.
CO 3	Apply the principles of pathogenesis in understanding symptoms, signs and complications of disease states mentioned.
CO 4	Explain the etiopathogenesis of hematologic, endocrine, nervous, gastrointestinal, muscoskeletal diseases and Immunopathogenesis of infectious diseases.
CO 5	Appraise the principles of physical, chemical and biologic carcinogenesis.

Course Name: COMPUTER APPLICATIONS IN PHARMACY (Theory)

Course Code: BP205T, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Understand the fundamentals of computers and Apply the knowledge of mathematics
CO 2	Understand the Programming languages and computing fundamentals to pharmaceutical applications for any given requirement.
CO 3	Know the various types of application of computers in pharmacy
CO 4	Know the various types of databases
CO 5	Know the various applications Preclinical development of databases in pharmacy

Course Name: ENVIRONMENTAL SCIENCES (Theory)

Course Code: BP206T, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Impart knowledge about the environment and its allied problems.
CO 2	Know the various ecosystems and its functions.
CO 3	Understand the concept of environmental pollution.

Course Name- HUMAN ANATOMY AND PHYSIOLOGY-II (Practical)

Course code: BP207P, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Recall the physiology of special senses with the help of models, charts and specimens.
CO 2	Develop the knowledge on coordinating working of organs of various systems with the help of models, charts and specimens.
CO 3	Analyze the functions of cranial nerves by various sensory and motor functions.
CO 4	Evaluate body temperature and body mass index and to determine tidal volume and vital capacity.
CO 5	Assess the knowledge on family planning devices, pregnancy diagnostic tests, tissues of vital organs and gonads.

Course Name: PHARMACEUTICAL ORGANIC CHEMISTRY I (Practical)

Course Code: BP208P, I B Pharmacy

Upon completion of the course student will be able to

CO 1	Explain the qualitative analysis and preparation of pharmaceutical organic compounds.
CO 2	Identify the extra elements, present in the pharmaceutical organic compounds.
CO 3	Appraise the rules concerned with reactivity and orientation of organic compounds.
CO 4	Analyze unknown pharmaceutical organic compounds by determining their melting point/ boiling point.

Course Name: BIOCHEMISTRY (Practical)

Course Code: BP209P, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Study qualitative analysis of biomolecules that gives practical knowledge for better understanding of compositions of blood and urine samples
CO 2	Study quantitative analysis of blood sugars, creatinine and cholesterol levels helps to be aware of the health conditions like diabetes and jaundice etc.
CO 3	Gain knowledge on different buffer preparations that helps in research applications.
CO 4	Study enzymes like Amylases give knowledge related to enzyme applications in industries.

Course Name: COMPUTER APPLICATIONS IN PHARMACY (Practical)

Course Code: BP210P, I B. Pharmacy

Upon completion of the course student will be able to

CO 1	Introduction to MS word, MS excel, MS power point, etc.
CO 2	Describe how to design a HTML web page.
CO 3	Retrieve the information of a drug and its adverse effects using online tools.
CO 4	Work with MS access.
CO 5	Exporting Tables, Queries, Forms and Reports to web pages and HTML.
CO 6	Creating tables, databases regarding patient information.

SEMESTER-III

Course Name: PHARMACEUTICAL ORGANIC CHEMISTRY II (Theory)

Course Code: BP301T, II B Pharmacy

Upon completion of the course student will be able to

CO 1	Understand about aromaticity, chemistry and reactions of benzene.
CO 2	Understand the concept of hydrolysis, hydrogenation, saponification and rancidity of oils.
CO 3	Gain knowledge on structure and medicinal uses of pharmaceutical organic compounds.
CO 4	Understand the concept of Baeyer's theory and Sachse Mohr'stheory.
CO 5	Gain knowledge on chemistry of phenols, aromatic amines and aromatic acids.

Course Name: PHYSICAL PHARMACEUTICS I (Theory)

Course Code: BP302T, II B Pharmacy

Upon completion of the course student will be able to

CO 1	Demonstrate solubility of various drugs and understand the principles of diffusion in biological systems.
CO 2	Recollect the states of matter and understand the applications of various physiochemical properties to design dosage forms.
CO 3	Determination of surface and interfacial tension, applications of surface-active agents in drug solubilization.
CO 4	Perceive and apply the concepts of complexation and protein binding in pharmacy.
CO 5	Determine pH and study applications of buffers in pharmaceutical and biological system.

Course Name: PHARMACEUTICAL MICROBIOLOGY (Theory)

Course Code: BP303T, II B Pharmacy

Upon completion of the course student will be able to

CO 1	Understand the importance and implementation of sterilization in pharmaceutical processing and industry.
CO 2	Utilize the knowledge in identification, cultivation and preservation of various microorganisms.
CO 3	Test for the microbiological standardization of pharmaceuticals.
CO 4	Choose the cell culture technology and microbial characters for the pharmaceutical industry.
CO 5	Compile the microbiological testing protocols.

Course Name: PHARMACEUTICAL ENGINEERING (Theory)

Course Code: BP304T, II B Pharmacy

Upon completion of the course student will be able to

CO 1	Understand the concepts of flow of fluids, size reduction and size separation.
CO 2	Summarize different mechanisms of heat transfer.
CO 3	Compare and contrast different types of evaporation and distillation process.
CO 4	Determine the factors influencing mixing, filtration and centrifugation.
CO 5	Elaborate various preventive methods used for corrosion control in pharmaceutical industries.

Course Name: PHARMACEUTICAL ORGANIC CHEMISTRY II (Practical)

Course Code: BP305P, II B. Pharmacy

Upon completion of the course student will be able to

CO 1	Gain the knowledge on different recrystallization and steam distillation techniques.
CO 2	Remember and recall the different laboratory techniques used in pharmaceutical chemistry.
CO 3	Identify the purity of fats and oils by acid value, saponification value and iodine value.
CO 4	Perform various reaction like diazotization, oxidation reactions.
CO 5	Analyze named reactions like Perkin and Claisen Schmidt reactions by using carbonyl compounds.
CO 6	Test the knowledge on different electrophilic aromatic substitutions reactions like bromination, nitration in mono substituted aromatic compounds.

Course Name: PHYSICAL PHARMACEUTICS I (Practical)

Course Code: BP306T, II B. Pharmacy

Upon completion of the course student will be able to

CO 1	Determination of solubility of various drugs and apply Henderson –Hassel Balch equation for interpretation of pKa value of drugs.
CO 2	Determination of partition coefficient, % composition, surface tension and HLB number of the compounds.
CO 3	Determine Freundlich-Langmuir constant using activated charcoal and critical micellar concentration of surfactants. To estimate the stability constants of complexes by solubility and pH titration methods
CO 4	Explain the complexation phenomena.
CO 5	Study the adsorption of oxalic acid on charcoal.

Course Name: PHARMACEUTICAL MICROBIOLOGY (Practical)

Course Code: BP307T, II B. Pharmacy

Upon completion of the course student will be able to

CO 1	Recall different techniques of sterilization.
CO 2	Demonstrate various staining methods – simple, gram staining and acid-fast staining.
CO 3	Interpret the results of microbial testing.
CO 4	Test for possible microbial contaminants.
CO 5	Choose the correct method to evaluate the microbes to be tested.

Course Name: PHARMACEUTICAL ENGINEERING (Practical)

Course Code: BP308 P, II B Pharmacy

Upon completion of the course student will be able to

CO 1	Understand the basic principles involved in unit operations such as size reduction, size separation, distillation and drying.
CO 2	Demonstrate and explain about the construction, working and applications of pharmaceutical equipment's such as colloid mill, planetary mixer, fluidized bed dryer and freeze dryer.
CO 3	Experiment with the process variables of filtration, evaporation and infer the same.
CO 4	Determine radiation constant of brass, iron, unpainted and painted glass and overall heat transfer coefficient by heat exchanger.
CO 5	Estimate moisture content, loss on drying and construct drying curves for calcium carbonate and starch.

SEMESTER-IV

Course Name: PHARMACEUTICAL ORGANIC CHEMISTRY III (Theory)

Course Code: BP401T, II B. Pharmacy

Upon completion of the course student will be able to

CO 1 Understand the nomenclature, properties and methods of preparation of heterocyclic compounds.

CO 2 Understand the fundamentals of stereo chemical aspects.

CO 3 Identify medicinal uses and other applications of organic compounds.

CO 4 Explain stereo isomerism in biphenyl compounds (atropisomerism) and conditions for optical activity.

CO 5 Elaborate the reactions and synthetic importance of metal hydride reduction (NaBH4 & LiAlH4), Clemmensen reduction, Oppenauer oxidation and Beckmann rearrangement.

Course Name: MEDICINAL CHEMISTRY I (Theory)

Course Code: BP402T, II B Pharmacy

Upon completion of the course student will be able to

CO 1 Explain the various physiochemical properties in relation to biological activity and to discuss drug metabolism.

CO 2 Study SAR of some important drug classes and mode of action at molecular level.

CO 3 Learn pharmacological action of different drug classes and their Side effects and synthesis of the important class of compounds.

CO 4 Explain drugs acting on the adrenergic nervous system and cholinergic nervous system.

CO 5 Discuss the drugs acting as CNS depressants: Anticonvulsants, Antipsychotics, Sedatives, Hypnotics, Local anesthetics, antihistamines, analgesics & anti-inflammatory agents.

Course Name: PHYSICAL PHARMACEUTICS II (Theory)

Course Code: BP403T, II B. Pharmacy

Upon completion of the course student will be able to

CO 1	Introduce and categorize the dispersed systems and understand the properties and applications of colloidal dispersions.
CO 2	Use principles of kinetics in the stabilization of dosage forms.
CO 3	Interpret the rheological behavior of fluids and illustrate the physics of tablet compression.
CO 4	Determine the properties of powders and apply them in formulation development.
CO 5	Formulate and evaluate coarse dispersions making use of rheological and electrical properties.

Course Name- PHARMACOLOGY-I (Theory)

Course code: BP404T, II B. Pharmacy

Upon completion of the course student will be able to

CO 1	Define the fundamental concepts of pharmacology and pharmacokinetics.
CO 2	Understand the basics of pharmacodynamics, adverse reactions, drug interactions and drug discovery.
CO 3	Identify the role of neurohumoral transmission and drugs acting on peripheral nervous system.
CO 4	Analyze the functions of neurotransmitters and drugs acting on central nervous system.
CO 5	Predict the effects of drugs against neurodegenerative disorders and to elaborate the concepts of drug addiction/abuse/tolerance/ dependence.

Course Name: PHARMACOGNOSY AND PHYTOCHEMISTRY I (Theory)

Course Code: BP405T, II B. Pharmacy

Upon completion of the course student will be able to

CO 1	Recall the history, scope and development of pharmacognosy.
CO 2	Remember different sources of crude drugs and also classify them accordingly.
CO 3	Illustrate students about cultivation, collection, processing and storage of crude drugs.
CO 4	Plan systematic pharmacognostic study of primary metabolites, ayurvedic drugs, marine drugs and teratogens.
CO 5	Elaborate the applications of advanced technologies like polyploidy, mutation and hybridization in medicinal plants. To analyze quality of crude drugs.

Course Name: MEDICINAL CHEMISTRY I (Practical)

Course Code: BP406P, II B Pharmacy

Upon completion of the course student will be able to

CO 1	Recall the basic requirements for synthesis and assay of drugs.
CO 2	Explain the techniques involved in isolation and purification of drugs intermediates.
CO 3	Synthesize, characterize and purify medicinal compounds and intermediates.
CO 4	Analyze the selected drugs present in dosage forms and to determine the percentage purity.
CO 5	Determine the physicochemical property of drugs and signify its importance.

Course Name: PHYSICAL PHARMACEUTICS II (Practical)

Course Code: BP407P, II B. Pharmacy

Upon completion of the course student will be able to

CO 1 Choose a good suspending agent to formulate a stable suspension.

CO 2 Interpret the shelf life of a given formulation by accelerated stability studies.

CO 3 Make use of derived and flow properties of powders to ensure a stable solid formulation.

CO 4 Distinguish the rate constants as per the chemical reaction.

CO 5 Determine the viscosity using Ostwald's and Brookfield's viscometer.

Course Name- PHARMACOLOGY I (Practical)

Course Code: BP408P, II B. Pharmacy

Upon completion of the course student will be able to

CO 1 Learn about basic instruments, common laboratory animals used in experimental pharmacology and to organize animal house as per the CPCSEA guidelines.

CO 2 Demonstrate the common laboratory techniques like routes of administration, blood withdrawal, anesthetics and euthanasia used for animal studies.

CO 3 Interpret the effects of various drugs on rabbit eye and ciliary motility of frog esophagus in correlation with humans.

CO 4 Analyze the effect of drugs acting as enzyme inducers, skeletal muscle relaxants and affecting locomotor activity in laboratory animals.

CO 5 Evaluate the stereotype and anticatatonic activity of drugs in rats/mice.

Course Name: PHARMACOGNOSY AND PHYTOCHEMISTRY I (Practical)

Course Code: BP409P, II B. Pharmacy

Upon completion of the course student will be able to

CO 1	Remember different morphological and microscopical characteristic features of crude drugs.
CO 2	Understand the cellular structure of crude drugs.
CO 3	Evaluate the crude drugs by quantitative evaluation methods.
CO 4	Evaluate the crude drugs by physical methods of evaluation.
CO 5	Evaluate the crude drugs by chemical methods of evaluation.

SEMESTER-V

Course Name: MEDICINAL CHEMISTRY II (Theory)

Course Code: BP501T, III B. Pharmacy

Upon completion of the course student will be able to

CO 1	Describe the Biosynthesis and metabolism of Histamine & Learn SAR of some important drug classes and mode of action at molecular level. Describe Diuretics & Anti-anginal Drugs with related structures.
CO 2	Explain the classification of anti-arrhythmic agents with structures and the drug used in the treatment of Congestive Heart failure. To explain the synthesis of anticoagulants.
CO 3	Describe oral contraceptives and classification of thyroid drugs.
CO 4	Describe the classification and mechanism of action ant diabetic drugs for Local anesthetic agents. To explain the Structural activity relationship of Benzocaine and lidocaine derivatives.

Course Name: INDUSTRIAL PHARMACY I (Theory)

Course Code: BP502T, III B. Pharmacy

Upon completion of the course student will be able to

CO 1	Outline the objectives and applications of preformulation studies in the development and stability of dosage forms
CO 2	Review the formulation and manufacturing considerations of liquid orals.
CO 3	Describe the preparation and quality control of parenteral and ophthalmic preparations.
CO 4	Summarize formulation, manufacturing and evaluation of cosmetic preparations, pharmaceutical aerosols and appraise the science of packaging materials.

Course Name- PHARMACOLOGY II (Theory)

Course Code: BP503T, III B. Pharmacy

Upon completion of the course student will be able to

CO 1	Relate the relative pros and cons in the use of drugs for various cardiac complications.
CO 2	Illustrate the drugs acting on hematopoietic system, shock, diuretics and anti-diuretics.
CO 3	Identify the role of autocoids and related drugs.
CO 4	Analyze and summarize the drugs acting on endocrine system.
CO 5	Predict principles of bioassay and to construct the bioassay methods of various compounds.

Course Name: PHARMACOGNOSY AND PHYTOCHEMISTRY II(Theory)

Course Code: BP504T III B Pharmacy

Upon completion of the course student will be able to

CO 1	Understand basic metabolic pathways and formation of different secondary metabolites through various biosynthetic pathways and utilization of radioactive isotopes in the investigation of Biogenetic studies.
CO 2	Describe the source, chemistry, therapeutic uses and commercial applications of various secondary metabolites containing drugs.
CO 3	Memorize the isolation, identification and analysis of phytoconstituents.
CO 4	Discuss the method for industrial production, estimation and utilization of some therapeutically important drugs.
CO 5	Demonstrate the basic techniques like spectroscopy, chromatography and electrophoresis in the isolation and purification and identification of crude drugs.

Course Name: PHARMACEUTICAL JURISPRUDENCE (Theory)
Course Code: BP505T, III B Pharmacy

Upon completion of the course student will be able to

CO 1	Relate the significance of Drugs and cosmetics act 1940 and its rules 1945 in relation to import and manufacture of drugs.
CO 2	Understand the functions of pharmacy councils and implementation of education regulations in pharmacy
CO 3	Appraise the importance of medicinal and toilet preparations act and narcotic drugs and psychotropic substances act and rules.
CO 4	Discuss the salient features of drugs and magic remedies act, prevention of cruelty to animals act and drugs price control order.

Course Name: INDUSTRIAL PHARMACY I (Practical)

Course Code: BP506P, III B. Pharmacy

Upon completion of the course student will be able to

CO 1	Interpret the preformulation studies on drugs.
CO 2	Explain the preparation, evaluation and coating of tablets.
CO 3	Design parenteral and ophthalmic products.
CO 4	Describe the preparation of creams.

Course Name- PHARMACOLOGY-II (Practical)

Course Code: BP507P, III B. Pharmacy

Upon completion of the course student will be able to

CO 1	Illustrate the diuretic activity of drugs in mice/rats.
CO 2	Identify the dose response relationship, effect of drugs on DRC and to construct the drug concentrations by various bioassay methods using animal simulator software.
CO 3	Categorize the PA2 and PD2 value of drugs using rat anococcygeus muscle and guinea pig ileum.
CO 4	Interpret the effect of spasmogens and spasmolytics using rabbit jejunum.
CO 5	Predict various screening models for analgesic and anti- inflammatory.

Course Name: PHARMACOGNOSY AND PHYTOCHEMISTRY II(Practical)

Course Code: BP508P III B Pharmacy

Upon completion of the course student will be able to

CO 1	Analyze the macroscopy, microscopy and powder characteristics of crude drugs for detection and test for isolation, identification of phytoconstituents.
CO 2	Understand the separation techniques of sugars and herbal extracts by paper and thin layer chromatography.
CO 3	Distinguish separation, detection techniques of volatile oils and unorganized crude drugs by various chemical tests.
CO 4	Demonstrate extractive values, moisture content, swelling index and foaming of crude drugs.

SEMESTER-VI

Course Name: MEDICINAL CHEMISTRY III (Theory)

Course Code: BP601T, III B Pharmacy

Upon completion of the course student will be able to

CO 1	Recall the classification, Historical background, Nomenclature, Stereochemistry, SAR, Chemical degradation β-Lactam antibiotics, Anti-malarials, Quinolines.
CO 2	Identify the mechanism of action and therapeutic uses of Anti-tubercular Agents and Urinary tract anti-infective agent.
CO 3	Study the classification, SAR, chemical degradation, synthesis and uses of Quinolones Antiviral agents, Antifungal antibiotics, Anthelmintic.
CO 4	Explain the concept of prodrugs and their importance and discuss the approaches in drug design including QSAR, pharmacophore modeling, docking and combinatorial chemistry.

Course Name: PHARMACOLOGY III (Theory)

Course Code: BP602T, III B Pharmacy

Upon completion of the course student will be able to

CO 1	List the drugs used in respiratory and gastrointestinal complications.
CO 2	Understand the principles of chemotherapy and illustrate the mechanism of action of antibiotics.
CO 3	Explain and compare the mechanism of anti-mycobacterial, antifungal, anti-viral.
CO 4	Analyze the chemotherapy of UTI's, STD's, anti-cancer drugs and to categorize the immunopharmacology.
CO 5	Assess the various types of toxicity studies, principles of treatment of poisoning and management of various poisoned conditions.
CO 6	Compile the biological clock and its significance leading to chronotherapy.

Course Name: HERBAL DRUG TECHNOLOGY (Theory)

Course Code: BP603T III B Pharmacy

Upon completion of the course student will be able to

CO 1	Recall the fundamental concepts of herbal raw materials and biodynamic agriculture techniques.
CO 2	Understand the concept of nutraceuticals and herbal food interactions.
CO 3	Apply the knowledge for evaluation and preparation of herbal formulations.
CO 4	Remember the regulatory guidelines for the assessment of herbal drugs and patenting
CO 5	Illustrate the scope and future prospects of the herbal drug industry.

Course Name: BIOPHARMACEUTICS AND PHARMACOKINETICS (Theory)

Course Code: BP604T, B Pharmacy

Upon completion of the course student will be able to

CO 1	Recall and understand basic concepts of absorption, distribution, metabolism and excretion of drugs.
CO 2	Understand the mechanisms, interpret various factors affecting drug absorption, distribution, metabolism and excretion of drugs.
CO 3	Utilize the pharmacokinetic models for the determination of pharmacokinetic parameters.
CO 4	Analyze the bioavailability of a drug and to compare the bioequivalence between drug products.
CO 5	Evaluate various pharmacokinetic parameters for the drugs exhibiting saturation kinetics.
CO 6	Design multiple dosage regimens based on pharmacokinetic parameters for maximizing patient compliance and therapeutic effectiveness.

Course Name: PHARMACEUTICAL BIOTECHNOLOGY (Theory)

Course code: BP605T, B Pharmacy

Upon completion of the course student will be able to

CO 1	Remember the basic concepts of biotechnology with respect to enzyme technology, immunology, microbial technology, genetic engineering and protein engineering.
CO 2	Understand the steps involved in development of biosensors, recombinant products and concepts of immunology.
CO 3	Outline the production parameters important in pharmaceutical product development using principles of biotechnology.
CO 4	Compare the genetic organization of different types of cells and to list detection methods at genomic level, gene transfer methods and mutagens.
CO 5	Explain general requirements of fermentative production and biotechnological production of pharmaceuticals.

Course Name: PHARMACEUTICAL QUALITY ASSURANCE (Theory)

Course Code: BP606T, III B Pharmacy

Upon completion of the course student will be able to

CO 1	Remember the concepts of quality assurance, quality management and ICH guidelines.
CO 2	Explain the ISO, NABL and QbD concepts in pharmaceutical industry.
CO 3	Identify the organization and personnel responsibilities.
CO 4	Analyze quality control parameters and good laboratory practices in pharmaceutical industry.
CO 5	Evaluate the complaints and documents maintenance in industry with required regulatory guidelines and elaborate the calibration, validation procedures and good warehousing practices.

Course Name: MEDICINAL CHEMISTRY III (Practical)

Course Code: BP607P, III B. Pharmacy

Upon completion of the course student will be able to

CO 1 Study preparation of drugs and intermediates.

CO 2 Study assay of drugs.

CO 3 Study preparation of medicinally important compounds or intermediates by Microwave irradiation technique.

CO 4 Draw structures and reactions using chem draw. Determination of physicochemical properties such as logP, clogP, MR, Molecular weight, Hydrogen bond donors and acceptors for class of drugs course content using drug design software Drug likeliness screening (Lipinskies RO5).

Course Name- PHARMACOLOGY III (Practical)

Course Code: BP608P, III B. Pharmacy

Upon completion of the course student will be able to

CO 1 Identify the dose calculation range in pharmacological experiments.

CO 2 Study & regulate the effect of anti-ulcer activity & anti allergic activity.

CO 3 Determine the effect of drug by acute oral toxicity, skin irritation.

CO 4 Estimate the effect of serum bio-chemical parameters by semi-auto analyzer.

CO 5 Gain knowledge on biostatistics methods used in experimental pharmacology.

CO 6 Study the effect of Agonist & Antagonistic drugs on different isolated tissue preparations.

Course Name: HERBAL DRUG TECHNOLOGY (Practical)

Course Code: BP609P III B Pharmacy

Upon completion of the course student will be able to

CO 1 Remember different preliminary phytochemical screening of crude drugs.

CO 2 Evaluate the various herbal formulations.

CO 3 Apply mono graphic analysis of herbal drugs as per pharmacopoeias.

CO 4 Evaluate parameters such as aldehyde and phenol contents & assess the total alkaloid content.

SEMESTER-VII

Course Name: INSTRUMENTAL METHODS OF ANALYSIS (Theory)

Course code: BP701T, B Pharmacy

Upon completion of the course student will be able to

CO 1	Understand selected instrumental analytical techniques (spectroscopic and chromatographic methods) and differentiate with volumetric analysis.
CO 2	Gain knowledge on interaction of EMR with matter and to build the analytical understanding at the level of atom, group and molecular structure of organic and inorganic compounds with different functional groups and their applications in pharmacy.
CO 3	Maximize knowledge on characterization and estimation of ions by spectroscopical techniques.
CO 4	Simplify affinity of matter with stationary phase and mobile phase, physical and chemical properties of matter.
CO 5	Categorize different organic and inorganic compounds using suitable spectroscopic and chromatographic techniques.

Course Name: INDUSTRIAL PHARMACY II (Theory)

Course code: BP702T, IV B Pharmacy

Upon completion of the course student will be able to

CO 1	Explains pilot plant scale up techniques and SUPAC guidelines.
CO 2	Outline various aspects of technology transfer involved from R & D to productions.
CO 3	Choose and to apply various responsibilities and regulatory requirements for drug approval.
CO 4	Analyze and study various quality management systems in pharmacy field.
CO 5	Determine the requirements and approval procedures for new drugs by Indian Regulatory.

Course Name: PHARMACY PRACTICE (Theory)

Course Code: BP703T, IV B Pharmacy

Upon completion of the course student will be able to

CO 1	Describe the functioning of hospital and community pharmacy and assess ADR's.
CO 2	Establishment of pharmacy, therapeutic committee and develop the contents of hospital formulary and adapt to drug distribution system in the hospital.
CO 3	Analyze pharmacy and therapeutic committee, patient counseling and education training programme in the hospital.
CO 4	Recite the knowledge on preparation and implementation of budget & practice clinical pharmacy, OTC sales
CO 5	Establish drug store management and interpret clinical laboratory tests for specific disease states.

Course Name: NOVEL DRUG DELIVERY SYSTEM (Theory)

Course Code: BP704T, IV B Pharmacy

Upon completion of the course student will be able to

CO 1	Understand and rationalize fundamentals and polymers used in the design of controlled drug delivery systems.
CO 2	Outline the concepts of formulation and evaluation of oral, mucosal and implantable drug delivery system.
CO 3	Develop and study oral, mucosal, dermal, pulmonary and Nasal drug delivery systems over conventional dosage forms for prolonged action.
CO 4	Illustrate the principles and fundamentals of drug targeting in the design of site specific drug delivery system.
CO 5	Study the importance of site specific drug delivery systems or devices for ocular and intra uterine routes.

Course Name: INSTRUMENTAL METHODS OF ANALYSIS (Practical)

Course Code: BP705P, IV. B Pharmacy

Upon completion of the course student will be able to

CO 1 Learn the concepts of quantitative estimation techniques.

CO 2 Gain knowledge of handling of the instruments like HPLC, GC.

CO 3 Apply the concepts of separation methods for sugars, amino acids, pigments etc.,

CO 4 Gain knowledge on qualitative determination of organic compounds.

CO 5 Perform assay of dosage forms by the application of UV/Vis spectrophotometry.

SEMESTER-VIII

Course Name: BIOSTATISTICS AND RESEARCH METHODOLOGY(Theory)

Course Code: BP 801T, IV B Pharmacy

Upon completion of the course student will be able to

CO 1	Identify the concepts of medical research and values in medical ethics. Define the CPCSEA guidelines for laboratory animal facility.
CO 2	Understand Basic statistical methods which are used in collecting data study and analyze. Observe Errors relating experimentation.
CO 3	Know testing of the hypothesis and understand how far population parameter significant based on estimator with the help of parametric tests Non-Parametric tests can also observed.
CO 4	Know application of Analysis in field or lab experimental to design and factorial experiments. Apply the knowledge in research objects about reliability and validity experimental study.
CO 5	Know the various statistical techniques to solve statistical problems.

Course Name: SOCIAL AND PREVENTIVE PHARMACY (Theory)

Course Code: BP802T, IV B Pharmacy

Upon completion of the course student will be able to

CO 1	Understand the concept of health and health education.
CO 2	Create awareness about various preventive measures of stated communicable and non-communicable diseases.
CO 3	Apply the knowledge of national health programmes serving the community in the real world.
CO 4	Describe the several vaccines included in the national immunization programme and their schedule.
CO 5	Illustrate the influence of urbanization and socio-cultural influences on health.
CO 6	Assess the issue with pharmacy and health from a societal perspective.

Course Name: PHARMA MARKETING MANAGEMENT (Theory)

Course Code: BP803ET, IV B Pharmacy

Upon completion of the course student will be able to

CO 1	Acquired basic knowledge on Definition, general concepts, and scope of marketing.
CO 2	Appreciate the role of product life cycle, product portfolio analysis, product positioning, Product branding, packaging and labeling decisions.
CO 3	Acquired theoretical knowledge on strategies in sales promotion.
CO 4	Possess knowledge on pharmaceutical marketing channels and role of Medical Representatives.
CO 5	Got an understanding of drug pricing policies in India.

Course Name: PHARMACOVIGILANCE (Theory)

Course Code: BP805T, IV B Pharmacy

Upon completion of the course student will be able to

CO 1	Acquire knowledge on Pharmacovigilance and Adverse Drug Reactions its types and terminologies used in Pharmacovigilance.
CO 2	Relate the information using the Drug information resources and other drug dictionaries and classification of drug and disease.
CO 3	Analyze the methods of Pharmacovigilance and Vaccine Safety Surveillance with effective communication.
CO 4	Acquire knowledge on ICH guidelines and data generation in Pharmacovigilance.
CO 5	Discuss about Pharmacogenomics, drug safety in special population and CDSCO.

Course Name: COSMETIC SCIENCE (Theory)

Course Code: BP 809ET, IV B Pharmacy

Upon completion of the course student will be able to:

CO 1	Describe Cosmetics and Cosmeceuticals as per Indian and EU regulations.
CO 2	Aware of the role of cosmetic excipients and building blocks in the formulation of cosmetics
CO 3	Acquire knowledge about the structure and function of the skin, hair, teeth and gums.
CO 4	Discuss the fundamentals of sun protection and the formulation of Sunscreens, antiperspirants and deodorants.
CO 5	Design various cosmetics and cosmeceuticals.

Course Name: ADVANCED INSTRUMENTATION TECHNIQUES (Theory)

Course Code: BP811ET, IV B Pharmacy

Upon completion of the course student will be able to

CO 1 Understand the advanced instruments used and its application in drug analysis.

CO 2 Understand the chromatographic separation and analysis of drugs.

CO 3 Understand the calibration of various analytical instruments.

CO 4 Understand analysis of drugs using various analytical instruments.

Course Name: PROJECT WORK

Course Code: BP813PW, IV B Pharmacy

Upon completion of the course student will be able to

CO 1 Generate the topic for the project and Collect the information from the relevant sources.

CO 2 Assemble the information into a more realistic draft ethically and conclude the contents.

CO 3 Prepare the presentation and explain outcome of their project along with further scope for research. This develops their oratory and leadership skills.

Course Name: COMPREHENSIVE VIVA VOCE

Upon completion of the course student will be able to

CO 1 This will test the student's learning and understanding during the course of their programme.

CO 2 In doing so, the main objective of this course is to prepare the students to face interview both at the academic and the industrial sector.