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COURSE OUTCOMES – B.PHARMACY

B.Pharmacy I Year I Semester (R23) (I Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Human Anatomy and Physiology – I Theory BP101T	C111.1	Define anatomy & physiology, basic anatomical terminology, describe various homeostatic mechanisms & their imbalances in the human body and identify different tissues and different systems of the human body.
	C111.2	Demonstrate skin, different types of bones & joints in the human body.
	C111.3	Explain different body fluids, blood and lymphatic system.
	C111.4	classify peripheral nervous system, explain structure and functions of special senses.
	C111.5	Illustrate the anatomy and physiology of cardiovascular system.
Pharmaceutical Analysis – I Theory BP102T	C112.1	Learn scope and principles of volumetric analysis.
	C112.2	Explain principles and procedures involved in Volumetric titrations like Acid-base and Non-aqueous titrations.
	C112.3	Learn classification and how to perform various volumetric titrations like precipitation, non-aqueous, gravimetric and Diazotization titrations.
	C112.4	Explain concepts, principle, classification and applications involved in Redox titrations.
	C112.5	Develop analytical skills to perform Electrochemical analysis.
Pharmaceutics – I Theory BP103T	C113.1	Explain history of profession of Pharmacy in India & Pharmacopoeia and its development. Learn parts and handling of prescription, posology & dose calculation of drug in children.
	C113.2	Elaborate different pharmaceutical calculation involved in formulation. Explain basic requirement and formulation of powders and liquid dosage form.
	C113.3	Explain basic requirement and formulation of Monophasic and Biphasic liquid dosage forms
	C113.4	Learn basic requirement, formulation and evaluation of suppositories and types of pharmaceutical incompatibility.

	C113.5	Explain the mechanisms of drug penetration transdermal route. Explain the formulation and evaluation of semisolid preparation such as ointment, gel, Pastes, cream etc.

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B.Pharmacy I Year I Semester (R19) (I Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Pharmaceutical Inorganic Chemistry Theory BP104T	C114.1	Know the sources of impurities and methods to determine the impurities present in Inorganic drugs.
	C114.2	Learn methods to adjust Isotonicity, Major Physiological ions and Replacement Therapy.
	C114.3	Explain Medicinal and Pharmaceutical importance of Gastrointestinal agents and antimicrobial agents.
	C114.4	Explain Medicinal and Pharmaceutical importance of Expectorants, Emetics, Haemetinics, Antidotes and Astringents.
	C114.5	Explain Pharmaceutical importance and applications of Radiopharmaceuticals.
Communication Skills Theory BP105T	C115.1	Outline the communication skills with respect to process and barriers.
	C115.2	Explain the behavioral needs for a pharmacist to function effectively in the areas of pharmaceutical operations.
	C115.3	Demonstration on basic listening skills and written communications.
	C115.4	Summarize the interview skills.
	C115.5	Develop the Pharmacist towards the facing of problems in Group discussion.
Remedial Biology Theory BP106RBT	C116.1	Define characters of living organisms, explain binomial nomenclature, classify kingdoms of life, and explain the morphology of flowering plants.
	C116.2	Explain and explain composition of blood, human circulatory system, digestive and respiratory systems in detail.
	C116.3	Explain excretory system, nervous system and reproductive system, and chemical coordination and regulation of hormones.
	C116.4	Illustrate plants and mineral nutrition and mechanism of photosynthesis.
	C116.5	Explain & explain cell and its organelles, tissues and cell division. Acknowledge the mechanism of plant respiration, plant growth and development.

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B.Pharmacy I Year I Semester (R19) (I Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Remedial Mathematics Theory BP106RMT	C117.1	Explain the theory and solving the problems of Partial fraction, Logarithms and Limits and continuity.
	C117.2	Know the solving of different types of problems by learning and applying theory in Matrices and Determinant.
	C117.3	Develop in solving the problems by learning the theory of Calculus in Pharmacy.
	C117.4	Develop in solving the problems by learning the theory of Analytical Geometry in Pharmacy.
	C117.5	Explain the use of theories in calculating the problems in pharmacy for Differential Equations and Laplace Transform.
Human Anatomy and Physiology – I Practical BP107P	C118.1	Perform various experiment related to identification of the tissues indifferent systems of human body.
	C118.2	Examine various techniques like blood group determination, blood pressure determination, blood cell counting.
	C118.3	Evaluate various experiments related to special senses and nervous system.
	C118.4	Practice the determination of heart rate and pulse rate.
	C118.5	Record blood parameters like hemoglobin, clotting and bleeding time.
Pharmaceutical Analysis – I Practical BP108P	C119.1	Determine quality control tests in limiting traces of impurities present in pharmaceuticals by performing limit tests.
	C119.2	Impart knowledge in preparation and standardization of solutions with different strength.
	C119.3	Perform volumetric analysis such as Acid-base titrations and Cerimetry and Idometry.
	C119.4	Conduct volumetric analysis such as complexometry and permanganometry titrations and precipitation and non-aqueous titration.
	C119.5	Perform electro-analytical methods.

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Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Pharmaceutics – I Practical BP109P	C1110.1	Explain the preparation Pharmaceutics Syrups and Elixirs.
	C1110.2	Formulation and applications of Linctus and Solutions.
	C1110.3	Compounding and usage of Liniments and Suspensions.
	C1110.4	Preparation and stability of suspensions, emulsions, powders and granules.
	C1110.5	Formulation of suppositories, topical and oral hygienic products.
Pharmaceutical Inorganic Chemistry Practical BP110P	C1111.1	Perform quality control tests in limiting traces of impurities present in pharmaceuticals by performing limit tests.
	C1111.2	Perform identification inorganic salts through various qualitative tests.
	C1111.3	Determine the tests for purity for different compounds as per IP.
	C1111.4	Knowledge and skills to prepare inorganic salts -boric acid, potash alum and ferrous sulphate.
Communication Skills Practical BP111P	C1112.1	Apply of communication word in during interaction with others.
	C1112.2	Make use of pronunciations during the process of communication.
	C1112.3	Explaining the listening and writing techniques during communication.
	C1112.4	Explain about the techniques in written documentation professionally.
Remedial Biology Practical BP112RBP	C1113.1	Study and explain Microscope, Section cutting, Mounting and staining techniques along with Permanent slide preparation.
	C1113.2	Study and explain cell, its inclusions, various modifications of Stem, Root, Leaf, seed, fruit, flower.
	C1113.3	Detailed study of frog and computer-based tutorials.
	C1113.4	illustrate microscopic identification of tissues pertinent to Stem, Root Leaf, seed, fruit, flower & bones.
	C1113.5	Determination of blood group, blood pressure & tidal volume.

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B.Pharmacy I Year II Semester (R19) (II Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Human Anatomy and Physiology – II Theory BP201T	C121.1	Explain organization of nervous system & central nervous system.
	C121.2	Explain anatomy of GI tract and energetics.
	C121.3	Explain and explain anatomy of respiratory & urinary system.
	C121.4	Classify hormones, explain mechanism of action and structure and functions of various glands.
	C121.5	Explain male and female reproductive system, hormones and genetics.
Pharmaceutical Organic Chemistry – I Theory BP202T	C122.1	Apply the principles of organic chemistry for the classification, nomenclature, structure, and isomerism of organic compounds.
	C122.2	Explaining of important physical properties, reactions (and underlying mechanisms) and methods of preparation of various functional groups.
	C122.3	Analyze and write the reactions and uses of various organic compounds.
	C122.4	Discuss the orientation, reactivity, and stability of organic compounds.
	C122.5	Identify and confirm the organic compounds by qualitative tests.
Biochemistry Theory BP203T	C123.1	Discuss about the bio molecules gives knowledge on bio chemical organization of living organisms along with their role.
	C123.2	Explain the catalytic role of enzymes, importance of enzyme inhibition in the design of new drug.
	C123.3	Study of enzymes and isoenzymes emphasizes their role in therapeutic and diagnostic applications.
	C123.4	Study on metabolic pathways of bio molecules helps the students to acquire knowledge on various energy metabolisms that occur in living organisms.
	C123.5	Explaining the concepts of DNA, RNA, Protein and mutations gives wide knowledge to the student community to face the future challenges in health care sector.

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Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Pathophysiology Theory BP204T	C124.1	Study the various etiological factors for the development of diseases including cell injury and adaptation, mechanism involved in process of inflammation and repair.
	C124.2	Explain the concepts of pathophysiological basis of selected diseases related to cardiovascular, respiratory and renal systems.
	C124.3	Learn the basics of signs and symptoms of Diseases such as hematological, endocrine, nervous and gastrointestinal system.
	C124.4	Study of common complications of the diseases.
	C124.5	Explain infectious and sexually transmitted diseases.
Computer Applications in Pharmacy Theory BP205T	C125.1	Explaining various number system in computers.
	C125.2	Explain the web technologies with respect to Pharmacy Drug Database.
	C125.3	Outline the applications of computers in Pharmacy.
	C125.4	Summarize the Bioinformatic techniques in development of Pharmacy.
	C125.5	Make use of computers as data analysis in Preclinical development.
Environmental Sciences Theory BP206T	C126.1	Know the different natural sources and them conservation to save the environment.
	C126.2	Explaining the types, characteristic features, structure and function of ecosystems.
	C126.3	Summarize about various environmental pollutions and their solving methods.
Human Anatomy and Physiology Practical BP207P	C127.1	Conceptualized study of integumentary systems.
	C127.2	Practice the experiments like neurological reflex, body temperature measurement
	C127.3	Identify the various organs of different systems of human body.
	C127.4	Study of basic physiological parameters like blood pressure, heart rate, pulse and respiratory volumes.
	C127.5	Perform the hematological tests like blood cell counts, hemoglobin estimation, bleeding/clotting time etc.

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B.Pharmacy I Year II Semester (R23) (II Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Pharmaceutical Organic Chemistry – I Practical BP208P	C128.1	Apply the qualitative analysis principles to analyze organic compounds having different functional groups.
	C128.2	Explaining of steps involved in the identification of unknown organic compounds.
	C128.3	Explain and explain the principles of qualitative analysis.
	C128.4	Demonstrate laboratory skills to prepare organic compounds.
	C128.5	Explain the organic concepts to prepare stereo models containing various functional groups.
Biochemistry Practical BP209P	C129.1	Experiments on qualitative analysis of bimolecular gives practical knowledge to the students for better explaining of compositions of blood and urine samples.
	C129.2	Quantitative analysis of blood sugars, creatinine and cholesterol levels makes the students to be aware of the health conditions like Diabetes and jaundice etc.
	C129.3	Provide a knowledge on different buffer preparations that helps them in research applications.
	C129.4	Study of enzymes like Amylases give knowledge to the students related to enzyme applications in industries.
	C129.5	Qualitative analysis of urine sample for abnormal constituents helps to know about the diseases related to urine in human beings.
Computer Applications in Pharmacy Practical BP210P	C1210.1	Explaining the technics in utilization of computers for creating the patient database.
	C1210.2	Learning the methods in computer for maintain the information of drugs and patients.
	C1210.3	Creating the documents such as queries, patient forms, reports etc., on websites.

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B.Pharmacy II Year I Semester (R19) (III Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Pharmaceutical Organic Chemistry – II Theory BP301T	C211.1	Explain and write the structure, nomenclature, Aromaticity, reactivity, orientation of benzene, effects of substituents of benzene, and Structure & uses of DDT, Saccharin, BHC, and Chloramine.
	C211.2	Interpret and Explain the Acid-base properties of phenols and amines and the effect of substituents.
	C211.3	Chemistry of Fatty acids, Fats-oils, and their estimation in analytical constants with significance.
	C211.4	Write the synthesis, reactions with mechanisms and uses of Polycyclic Aromatic Hydrocarbons.
	C211.5	Explain and predict the theory, and stabilities of cycloalkanes and their reactions.
Physical Pharmaceutics – I Theory BP302T	C212.1	Explain the Solubility expressions, mechanism of solvent interactions, Diffusion principles in biological systems
	C212.2	State the physicochemical properties of drug molecules, pH, and solubility
	C212.3	Explain the role of surfactants, interfacial phenomenon, adsorption of solid and liquid interfaces
	C212.4	Explain Complexation, crystalline structures of compounds, Thermodynamic stability
	C212.5	Learn the physical properties of solutions, buffers, isotonicity

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B.Pharmacy II Year I Semester (R19) (III Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Pharmaceutical Microbiology Theory BP303T	C213.1	Explain the significance of microbiology in pharmaceutical sciences, and know the isolation and preservation methods for animal cell and transformed cell cultures, pure cultures including quantitative measurement of bacterial growth and cell cultures and the applications in pharmaceutical industry.
	C213.2	Explain different microscopes and microscopical techniques, and the identify of bacteria using different staining methods.
	C213.3	Explain the different sterilization methods, sterility indicators, different disinfectant techniques, sterility testing and their factors on the fungi and virus.
	C213.4	Acknowledge the design of aseptic area, Explain different sources of contamination present and different of different microbial assay techniques.
	C213.5	To explain different aseptic techniques like laminar air flow for the preventive measurement from contamination, and preservation of pharmaceutical products, along with microbial stability of formulations.
Pharmaceutical Engineering Theory BP304T	C214.1	To Know the various unit operations used in pharmaceutical industries, explaining of various laws, mechanism of unit operations.
	C214.2	Explain the material handling technique. Perform the various process involved in pharmaceutical manufacturing process in heat transfer, evaporation, distillation.
	C214.3	Explain and perform the various process involved in pharmaceutical manufacturing process in drying, mixing.
	C214.4	Explain and perform the various process involved in pharmaceutical manufacturing process in filtration, centrifugation.
	C214.5	To carry out various tests to prevent environmental pollution, significance of plant layout design for optimum use of resources. To appreciate the various preventive methods used for corrosion control in pharmaceutical industries.

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B.Pharmacy II Year I Semester (R19) (III Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Pharmaceutical Organic Chemistry – II Practical BP305P	C215.1	Apply the basic knowledge of organic chemistry in the identification of functional groups and synthesis of organic compounds.
	C215.2	Analyze and predict the principles of chemical reactions.
	C215.3	Analyze and interpret the mechanism of chemical reactions.
	C215.4	Apply the concept of moles in calculating theoretical yield.
	C215.5	calculate and estimate the percentage purity of the compounds synthesized.
Physical Pharmaceutics – I Practical BP306P	C216.1	Determine drug solubility at room temperature and calculate pKa using the half-neutralization method and Henderson-Hasselbalch equation.
	C216.2	Measure partition coefficients of benzoic acid in benzene-water and iodine in CCl4-water systems.
	C216.3	Measure surface tension of liquids using drop count and drop weight methods.
	C216.4	Determine Freundlich and Langmuir adsorption constants using activated charcoal.
	C216.5	Determine stability constants and donor-acceptor ratios for PABA-caffeine and Cupric-glycine complexes using solubility and pH titration methods.
Pharmaceutical Microbiology Practical BP307P	C217.1	Define and identify various instruments and process.
	C217.2	Summarize methods of identification, cultivation and preservation of various microorganisms.
	C217.3	Describe the importance and implementation of sterilization.
	C217.4	Examine various biochemical tests.
	C217.5	To develop the skills required for maintaining strictly aseptic condition & handling inoculating loop, its sterilization and inoculation procedure.

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B.Pharmacy II Year I Semester (R19) (III Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S)** **Upon completion of the course student will be able to**
Pharmaceutical Engineering Practical BP308P	C218.1	Determination of radiation constant of brass, iron, glass, moisture content, loss on drying, humidity of air, heat transfer coefficient.
	C218.2	Calculate the efficiency of steam distillation, uniformity index for given sample using double cone blender.
	C218.3	Demonstration of working of tablet machines, mill, humidifier, mixer, dryer, other equipment.
	C218.4	To evaluate the size distribution of tablets, to verify law of size reduction.
	C218.5	To study the factors affecting rate of filtration, evaporation, the effect of time on rate of crystallization.

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B.Pharmacy II Year II Semester (R19) (IV Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Pharmaceutical Organic Chemistry – III Theory BP401T	C221.1	To apply the concepts of stereochemistry in identifying the chiral and achiral molecules, Racemic modification, and Resolution of Racemic mixture.
	C221.2	To determine the nomenclature and configuration of stereoisomer and Conformational isomerism of saturated compounds and Stereoisomerism in biphenyl compounds.
	C221.3	To interpret the nomenclature and classification of heterocyclic compounds, methods of preparation, and uses.
	C221.4	Synthesis, reactions of heterocyclic compounds and compare the reactivity and properties of heterocyclic compounds with their uses.
	C221.5	Outline and discuss the reaction with its mechanism and Applications of Named reactions and Reagents.
Medicinal Chemistry – I Theory BP402T	C222.1	Explain the history and basic principles of Medicinal Chemistry. Apply the concept of physicochemical properties of drug molecules to biological activity and explain the phases of drug metabolism.
	C222.2	Learn classification, mechanism of action, structure-activity relationship, and uses of drugs acting on the Autonomic nervous system.
	C222.3	Study of classification, mechanism of action, Structure-activity relationship, and uses of drugs acting on the cholinergic System.
	C222.4	Study of classification, mechanism of action, Structure-activity relationship, and uses of drugs acting on the Central Nervous System.
	C222.5	Learn classification, mechanism of action, structure-activity relationship, and uses of General anesthetics, Narcotic and non-narcotic analgesics, and Anti-inflammatory agents.

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Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Physical Pharmaceutics – II Theory BP403T	C223.1	Explain colloidal dispersion, optical properties, kinetic properties, electrical properties.
	C223.2	Explain Rheology, viscosity, Thixotropy in formulation, Plastic and elastic deformation.
	C223.3	Explain coarse dispersions, Suspensions, Emulsions, Stability of emulsions.
	C223.4	Learn the particle size & distribution, derived properties of powders, Porosity, Bulkiness & Flow properties.
	C223.5	Explain reaction kinetics, physical and chemical degradation of pharmaceutical products.
Pharmacology – I Theory BP404T	C224.1	Describe the history and scope of pharmacology, general pharmacology, and pharmacokinetics.
	C224.2	Knowledge on Pharmacodynamics, Drug Discovery and clinical evaluation of new drugs.
	C224.3	Explain neurotransmission and the pharmacology of drugs acting on ANS like parasympathetics, local anaesthetics and drugs used for glaucoma.
	C224.4	Explain the pharmacology of drugs acting on Central Nervous System like sedatives & hypnotics, General anaesthetics, alcohol &disulfiram.
	C224.5	Explain the CNS disease and drugs used to treat them including anti psychotics, antidepressants, CNS stimulants and opioid drugs.
Pharmacognosy & Phytochemistry – I Theory BP405T	C225.1	Define pharmacognosy, classify crude drugs and explain methods of drug evaluation.
	C225.2	Explain the techniques and methods involved in cultivation and collection production of crude drugs.
	C225.3	Illustrate the plant tissue culture, its applications and brief note on edible vaccines.
	C225.4	Explain the role of pharmacognosy in traditional system of medicine, definition & classification of secondary metabolites.
	C225.5	Study of plant products and primary metabolites from natural sources.

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Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Medicinal Chemistry – I Practical BP406P	C226.1	Apply the basic knowledge of organic chemistry in the synthesis of medicinal compounds.
	C226.2	Analyze and predict the principles of chemical reactions and the mechanism of chemical reactions
	C226.3	Apply the concept of moles in calculating theoretical yield.
	C226.4	Calculate and estimate the percentage purity of the compounds synthesized.
	C226.5	Study of Partition coefficient of drugs.
Physical Pharmaceutics – II Practical BP407P	C227.1	Determine particle size and distribution using sieving and microscopic methods.
	C227.2	Measure bulk density, true density, and porosity.
	C227.3	Assess the angle of repose and the effect of lubricants on it.
	C227.4	Measure viscosity of liquids (Ostwald's viscometer) and semisolids (Brookfield viscometer).
	C227.5	Determine reaction rate constants (first and second order) and perform accelerated stability studies.
Pharmacology – I Practical BP408P	C228.1	Proficient in handling common laboratory animals used in pharmacological testing.
	C228.2	Proficient in performing blood withdrawal and administering drugs through multiple routes.
	C228.3	Capable of evaluating the effects of drugs on enzyme induction and ciliary motility.
	C228.4	Able to stimulate and evaluate the effect of drugs on the gastrointestinal tract using computational software Ex-Pharma.
	C228.5	Proficient in utilizing computational software Ex-Pharma to stimulate and assess the effects of drugs on the central nervous system (CNS) and cardiovascular system (CVS).

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B.Pharmacy II Year II Semester (R19) (IV Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Pharmacognosy & Phytochemistry – I Practical BP409P	C229.1	Explain the chemical nature of crude drug by chemical tests.
	C229.2	Perform stomatal number, stomatal index, vein islet number, vein islet termination and palisade ratio of leaf drug.
	C229.3	Explain and determine size of starch grains, calcium oxalate crystals, length and width of fiber of the sample.
	C229.4	Able to perform ash value, extractive values, moisture content for the evaluation of crude drugs.
	C229.5	Able to perform swelling and foaming index for the evaluation of crude drugs.

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B.Pharmacy III Year I Semester (R19) (V Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Medicinal Chemistry – II Theory BP501T	C311.1	To relate the physicochemical properties of drugs to their pharmacological action.
	C311.2	To solve the nomenclature of different categories of drugs by analyzing the chemical structure to classify different categories of drugs and to appraise their medicinal and pharmaceutical applications.
	C311.3	To find the mechanism of action, metabolic pathways, adverse effects, and therapeutic value of different classes of drugs.
	C311.4	To determine the Structure-Activity Relationship (SAR) of different classes of drugs.
	C311.5	To synthesize different classes of drugs.
Industrial Pharmacy – I Theory BP502T	C312.1	Carry out assessment of physicochemical properties and characteristics of drugs as a tool in the optimization of dosage forms.
	C312.2	Formulate and prepare and evaluation of tablets, liquid orals using established procedures and technology.
	C312.3	Formulate, prepare and evaluation of Capsules, Pellets.
	C312.4	Formulate and prepare different types of parenteral and ophthalmic dosage forms.
	C312.5	Select ingredients and formulate cosmetics such as lipsticks, shampoos, cold cream. Identify containers, closures, valves and propellants for different types of aerosol systems. Select and evaluate appropriate packaging materials for various pharmaceutical dosage forms.
Pharmacology – II Theory BP503T	C313.1	Explain the mechanism of drug action and its relevance in the treatment of diseases of Cardiovascular system.
	C313.2	Explain the mechanism of drug action and its relevance in the treatment of diseases of Cardiovascular & Urinary system.
	C313.3	To study the mechanism of autocoids in inducing diseases and pharmacology of related drugs.
	C313.4	Discuss pharmacological mechanisms and the Importance of drugs in endocrine disease treatment.
	C313.5	Learning the principles, procedure, types and uses of Bioassays in drug discovery process.

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B.Pharmacy III Year I Semester (R19) (V Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Pharmacognosy and Phytochemistry – II Theory BP504T	C314.1	Know & explain the basic metabolic pathways and formation of various secondary metabolites, and comprehend utilization of radioactive isotopes in the investigation of biogenetic studies.
	C314.2	Explain the source, chemistry, therapeutic uses & commercial applications of various secondary metabolites containing drugs.
	C314.3	Learn isolation, identification and analysis of various phytoconstituents.
	C314.4	Discuss the method for industrial production, estimation and utilization of few therapeutically important phytoconstituents.
	C314.5	Explain the basic techniques like spectroscopy, chromatography & electrophoresis in the isolation, purification, & identification of crude drugs.
Pharmaceutical Jurisprudence Theory BP505T	C315.1	Explaining the importance of code of pharmaceutical ethics and process of import, manufacture and licensing of drugs.
	C315.2	Detailed study of the provisions of acts pertaining to drugs and cosmetics.
	C315.3	Summarize about pharmacy act, medicinal and toilet preparations act and narcotic drugs and psychotropic substance act.
	C315.4	Demonstrate the drugs and magic remedies act, cruelty to animals act and national pharmaceutical pricing authority.
	C315.5	Study of pharmaceutical legislations and code of ethics during the pharmaceutical practice.
Industrial Pharmacy – I Practical BP506P	C316.1	Assessment in Preformulation Studies.
	C316.2	To Perform the Preparation and evaluation of tablet, Injections.
	C316.3	Evaluate the quality control test of tablets, Capsules.
	C316.4	Prepare of cold creams, Vanishing creams.
	C316.5	Evaluate of Glass Containers.

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B.Pharmacy III Year I Semester (R19) (V Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S)** **Upon completion of the course student will be able to**
Pharmacology – II Practical BP507P	C317.1	Perform the effect of drug on blood pressure and heart rate.
	C317.2	Estimate the dose response curves and bioassays of drugs on isolated tissue preparations.
	C317.3	Study of diuretic activity of drugs on experimental animals.
	C317.4	Determination of PA2 and PD2 values of drugs by schild's plot method.
	C317.5	Study of analgesic and anti-inflammatory activities.
Pharmacognosy and Phytochemistry – II Practical BP508P	C318.1	Analyze the morphology, histology & powder characteristics of crude drugs for extraction and detection.
	C318.2	Apply the techniques & tests for the isolation & identification of active principles.
	C318.3	Explain the separation techniques of sugars and herbal extract by paper and thin layer chromatography.
	C318.4	Know the separation and detection techniques of volatile oils.
	C318.5	Distinguish the unorganized crude drugs by various chemical tests.

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B.Pharmacy III Year II Semester (R19) (VI Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Medicinal Chemistry – III Theory BP601T	C321.1	Describe the chemistry of drugs with respect to their pharmacological activity.
	C321.2	Discuss the drug metabolic pathways, adverse effects, and therapeutic value of drugs.
	C321.3	Examine the chemical synthesis of various drugs.
	C321.4	Explain the structural activity relationship of different classes of drugs.
	C321.5	Study various approaches used in drug design. Explain the physicochemical parameters used in QSAR, docking techniques, and concept & applications of combinatorial chemistry.
Pharmacology – III Theory BP602T	C322.1	Explain the mechanism of drug action and its relevance in the pharmacological treatment of infectious diseases of respiratory and gastrointestinal system.
	C322.2	Explain the significance of chemotherapeutic agents and study of chemotherapy of drugs acting on folic acid metabolism, cell wall synthesis and protein synthesis.
	C322.3	Study in detail about the chemotherapy of drugs acting on tuberculosis, leprosy, fungal, viral, helminthiasis, malaria and amoebic infections.
	C322.4	Demonstrate the chemotherapy of UTI, STD and cancer and drugs acting on immune system.
	C322.5	Explain about toxicological studies and chronopharmacology.

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B.Pharmacy III Year II Semester (R19) (VI Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Herbal Drug Technology Theory BP603T	C323.1	Explain raw materials as source of herbal drugs from cultivation to herbal drug product and to know biodynamic agriculture and to explain basic principles, preparation and standardization of various formulations of Indian systems of medicine.
	C323.2	Utilize the plants of neutraceuticals in ailments and also explain herb-food and herb-drug interaction of various plant drugs.
	C323.3	Identify the natural origin drugs as raw materials for preparation of cosmetics, excipients, conventional herbal formulations & novel dosage formulations like phytosomes.
	C323.4	Explain and explain the stability testing of herbal drugs as per WHO & ICH guidelines for evaluation of herbal drugs & patenting of natural products.
	C323.5	Know present and future scope of herbal industry & good manufacturing practices of Indian system of medicine.
Biopharmaceutics and Pharmacokinetics Theory BP604T	C324.1	Broader Explaining the concepts of ADME of drug in human body.
	C324.2	Learn the measurement of bioavailability and development of BA-BE study protocol for the new drug molecule.
	C324.3	Determine the various pharmacokinetic parameters from either plasma concentration or urinary excretion data for drug.
	C324.4	Design dosage regimens for patients based on calculated pharmacokinetic parameters and ability to calculate loading and maintenance doses.
	C324.5	Learn the concept of non-linear pharmacokinetics and michaelis-menten equation and calculate the pharmacokinetic parameters.

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B.Pharmacy III Year II Semester (R19) (VI Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Pharmaceutical Biotechnology Theory BP605T	C325.1	Define basic concepts & applications of enzyme biotechnology, protein & genetic engineering, & explain use of microbes in industry.
	C325.2	Explain & apply recombinant DNA technology & PCR.
	C325.3	Utilize the knowledge of immunity and blood products.
	C325.4	Examine immune blotting techniques & genetic organization & types of mutants.
	C325.5	Study of microorganisms in fermentation techniques.
Quality Assurance Theory BP606T	C326.1	Explain Regulatory aspects and certification involved in Regulatory bodies like ICH, ISO and GMP &cGMP aspects in Pharmaceutical Industry.
	C326.2	Gain knowledge on Organization, Personnel, Premises, Equipment and raw materials in Pharmaceutical Industry.
	C326.3	Remember QC tests for containers, Closures and 20 packaging and Good Laboratory Practices.
	C326.4	Appreciate the importance of documentation and handling of Complaints.
	C326.5	Know Calibration, Qualification, Validation of Different analytical Instruments and Ware housing Practices.
Medicinal Chemistry – III Practical BP607P	C327.1	Experiment with chemicals to prepare drugs and Intermediates.
	C327.2	Estimate the percentage purity of the compounds by performing different types of assay techniques.
	C327.3	Prepare medicinally important compounds or intermediates by Microwave synthesis.
	C327.4	Design the structures and reactions using Chem Draw.
	C327.5	Explain and calculate the physiochemical properties of drug molecules using drug design software Drug likeliness screening (Lipinskies RO5).

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B.Pharmacy III Year II Semester (R19) (VI Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Pharmacology – III Practical BP608P	C328.1	Study on different dose calculations in pharmacological experiments.
	C328.2	Demonstration of various activities, test and effect on different models of experiments.
	C328.3	Demonstration of acute corrosion activity of test substances over skin and eye.
	C328.4	Explain the calculations of pharmacokinetic parameters.
	C328.5	Explain Biostatistical methods in experimental pharmacology.
Herbal Drug Technology Practical BP609P	C329.1	Evaluate the preliminary qualitative screening of crude drugs and excipients of natural sources.
	C329.2	Determine the alcohol content of ayurvedic preparation and aldehyde content, phenol content and determination of total alkaloid content.
	C329.3	Know the formulation and evaluation techniques of herbal creams, lotions & shampoos.
	C329.4	Apply the preparation and standardization process of herbal syrup, mixtures and tablets.
	C329.5	Analyze the monograph of herbal drugs from recent pharamacopoeia.

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B.Pharmacy IV Year I Semester (R19) (VII Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Instrumental Methods of Analysis Theory BP701T	C411.1	Explain interaction of matter with UV- Visible light, instrumentation in UV and Fluorimetry and their applications in drug analysis.
	C411.2	Explain fundamentals, principles, instrumentation, Interferences and applications of IR, Flame Photometry, AAS and Nephelometry.
	C411.3	Learn principle, methodology, various techniques and applications of CC, PC, TLC and Electrophoresis.
	C411.4	Describe Chromatographic separation and analysis of drugs by GC and HPLC.
	C411.5	Know theory involved, instrumentation and applications of Ion exchange, Gel and Affinity chromatographic techniques.
Industrial Pharmacy – II Theory BP702T	C412.1	Know the process of pilot plant and scale up of pharmaceutical dosage forms.
	C412.2	Explain the process of technology transfer from lab scale to commercial batch.
	C412.3	Know different Laws and Acts that regulate pharmaceutical industry.
	C412.4	Describes the role of Quality Management in Pharmaceutical industry.
	C412.5	Explain the organization and responsibilities of national and state licensing authority.
Pharmacy Practice Theory BP703T	C413.1	Explain the organization of hospital pharmacy, drug distribution methods, and identification of drug-related problems.
	C413.2	Monitor patient drug therapy through medication chart reviews and clinical evaluations.
	C413.3	Interpret laboratory results to use as monitoring parameters for specific disease states.
	C413.4	Provide pharmaceutical care services and patient counseling in community pharmacies to enhance patient quality of life.
	C413.5	Explain hospital formulary management and inventory control.

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B.Pharmacy IV Year I Semester (R19) (VII Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Novel Drug Delivery System Theory BP704T	C414.1	Explain the principles and technology used in the design of controlled release drug delivery systems and criteria for selection of a drugs and polymers for the development of Novel drug delivery systems.
	C414.2	Learn the various approaches for development of novel drug delivery systems.
	C414.3	Explain the formulation and evaluation of transdermal drug delivery systems, Approaches and formulations for gastroretentive and nasopulmonary drug delivery systems.
	C414.4	Discuss various approaches for the development of targeted drug Delivery systems.
	C414.5	Explain development of ocular formulations and intra uterine devices (IUDs) and it's applications.
Instrumental Methods of Analysis Practical BP705T	C415.1	Explain the concept of absorbance maxima and their effect on organic compounds.
	C415.2	Estimate the number of drugs present in the pharmaceutical products using colorimetric, UV visible and Fluorometric principles.
	C415.3	Determine the ions through flame photometry and nephelo turbidometry methods.
	C415.4	Separate and evaluate the natural products using paper, thin layer chromatography and column chromatography techniques.
	C415.5	Demonstration on HPLC and gas chromatography techniques.

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B.Pharmacy IV Year II Semester (R19) (VIII Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Biostatistics and Research Methodology Theory BP801T	C421.1	Explain the introduction, measures of central tendency and dispersion and Correlation in Biostatistics.
	C421.2	To gain the knowledge and explaining the concept of statistical theories of Regression, Probability and Parametric test in evaluation of Research.
	C421.3	Gain the knowledge of Non parametric test in evaluation of Research and study about the graphs and design and methodology.
	C421.4	Know the utilization of statistical software's to industrial and clinical trial approach.
	C421.5	Explain and gain the knowledge in design and analysis of experiments in Research.
Social and Preventive Pharmacy Theory BP802T	C422.1	Recognize the concepts and evaluation of public health.
	C422.2	Explain the principles on the prevention and control of communicable and non-communicable diseases.
	C422.3	Identify National health programs its objectives functioning and outcomes.
	C422.4	Explaining of National health intervention programs.
	C422.5	Recognize the community services in rural, urban and school health.

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B.Pharmacy IV Year II Semester (R19) (VIII Semester)		
Subject Name & Code	**CO's Number**	**Course Outcomes (CO'S) Upon completion of the course student will be able to**
Pharmacovigilance Theory BP805ET	C423.1	Define pharmacovigilance, its history, development, and the importance of medicine safety monitoring, including WHO and PvPI programs.
	C423.2	Describe and classify adverse drug reactions (ADRs) and explain methods for their detection, reporting, causality assessment, and management.
	C423.3	Explain drug and disease classification, drug dictionaries, and coding systems such as MedDRA and WHO drug dictionaries.
	C423.4	Develop and manage pharmacovigilance programs in hospitals, industry, CROs, and nationally, using relevant drug information resources.
	C423.5	Explain ICH guidelines for pharmacovigilance, including expedited reporting, safety reports, and pharmacovigilance planning, and compare Indian and global regulatory requirements.
Advanced Instrumentation Techniques Theory BP811ET	C424.1	Explain Advanced instrumentation and techniques involved in NMR and Mass Spectroscopies and its applications to drug analysis.
	C424.2	Explain principle, Instrumentation and Applications of Thermal methods and XRD.
	C424.3	Learn Calibration and Validation of various analytical instruments.
	C424.4	Gain knowledge on principle and procedures involved in RIA and Extraction methods.
	C424.5	Know analysis of drugs using advanced Hyphenated Mass techniques.