



B.PHARMACY - COURSE OUTCOMES (Cos)

Upon completion of course the student will be able to

Programme : I/IV B.Pharmacy
Semester/Year of Study : 1st Semester
Course Name : Human Anatomy and Physiology
Course Code : BP101T (Theory)

CO1	Recall the structure (gross and histology) and functions of various organs of the human body
CO2	Describe the various homeostatic mechanisms and their imbalances of various systems
CO3	Identify the various tissues and organs of the different systems of the human body
CO4	Recognize coordinated working pattern of different organs of each system
CO5	Analyse the interlinked mechanisms in the maintenance of normal functioning of human body

Programme : I/IV B.Pharmacy
Semester/Year of Study : 1st Semester
Course Name : Pharmaceutical Analysis - I
Course Code : BP102T (Theory)

CO1	Apply the basic principles of analysis in standardization of some compounds.
CO2	Identify the possible sources of impurities in medicinal agents and errors in analytical methods.
CO3	Analyze the pharmaceuticals by different volumetric methods.
CO4	Explain the principles of electro analytical methods, in analyzing various compounds
CO5	Determine the endpoint of titrations by electro analytical methods



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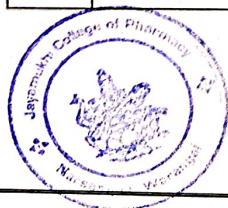
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Programme : I/IV B.Pharmacy
Semester/Year of Study : 1st Semester
Course Name : Pharmaceutics - I
Course Code : BP103T (Theory)

CO1	Learn the historical background and profession of pharmacy and basics of pharmaceutical dosage forms
CO2	Solve pharmaceutical calculations and understand the formulation of powders and liquid dosage forms.
CO3	Prepare and dispense monophasic and biphasic liquid dosage forms.
CO4	Explain the concepts of suppositories and pharmaceutical incompatibilities
CO5	Summarize formulation and evaluation of semi solid dosage forms.

Programme : I/IV B.Pharmacy
Semester/Year of Study : 1st Semester
Course Name : Pharmaceutical Inorganic Chemistry - I
Course Code : BP104T (Theory)

CO1	Discuss the history of different types of pharmacopoeias and know principles involved in identification of impurities in inorganic pharmaceuticals
CO2	Select buffers in pharmaceutical systems and choose the appropriate electrolytes in therapy
CO3	Classify and study the preparation, properties and assay of inorganic compounds
CO4	Recognize types and applications of radiopharmaceuticals in pharmaceutical industry
CO5	Know the classification, preparation, properties and assay of poisonous compounds



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Programme : I/IV B.Pharmacy
Semester/Year of Study : 1st Semester
Course Name : Communication Skills
Course Code : BP105T (Theory)

CO1	Describe the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
CO2	Define the Verbal and Non Verbal Communication skills effectively
CO3	Discuss effectively how to manage the team as a team player
CO4	Explains the interview skills to face challenges which arises in interviews
CO5	Develops the Leadership qualities and essentials

Programme : I/IV B.Pharmacy
Semester/Year of Study : 1st Semester
Course Name : Remedial Biology
Course Code : BP106RBT (Theory)

CO1	Recall the classification and salient features of five kingdoms of life and explains the basic components of anatomy and physiology of a plant
CO2	Describe the structure and functions of cardiovascular, digestive and respiratory systems of human body
CO3	Discuss the physiology of excretory system, structure of spinal cord and brain, functions of hormones in humans
CO4	Determine the macronutrients and micronutrients and process of photosynthesis, factors affecting photosynthesis
CO5	Elaborate the various life processes in plants like plant respiration, cell division and different types of tissues



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Programme : I/IV B.Pharmacy
Semester/Year of Study : 1st Semester
Course Name : Remedial Mathematics
Course Code : BP106RMT (Theory)

CO1	Recall the importance of mathematics in pharmacy
CO2	Analyse the mathematical equation in solving problems
CO3	Know the application of logarithms and matrices in pharmacy
CO4	Analyse geometry and method of partial fractions, integration
CO5	Discuss differential equations, write properties and elementary functions using laplace transforms

Programme : I/IV B.Pharmacy
Semester/Year of Study : 1st Semester
Course Name : Human Anatomy and Physiology
Course Code : BP107P (Practical)

CO1	Recall the handling of compound microscope
CO2	Enumerate the WBC and RBC count
CO3	Determine and measure the heart rate, pulse rate and blood pressure
CO4	Estimate the haemoglobin content and electrolyte sedimentation rate
CO5	Determine the blood group, bleeding time and clotting time




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Programme : I/IV B.Pharmacy
Semester/Year of Study : 1st Semester
Course Name : Pharmaceutical Analysis
Course Code : BP108P (Practical)

CO1	Identify the various impurities present in compounds by performing limit tests
CO2	Analyze the compounds by acid base and nonaqueous titrations
CO3	Estimate different Pharmaceuticals by redox titration
CO4	Determine the medicinal compounds by precipitation and complexometric titrations.
CO5	Evaluate the strength of different standard/sample solutions by electro analytical techniques.

Programme : I/IV B.Pharmacy
Semester/Year of Study : 1st Semester
Course Name : Pharmaceutics
Course Code : BP109P (Practical)

CO1	Recall the principles used in the preparation of solid, liquid and semi solid dosage formssis
CO2	Compound and dispense monophasic liquid dosage forms for internal and external administration.
CO3	Compound and dispense biphasic liquid dosage forms
CO4	Compound and dispense powders and granules
CO5	Compound and dispense different semi solid dosage forms and suppositories



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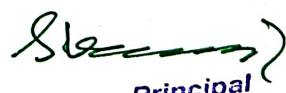
Programme : I/IV B.Pharmacy
Semester/Year of Study : 1st Semester
Course Name : Pharmaceutical Inorganic Chemistry
Course Code : BP110P (Practical)

CO1	Recall the handling of apparatus and glassware in the chemistry laboratory
CO2	Perform the limit tests for different types of impurities
CO3	Identify different types of inorganic compounds
CO4	Perform the test for purity for different types of pharmaceutical compounds as per pharmacopoeial standards
CO5	Discuss the requirements and methods for preparation of selected compounds

Programme : I/IV B.Pharmacy
Semester/Year of Study : 1st Semester
Course Name : Communication Skills
Course Code : BP111P (Practical)

CO1	Define the communication skills required in day to day life
CO2	Apply the elements of communication and make use of communication styles
CO3	Explain the interview handling and presentation skills
CO4	Use of proper pronunciation by using consonant and vowel sounds
CO5	Discuss compose of email writing and to apply online job application




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Programme : I/IV B.Pharmacy
Semester/Year of Study : 1st Semester
Course Name : Remedial Biology
Course Code : BP112P (Practical)

CO1	Know the handling of microscopic and slide preparation techniques
CO2	Explain structure of cell and its organelles, identify various parts of plant and its modifications
CO3	Assess the microscopic study and identification of tissues pertinent in stem, leaves, root, seed, fruit and flower
CO4	Determine blood pressure, blood group and tidal volume
CO5	Detail study of frog by using different models

Programme : I/IV B.Pharmacy
Semester/Year of Study : 2nd Semester
Course Name : Human Anatomy and Physiology
Course Code : BP201T (Theory)

CO1	Recall the organization of nervous system, electrophysiology, action potential and impulse
CO2	Understand the anatomy of GIT, production & regulation of acid production, disorders
CO3	Identify the structure and function of respiratory system and explain the regulations and mechanism and regulations of respiration
CO4	Summarize the anatomy of urinary system and physiology of urine formation
CO5	Analyze Classification of hormones, mechanism of hormone action and predict physiology of male and female reproductive system




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Programme : I/IV B.Pharmacy
Semester/Year of Study : 2nd Semester
Course Name : Pharmaceutical Organic Chemistry -I
Course Code : BP202T (Theory)

CO1	Recall the classification, nomenclature, isomerism and concepts of hybridization in organic compounds
CO2	Select the method of preparation of various classes of organic compounds
CO3	Compare the kinetics, reactivity, stereochemistry and factors influencing reactions in alkyl halides and alcohols
CO4	Explain the named reactions of carbonyl compounds, acidity of carboxylic acids and basicity of amines
CO5	Discuss the qualitative tests, structure and uses of selected organic compounds

Programme : I/IV B.Pharmacy
Semester/Year of Study : 2nd Semester
Course Name : Biochemistry
Course Code : BP203T (Theory)

CO1	Illustrate the concepts of biosynthesis and metabolism and associated disorders of carbohydrates and importance of biological oxidation
CO2	Understand the basic concepts of Biomolecules and Bioenergetics
CO3	Identify the physiological and pathological conditions of lipids and amino acids
CO4	Distinguish the genetic organization of prokaryotes and eukaryotes
CO5	Assess the role of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.




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Programme : I/IV B.Pharmacy
Semester/Year of Study : 2nd Semester
Course Name : Pathophysiology
Course Code : BP204T (Theory)

CO1	Identify the basic principles of cell injury, morphology of cell injury and cellular adaptations.
CO2	Explain the etiology and pathogenesis of various diseases
CO3	Apply the principles of pathogenesis in understanding symptoms, signs and complications of disease states
CO4	Appraise the principles of physical, chemical and biologic carcinogenesis
CO5	Adapt the principles of inflammation in understanding pathogenesis of various disease states

Programme : I/IV B.Pharmacy
Semester/Year of Study : 2nd Semester
Course Name : Computer Applications in Pharmacy
Course Code : BP205T (Theory)

CO1	Outline the fundamentals and Principles of Number System and Information System Software.
CO2	Develop pharmacy drug databases using proper web technologies
CO3	Apply the knowledge of Computers in Community Pharmacy.
CO4	Choose a relevant bioinformatics data base in vaccine discovery
CO5	Select an appropriate computing tool for data analysis in preclinical development.



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Programme : I/IV B.Pharmacy
Semester/Year of Study : 2nd Semester
Course Name : Environmental Sciences
Course Code : BP206T (Theory)

CO1	Understand and develop an attitude of concern for the various components of the environment.
CO2	Impart basic knowledge about environmental resources, ecosystems, biodiversity and pollution
CO3	Apply the concepts of environment in environment protection and environment improvement.
CO4	Identify the environment related problems and Strive to attain harmony with nature
CO5	Take part in helping the concerned individuals in identifying and solving environmental problems.

Programme : I/IV B.Pharmacy
Semester/Year of Study : 2nd Semester
Course Name : Human Anatomy and Physiology
Course Code : BP207P (Practical)

CO1	Recall the integumentary and special senses using specimen, models, etc
CO2	Identify the functions of cranial nerves by various sensory and motor activities
CO3	Examine tidal volume and vital capacity
CO4	Analyze recording of basal mass index and evaluate body temperature
CO5	Elaborate the knowledge on family planning devices, pregnancy diagnostic tests, tissues of vital organ and gonads




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Programme : I/IV B.Pharmacy
Semester/Year of Study : 2nd Semester
Course Name : Pharmaceutical Organic Chemistry -I
Course Code : BP208P (Practical)

CO1	Recall the molecular models of organic compounds and their preliminary qualitative tests
CO2	Compare the physical constants of unknown organic compounds with reference from the literature
CO3	Synthesize different type of organic compounds and their derivatives
CO4	Analyze organic compounds qualitatively and appropriate method of purification of organic compounds
CO5	Experiment the detection of elements and analysis of functional groups

Programme : I/IV B.Pharmacy
Semester/Year of Study : 2nd Semester
Course Name : Biochemistry
Course Code : BP209P (Practical)

CO1	Test for qualitative analysis of carbohydrates, proteins and urine
CO2	Analyze quantitatively reducing sugars and proteins
CO3	Assess the blood creatinine, blood sugar and serum total cholesterol
CO4	Measure PH of the prepared buffer solutions
CO5	Determine salivary amylase activity and the effect of temperature and substrate concentration on it




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Programme : I/IV B.Pharmacy
Semester/Year of Study : 2nd Semester
Course Name : Computer Applications in Pharmacy
Course Code : BP210P (Practical)

CO1	Make use of computing fundamentals in pharmaceutical sciences
CO2	Apply efficiently the online tools to all pharmaceutical related activities
CO3	Develop solutions for pharmaceutical problems using computer applications.
CO4	Create HTML web pages and XML pages to export patient database
CO5	Support drug information storage and retrieval using MS Access

Programme : II/IV B.Pharmacy
Semester/Year of Study : 3rd Semester
Course Name : Pharmaceutical Organic Chemistry -II
Course Code : BP301T (Theory)

CO1	Recall the structure, properties and reactions of benzene
CO2	Outline the properties of fats and oils and study their analytical constants
CO3	Identify the effect of substituent's on properties of carboxylic acids, phenols and amines
CO4	Categorize the organic compounds and study their structure and uses
CO5	Discuss the polynuclear hydrocarbons and explain their synthesis and reactants



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Programme : II/IV B.Pharmacy
Semester/Year of Study : 3rd Semester
Course Name : Physical Pharmaceutics I
Course Code : BP302T (Theory)

CO1	Recollect the states of matter and understand the applications of various physiochemical properties to design dosage forms
CO2	Gain knowledge of pH and buffers and their use in the stabilization of pharmaceutical formulations.
CO3	Understand the principle of interfacial tension and the applications of surface active agents in drug solubilization.
CO4	Perceive and apply the concepts of complexation and protein binding in pharmacy
CO5	Elaborate the significance of physical properties of drug molecules in design and stability of dosage forms.

Programme : II/IV B.Pharmacy
Semester/Year of Study : 3rd Semester
Course Name : Pharmaceutical Microbiology
Course Code : BP303T (Theory)

CO1	Develop methods for qualitative and quantitative analysis of microorganisms
CO2	Apply sterilization and disinfection methods in pharmaceutical industry
CO3	Analyze antimicrobial agents
CO4	Assess microbial contaminants of pharmaceutical products
CO5	Select appropriate methods for microbiological standardization and cell culture techniques.



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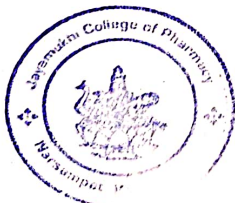
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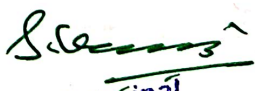
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Semester/Year of Study : 3rd Semester
Course Name : Pharmaceutical Engineering
Course Code : BP304T (Theory)

CO1	Understand the laws governing Flow of fluids and Heat transfer.
CO2	Apply the size reduction and size separation techniques on pharmaceutical powders.
CO3	Identify suitable operating methods of Evaporation and Distillation for different types of products
CO4	Distinguish among various techniques used for Drying and Mixing of Pharmaceutical products
CO5	Categorize equipment used for Filtration and Centrifugation of Pharmaceutical products.

Programme : II/IV B.Pharmacy
Semester/Year of Study : 3rd Semester
Course Name : Pharmaceutical Organic Chemistry -II
Course Code : BP305P (Practical)

CO1	Recall the principles involved in the analysis of fixed oils
CO2	Illustrate about recrystallization and the concept of Steam distillation
CO3	Synthesize different type of organic compounds using various kinds chemical reactions
CO4	Investigate the purity of the synthesized products & fats and oils quantitatively
CO5	Relate the experimental values of fat constants with reference values




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Programme : II/IV B.Pharmacy
Semester/Year of Study : 3rd Semester
Course Name : Physical Pharmaceutics -I
Course Code : BP306P (Practical)

CO1	Understand the significance of physical properties such as solubility, surface tension, partition coefficient and pKa in the design of dosage forms.
CO2	Explain adsorption isotherms and determine Freundlich-Langmuir constant using activated charcoal
CO3	Apply Henderson – Hasselbalch equation for interpretation of pK _a value of drugs and deduce the HLB value and critical micellar concentration of a surfactant.
CO4	Determine the surface tension of sample liquids by drop count and drop weight methods
CO5	Estimate the stability constants of complexes by solubility and pH titration methods

Programme : II/IV B.Pharmacy
Semester/Year of Study : 3rd Semester
Course Name : Pharmaceutical Microbiology
Course Code : BP307P (Practical)

CO1	Apply aseptic techniques for culturing of microbes and differentiate bacteria by staining techniques
CO2	Identify bacteria based on motility characteristics and biochemical tests
CO3	Analyze the bacteria in water and sterility of pharmaceutical products
CO4	Estimate the colonies isolated by pure culture techniques
CO5	Determine the potency of antibiotics by microbiological assays




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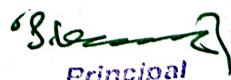
Programme : II/IV B.Pharmacy
Semester/Year of Study : 3rd Semester
Course Name : Pharmaceutical Engineering
Course Code : BP308P (Practical)

CO1	Demonstrate Pharmaceutical machinery such as Rotary tablet machine, Fluidized energy mill, Ball mill.
CO2	Construct the drying rate curves of Calcium Carbonate and Starch.
CO3	Analyze the effect of various factors (Concentration, Surface area, Thickness/ Viscosity) on the rate of filtration and evaporation.
CO4	Examine the effect of time on the Rate of Crystallization.
CO5	Determine the radiation rate constant of painted glass and unpainted glass

Programme : II/IV B.Pharmacy
Semester/Year of Study : 4th Semester
Course Name : Pharmaceutical Organic Chemistry -III
Course Code : BP401T (Theory)

CO1	Recall the elements of symmetry and nomenclature of stereoisomer's
CO2	Explain concept of optical isomerism, geometrical isomerism and conformational isomerism
CO3	Apply stereoisomerism in biphenyl compounds and study stereospecific and stereoselective reactions
CO4	Classify and study the nomenclature, synthesis, reactions and medicinal uses of heterocyclic compounds and their derivatives
CO5	Discuss the named reactions and their synthetic importance




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Programme : II/IV B.Pharmacy
Semester/Year of Study : 4th Semester
Course Name : Medicinal Chemistry -I
Course Code : BP402T (Theory)

CO1	Understand the effect of physicochemical properties of drugs with respect to their pharmacological activity
CO2	Explain the drug metabolic pathways, adverse effect and therapeutic importance of drugs
CO3	Summarize the Structural Activity Relationship (SAR) of different class of drugs
CO4	Solve the synthesis of drugs by using standard protocols
CO5	Discuss the importance of natural products as drugs

Programme : II/IV B.Pharmacy
Semester/Year of Study : 4th Semester
Course Name : Physical Pharmaceutics - II
Course Code : BP403T (Theory)

CO1	Outline the types and properties of Colloidal dispersions
CO2	Characterize the pharmaceutical materials based on their rheological properties.
CO3	Develop stable formulations of various kinds of suspensions and emulsions.
CO4	Inspect the micromeritic characteristics of powders using various techniques.
CO5	Analyze the stability of drug products by using principles of kinetics.




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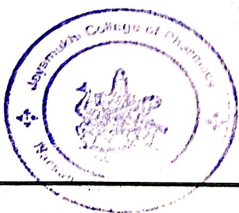
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Programme : II/IV B.Pharmacy
Semester/Year of Study : 4th Semester
Course Name : Pharmacology - I
Course Code : BP404T (Theory)

CO1	Understand various terminologies in general pharmacology and categorize based on pharmacology
CO2	Explain various drug action principles, mechanisms, adverse drug reactions and drug interactions
CO3	Employ concepts of drug discovery and clinical evaluation of new drugs.
CO4	Distinguish various drugs acting on peripheral & central nervous system
CO5	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases

Programme : II/IV B.Pharmacy
Semester/Year of Study : 4th Semester
Course Name : Pharmacognosy and Phytochemistry -I
Course Code : BP405T (Theory)

CO1	Know the handling of microscopic and slide preparation techniques
CO2	Explain structure of cell and its organelles, identify various parts of plant and its modifications
CO3	Assess the microscopic study and identification of tissues pertinent in stem, leaves, root, seed, fruit and flower
CO4	Determine blood pressure, blood group and tidal volume
CO5	Detail study of frog by using different models




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Programme : II/IV B.Pharmacy
Semester/Year of Study : 4th Semester
Course Name : Medicinal Chemistry -I
Course Code : BP406P (Practical)

CO1	Illustrate different organic reactions employed for synthesis of drugs or intermediates
CO2	Judge the solvent for purification of some medicinal compounds and their analogues by recrystallization
CO3	Determine different classes of drugs by quantitative methods of analysis.
CO4	List out the requirements for analysis of drugs
CO5	Investigate the partition coefficient value of drugs

Programme : II/IV B.Pharmacy
Semester/Year of Study : 4th Semester
Course Name : Physical Pharmaceutics - II
Course Code : BP407P (Practical)

CO1	Choose a good suspending agent to formulate a stable suspension
CO2	Interpret the shelf life of a given formulation by accelerated stability studies
CO3	Make use of derived and flow properties of powders to ensure a stable solid formulation.
CO4	Distinguish the rate constants as per the chemical reaction.
CO5	Determine the viscosity using Ostwald's and Brookfield's viscometer, Predict the flux by Franz diffusion cell.




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Programme : II/IV B.Pharmacy
Semester/Year of Study : 4th Semester
Course Name : Pharmacology - I
Course Code : BP408P (Practical)

CO1	Apply basics of pharmacology in understanding experimental pharmacology
CO2	Administer different drugs through different routes of drug administration in animals
CO3	Examine various Pharmacological laboratory techniques
CO4	Determine the effect of drugs on animals by simulated experiments
CO5	Predict various screening models for anticonvulsants and anxiolytic activities

Programme : II/IV B.Pharmacy
Semester/Year of Study : 4th Semester
Course Name : Pharmacognosy and Phytochemistry -I
Course Code : BP409P (Practical)

CO1	Apply basics of pharmacology in understanding experimental pharmacology
CO2	To administer different drugs through different routes of drug administration in animals
CO3	Examine various Pharmacological laboratory techniques
CO4	Determine the effect of drugs on animals by simulated experiments.
CO5	Predict various screening models for anticonvulsants and anxiolytic activities



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Programme : III/IV B.Pharmacy
Semester/Year of Study : 5th Semester
Course Name : Medicinal Chemistry -II
Course Code : BP501T (Theory)

CO1	Understand the chemistry of drugs with respect to their pharmacological activity
CO2	Apply the Structural Activity Relationship of different classes of drugs
CO3	Classify and illustrate the drugs mentioned in the course.
CO4	Explain the drug metabolic pathways, adverse effect and therapeutic value of drugs
CO5	Develop the synthesis of the selected medicinally active agents

Programme : III/IV B.Pharmacy
Semester/Year of Study : 5th Semester
Course Name : Industrial Pharmacy -I
Course Code : BP502T (Theory)

CO1	Discuss various physicochemical properties and their significance in the development and stability of dosage forms
CO2	Illustrate the classification, preparation, evaluation and packing of Solid dosage forms
CO3	Explain the formulation and manufacturing aspects of Liquid orals and Pellets.
CO4	Categorize preformulation factors, excipients, production facilities and aseptic techniques followed in the formulation of parenteral products and ophthalmic preparations
CO5	Summarize the formulation and evaluation of aerosols and cosmetics and importance of containers and closures




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Programme : III/IV B.Pharmacy
Semester/Year of Study : 5th Semester
Course Name : Pharmacology -II
Course Code : BP503T (Theory)

CO1	Understand the mechanism of drug action and its relevance in the treatment of different diseases
CO2	Demonstrate isolation of different organs/tissues from the laboratory animals by stimulated experiments
CO3	Demonstrate the various receptor actions using isolated tissue preparation
CO4	Appreciate correlation of pharmacology with related medical sciences

Programme : III/IV B.Pharmacy
Semester/Year of Study : 5th Semester
Course Name : Pharmacognosy -II
Course Code : BP504T (Theory)

CO1	Illustrate and use radioisotopes to ascertain biogenetic pathway of secondary metabolites in plants.
CO2	Explain phytochemistry of secondary metabolites of commercial importance.
CO3	Illustrate and interpret phytochemicals of industrial significance.
CO4	Explain the process of isolation, identification or analysis of phytoconstituents
CO5	Analyse the quality, identity and purity of crude drugs by modern methods



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Programme : III/IV B.Pharmacy
Semester/Year of Study : 5th Semester
Course Name : Pharmaceutical Jurisprudence
Course Code : BP505T (Theory)

CO1	Recall the Pharmaceutical legislations, ethics, right to information, medical termination of pregnancy and intellectual property rights
CO2	Relate the significance of Drugs and Cosmetics act 1940 and its rules 1945 in relation to import and manufacture of drugs.
CO3	Apply the knowledge on schedules pertaining to Drugs and Cosmetics Act 1940 and its rules 1945 and also administration of the act and rules
CO4	Understand the functions of pharmacy council and implementation of education regulations in pharmacy
CO5	Appraise the importance of medicinal and toilet preparations act and narcotic drugs and psychotropic substances act and rules

Programme : III/IV B.Pharmacy
Semester/Year of Study : 5th Semester
Course Name : Industrial Pharmacy -I
Course Code : BP506P (Practical)

CO1	Illustrate the formulation and evaluation of unit solid dosage forms
CO2	Explain the formulation of sterile preparations
CO3	Evaluate tablets, capsules and containers as per pharmacopoeial specifications
CO4	Formulate skin care cosmetics
CO5	Find the applications of preformulation studies



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Programme : III/IV B.Pharmacy
Semester/Year of Study : 5th Semester
Course Name : Pharmacology -II
Course Code : BP507P (Practical)

CO1	Understand effect of drugs on blood pressure and heart rate of dog.
CO2	Remember effect of physostigmine and atropine on DRC of acetylcholine using frog rectus abdominis muscle and rat ileum respectively.
CO3	Evaluate bioassay of oxytocin using rat uterine horn by interpolation method..
CO4	Analyze effect of spasmogens and spasmolytics using rabbit jejunum.
CO5	Predict various screening models for analgesic and anti-inflammatory activities

Programme : III/IV B.Pharmacy
Semester/Year of Study : 5th Semester
Course Name : Pharmacognosy and phytochemistry -II
Course Code : BP508P (Practical)

CO1	Examine the morphological or histological characters of crude drugs
CO2	Inspect the authenticity or adulteration of crude drugs by chemical tests
CO3	Choose the relevant method to isolate or extraction phytochemical from crude drugs
CO4	Assess the purity, identity or separate phytoconstituents using relevant chromatographic techniques
CO5	Analyse and evaluate the powdered crude drugs by morphological and microscopical characteristics




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Programme : III/IV B.Pharmacy
Semester/Year of Study : 6th Semester
Course Name : Medicinal Chemistry -III
Course Code : BP601T (Theory)

CO1	Remember the definition, classification and mode of action and contrast the different chemotherapeutic drugs and its uses.
CO2	Understand the chemistry of drugs with respect to their biological activity
CO3	Apply the Structural Activity Relationship and importance of different class of drugs
CO4	Distinguish the drug metabolic pathways, adverse effect and therapeutic value of drugs based on their chemical structures.
CO5	Plan the synthesis of selected medicinally active chemotherapeutic agents

Programme : III/IV B.Pharmacy
Semester/Year of Study : 6th Semester
Course Name : Pharmacology -III
Course Code : BP602T (Theory)

CO1	Students will be able to identify the drugs for treating various respiratory and gastrointestinal complications.
CO2	Explain the principles of chemotherapy and illustrate the mechanism of action of antibiotics.
CO3	Analyze the chemotherapy of UTI's, STD's, and anti-cancer drugs and to categorize the immunopharmacology.
CO4	Assess the various types of toxicity studies, principles of treatment of poisoning and management of various poisoned conditions.
CO5	Compile the biological clock and its significance leading to chronotherapy.



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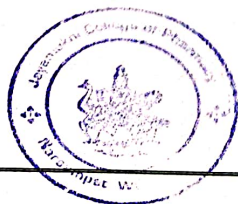
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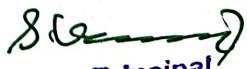
Programme : III/IV B.Pharmacy
Semester/Year of Study : 6th Semester
Course Name : Herbal Drug Technology
Course Code : BP603T (Theory)

CO1	Understand the raw materials as a source of herbal drugs and know the importance of Herbal preparations and Indian system of medicine
CO2	Discuss the significance of nutraceuticals in the management of life style disorders with a focus on herb-food interactions.
CO3	Illustrate various herbal formulations and herbal cosmetics formulated using excipients of natural origin.
CO4	Explain WHO and ICH guidelines for the evaluation and stability of herbal drugs and patenting procedures .
CO5	Summarize the concept, components, objectives and GMP of herbal industry

Programme : III/IV B.Pharmacy
Semester/Year of Study : 6th Semester
Course Name : Biopharmaceutics and Pharmacokinetics
Course Code : BP604T (Theory)

CO1	Understand biopharmaceutics concepts, various Pharmacokinetic process, their significance and applications
CO2	Illustrate the concept of bioavailability and bioequivalence in drug products and relate the concept in enhancement of solubility of poorly soluble drugs .
CO3	Construct various pharmacokinetic models for estimation of pharmacokinetic parameters of a drug administered through various routes.
CO4	Analyze dosage regimen based on pharmacokinetics of drug administered at multiple doses.
CO5	Interpret pharmacokinetic parameters for the drug which follow capacity limited kinetics




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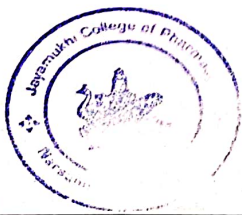
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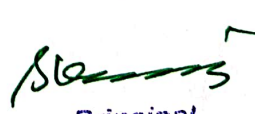
Programme : III/IV B.Pharmacy
Semester/Year of Study : 6th Semester
Course Name : Pharmaceutical Biotechnology
Course Code : BP605T (Theory)

CO1	Choose an immobilization engineering approach to upgrade industrial enzymes.
CO2	Identify vectors for the production of rDNA products.
CO3	Develop immunological and therapeutic products. .
CO4	Distinguish genetic organization of cells by immunoblotting techniques..
CO5	Select a biocatalytic process for the production of pharmaceutical products.

Programme : III/IV B.Pharmacy
Semester/Year of Study : 6th Semester
Course Name : Quality Assurance
Course Code : BP606T (Theory)

CO1	Apply c GMP aspects in pharmaceutical Industry and plan the various quality tools.
CO2	Distinguish the regulatory requirements of packaging materials, evaluation of packaging materials and examine the regulatory requirements of Non-Clinical Trials,.
CO3	Examine the importance of documentation and evaluate complaints and handling of returned goods. .
CO4	Explain the principals of validation, calibration and validation and determine the importance of validation and validation master plan. .
CO5	Determine the general principals of Analytical validation and qualification of analytical instruments and explain the concepts of material management. .




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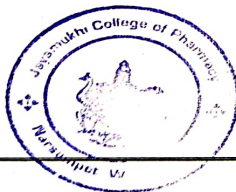
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Programme : III/IV B.Pharmacy
Semester/Year of Study : 6th Semester
Course Name : Medicinal chemistry III
Course Code : BP607P (Practical)

CO1	Synthesize important medicinal compounds and intermediates in the laboratory, calculate the percentage yield
CO2	Explain the principle, scheme, and mechanism involved in drug synthesis and develop practical skills
CO3	Judge the label claim of selected drugs after performing assay.
CO4	Compare the advantages of microwave technique over conventional synthesis of drugs.
CO5	Predict the relation between physicochemical properties and biological activity.

Programme : III/IV B.Pharmacy
Semester/Year of Study : 6th Semester
Course Name : Pharmacology III
Course Code : BP608P (Practical)

CO1	Recall the dose calculations in pharmacological experiments, and to relate the antiallergic activity / anti-ulcer activity in rat models.
CO2	Demonstrate of effect of drugs on gastrointestinal motility and the effect of agonist/antagonists on guinea pig ileum
CO3	Construct serum biochemical parameters by using semi auto analyzer.
CO4	Analyze effect of saline purgative on frog intestine, insulin hypoglycemic effect and test for pyrogens using rabbit method.
CO5	Evaluate acute oral toxicity (LD50), acute skin irritation / corrosion and acute eye irritation / corrosion of a test substance



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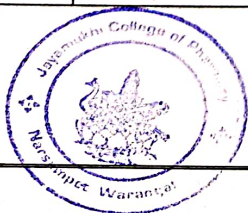
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Programme : III/IV B.Pharmacy
Semester/Year of Study : 6th Semester
Course Name : Herbal Drug Technology
Course Code : BP609P (Practical)

CO1	Recall the reagents used for the identification of crude drugs.
CO2	Experiment on herbal syrup and mixtures and their evaluation as per standards
CO3	Prepare tablets using herbal excipients and their evaluation as per pharmacopeia
CO4	Design herbal cosmetics using plant extracts.
CO5	Estimate the presence of various substances in traditional dosage forms

Programme : IV/IV B.Pharmacy
Semester/Year of Study : 7th Semester
Course Name : Instrumental Methods of Analysis
Course Code : BP701T (Theory)

CO1	Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis by UV-Visible and Fluorimetry.
CO2	Apply the principles of IR, FES, AA Spectroscopic techniques for the estimation of pharmaceuticals.
CO3	Distinguish the principles and implement procedures of various types of chromatographic and electro chromatographic separations and analysis of drugs
CO4	Compare the principles, instrumentation and applications of GLC and HPLC.
CO5	Estimate drugs qualitatively and quantitatively using various analytical techniques like Ion-exchange Chromatography, Gel and Affinity Chromatography




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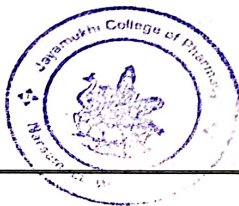
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Programme : IV/IV B.Pharmacy
Semester/Year of Study : 7th Semester
Course Name : Industrial Pharmacy II
Course Code : BP702T (Theory)

CO1	Understand the process of pilot plant and scale up of pharmaceuticals and various guidelines involved.
CO2	Summarize the principals of quality management systems and accreditations for quality standards.
CO3	Apply the regulatory requirements of Clinical Trials, and analyze Phase -I, II, III & IV studies and study designs.
CO4	Utilize the importance of documentation and filling dossier requirements for IND, NDA and ANDA and plan the management of clinical trials.
CO5	Apply the principals of technology development and transfer. To identify the technology transfer agencies in india.

Programme : IV/IV B.Pharmacy
Semester/Year of Study : 7th Semester
Course Name : Pharmacy Practice
Course Code : BP703T (Theory)

CO1	Awareness on drug distribution systems in hospital.
CO2	Appreciate drug store, inventory control and rational drug therapy.
CO3	Identify drug related problems and ADRs in the prescription .
CO4	Execute medication history interview and interpret the lab parameters with disease state.
CO5	Execute medication history interview and interpret the lab parameters with disease state.




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Programme : IV/IV B.Pharmacy
Semester/Year of Study : 7th Semester
Course Name : Novel Drug Delivery System
Course Code : BP704T (Theory)

CO1	Understand various approaches to controlled drug delivery systems and criteria selection of polymers and drugs for the development drug delivery systems.
CO2	Device micro encapsulated products as well as mucosal and implantable drug delivery systems.
CO3	Design transdermal, gastro retentive and nasopulmonary drug delivery systems.
CO4	Formulate targeted drug delivery systems.
CO5	Develop ocular drug delivery systems and intra uterine drug delivery systems..

Programme : IV/IV B.Pharmacy
Semester/Year of Study : 7th Semester
Course Name : Instrumental Methods of Analysis
Course Code : BP705P (Practical)

CO1	Apply the basics to calculate λ - max of drugs
CO2	Determine the drug content by different analytical methods
CO3	Estimate the compounds by chromatographic methods of separation.
CO4	Develop the practical skills in handling HPLC and Gas chromatographic instruments.
CO5	Experiment with estimation of drugs by colorimetry, fluorimetry and UV spectrophotometry




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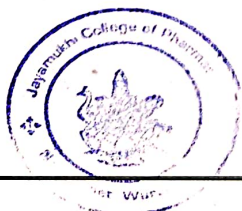
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Programme : IV/IV B.Pharmacy
Semester/Year of Study : 7th Semester
Course Name : Practice School
Course Code : BP706PS

CO1	Acquire knowledge and hands-on experience on the latest technologies and research domains beyond the syllabus.
CO2	Practically apply the knowledge and skills previously learned through conventional classroom teaching and laboratory experiments.
CO3	Develop the ability to adapt to rapidly changing requirements and challenges of a professional workplace in the real world.
CO4	Exhibit the acquired professional skills in unfamiliar and open-ended real-life situations that the student is not exposed to in a conventional classroom.
CO5	Improve their employability and establish a professional network before graduation.

Programme : IV/IV B.Pharmacy
Semester/Year of Study : 8th Semester
Course Name : Biostatistics and Research Methodology
Course Code : BP801T

CO1	Understand the applications of biostatistics in Pharmacy.
CO2	Make use of various statistical techniques to solve statistical problems
CO3	Apply the statistical techniques in analyzing statistical data
CO4	Operate various statistical software's in designing the experiments and in treatment of clinical study data
CO5	Explain the need of research, research designs and to build up the ability to use various statistical problems




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Programme : IV/IV B.Pharmacy
Semester/Year of Study : 8th Semester
Course Name : Social and Preventive Pharmacy
Course Code : BP802T

CO1	Acquire high consciousness on issues related to health in country and worldwide..
CO2	Derive the health care development strategies in view of current strategies.
CO3	Evaluate alternative ways for solving health related problems
CO4	Evaluate alternative ways for solving pharmaceutical issues.

Programme : IV/IV B.Pharmacy
Semester/Year of Study : 8th Semester
Course Name : Pharma Marketing Management
Course Code : BP803ET

CO1	Explain the general concepts of marketing and selling. Analyzing marketing environment.
CO2	Understand the quantitative and qualitative aspects of market. Summarize the market segmentation and analyzing the market
CO3	Explain the principles of product life cycle and product management in pharmaceutical industry
CO4	Contrast Pharma industry distribution management and tasks. Roles of professional sales representative
CO5	Analyze determinants of price and pricing methods, DPCO, NPPA. To understand the emerging concepts in marketing.



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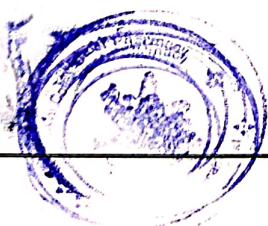
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Programme : IV/IV B.Pharmacy
Semester/Year of Study : 8th Semester
Course Name : Pharmaceutical Regulatory Science
Course Code : BP804ET

CO1	Recall the Concepts of Drug discovery, development process, clinical studies and generic drug product development.
CO2	Perceive the regulatory approval process and timelines for IND, NDA and ANDA and to know about changes to an approved NDA/ANDA.
CO3	Familiar with Regulatory authorities and agencies like India, USA, Europe, Australia, Japan and Canada
CO4	Know the regulatory registration process of Indian drugs in overseas market which include to understand about technical documents like DMF, CTD, eCTD and ACTD
CO5	Understand the concepts of Regulatory Science in pharmaceutical industry as well as to make use of regulatory guidelines, laws, acts, orange and purple book

Programme : IV/IV B.Pharmacy
Semester/Year of Study : 8th Semester
Course Name : Pharmacovigilance
Course Code : BP805ET

CO1	Awareness on drug safety monitoring, history and development of pharmacovigilance
CO2	Establishment of pharmacovigilance centers in hospitals.
CO3	Awareness on dictionaries used in pharmacovigilance and ICD classification of diseases
CO4	Appreciate drug evaluation, ICH guidelines CIOMS requirements for ADR reporting



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Programme : IV/IV B.Pharmacy
Semester/Year of Study : 8th Semester
Course Name : Quality Control and Standardization of Herbals
Course Code : BP806ET

CO1	Recall the basic tests and quality control (QC) tests as per World Health Organization (WHO) guidelines for evaluating commercial herbal medicines
CO2	Explain cgm, GLP, GAP and GACP for quality assurance in herbal industry as per WHO.
CO3	Outline research methods as per EU or ICH guidelines for assessing safety, efficacy and QC of Herbal medicines.
CO4	Design stability testing protocol and documents for export registration of new drug application (NDA) common technical document etc.
CO5	Assess and improve the safety of herbal medicines by markers, Pharmacovigilance, herbal pharmacopoeias and other regulatory guidelines.

Programme : IV/IV B.Pharmacy
Semester/Year of Study : 8th Semester
Course Name : Computer Aided Drug Design
Course Code : BP807ET

CO1	Apply the CADD techniques in various stages of drug discovery
CO2	Examine the Role of CADD in drug discovery
CO3	Analyze the physicochemical Properties and the techniques involved in QSAR
CO4	Execute the various structure based drug design methods (Molecular docking, De novo drug design)
CO5	Evaluate the various techniques in Virtual Screening




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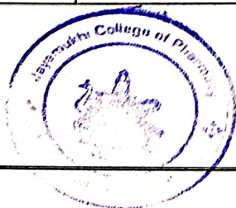
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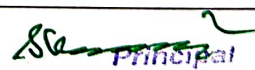
Programme : IV/IV B.Pharmacy
Semester/Year of Study : 8th Semester
Course Name : Cell and Molecular Biology
Course Code : BP808ET

CO1	Make use of microbial or mammalian cellular properties in drug discovery.
CO2	Apply molecular information in genetic engineering.
CO3	Categorize regulatory proteins that regulate genes.
CO4	Choose an appropriate molecular genetics mechanism in the development of transgenics.
CO5	Assess cellular communication in regulating cellular activities.

Programme : IV/IV B.Pharmacy
Semester/Year of Study : 8th Semester
Course Name : Cosmetic Science
Course Code : BP809ET

CO1	Understand the concepts of various classes of cosmetics and cosmeceutical products
CO2	Make use of drug absorption, drug distribution and protein binding with an emphasis on factors influencing each process.
CO3	Apply the formulation principles in building various skin care, hair care and oral care products.
CO4	Distinguish the role of herbs in formulating various skin care, hair care and oral care products
CO5	Evaluate various skin care, hair care and oral care cosmetic products.




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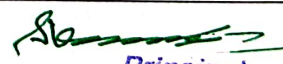
Programme : IV/IV B.Pharmacy
Semester/Year of Study : 8th Semester
Course Name : Experimental Pharmacology
Course Code : BP810ET

CO1	Recall the CPCSEA/OECD guidelines for maintenance, breeding and conduct of experiments on laboratory animals and to demonstrate different laboratory/transgenic/mutant animals, various routes of administration, techniques of blood collection and euthanasia
CO2	Outline various preclinical screening models for diuretics, nootropics, anti-asthmatics and drugs acting on CNS.
CO3	Construct preclinical screening models for drugs acting on ANS, eye and local anesthetics.
CO4	Analyze the preclinical screening models for drugs acting on CVS.
CO5	Appraise the preclinical screening models for drugs like antiulcer, antidiabetic and anticancer agents.

Programme : IV/IV B.Pharmacy
Semester/Year of Study : 8th Semester
Course Name : Advanced Instrumentation Techniques
Course Code : BP811ET

CO1	Understand the basic principles involved in advanced instruments used for drug analysis.
CO2	Apply the principles of NMR and Mass spectrometry for estimation of drugs.
CO3	Make use of the principles of thermal and X-ray diffraction techniques to analyze different compounds.
CO4	Carryout the calibration procedure for UV-Visible, IR, Fluorimeter, Flame Photometer, HPLC, GC.
CO5	Distinguish the principles and implement procedures of various types of sample extraction and RIA procedure for analysis of drugs.




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Programme : IV/IV B.Pharmacy
Semester/Year of Study : 8th Semester
Course Name : Project Work
Course Code : BP813PW

CO1	Understand basic concept on project work, Literature survey of various research & review articles.
CO2	Explain aim, objective & plan of work of present investigation.
CO3	Describe the materials and equipment used in project work
CO4	Excipient profiles used in preparation of dosage form. Drug analysis determining absorption maxima.
CO5	Apply their knowledge, skill related to a current trend research topic and develops a project towards research area.
CO6	Assemble the obtained results, summary & references and able to write thesis and present to panel/examiners.



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