



**SNJBs**  
**SHRIMAN SURESHDADA JAIN COLLEGE OF PHARMACY**

(Jain Gurukul), Neminagar,  
Chandwad, Dist. Nashik-423 101.

**NBA Accredited UG Program (2019-2022, 2022-2025)**  
**Best Professional College (Rural Area) Awarded by SPPU**

**2022-2023 FIRST YEAR SEM-I**

Human Anatomy & Physiology-I

BP101 is in the first semester, **101** is the Course code for Human Anatomy & Physiology-I

and CO BP 101.1 to CO BP 101.6 are the outcomes of this course.

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP 101.1T	Understand compounding, dispensing & counseling of pharmaceutical product.
CO BP 101.2T	Report various information to health care professional regarding ADR, idiosyncrasy & Pharmacovigilance.
CO BP 101.3T	Community pharmacist - Role of pharmacist in health care system and patient counseling regarding safe use of medicine.
CO BP 101.4T	Compounding & dispensing of various dosage form like Mouthwash, Gargle, Liniment, Emulsion, Suspension etc.
CO BP 101.5T	Calculation of drug dose according to age, body weight and surface area.
CO BP 101.6T	Remember physical, chemical & therapeutic incompatibility with respect to dosage form.

Pharmaceutical Analysis I

<b>Statement</b>	
<b>The students should be able to:</b>	
COBP102.1T	To learn the basics of analytical chemistry and the statistical treatment of analytical data.
COBP102.2T	To understand the concepts of aqueous and non-aqueous titrations
COBP102.3T	To grasp the Mohr's method for estimation of chlorides
COBP102.4T	To master the theory of complexometric titrations



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COBP102.5T	To learn the redox titrations
COBP102.6T	To become familiar with Conductometer and potentiometry

Pharmaceutics- I

<b>Statement</b>	
<b>The students should be able to:</b>	
COBP103.1T	Know the history of profession of pharmacy.
COBP103.2T	Understand the basic concepts of dosage form design.
COBP103.3T	Understand the professional way of handling the prescription.
COBP103.4T	Calculate of drug dose according to age, body weight and surface area.
COBP103.5T	Understand types and formulation aspects of conventional dosage forms.
COBP103.6T	Remember physical, chemical & therapeutic incompatibility with respect to dosage form.

Pharmaceutical Inorganic Chemistry

<b>Statement</b>	
<b>The students should be able to:</b>	
COBP104.1T	To understand the various Pharmacopoeias
COBP104.2T	To understand the separation and qualitative analysis of liquid-liquid binary mixture.
COBP104.3T	To understand contaminants in pharmaceuticals, sources and its control.
COBP104.4T	To understand the concept of gastrointestinal agents and their properties



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COBP104.5T	To understand the various electrolytes in human body and their properties
COBP104.6T	To understand the essential trace elements and their properties

Communication skills

<b>Statement</b>	
<b>The students should be able to:</b>	
COBP105.1T	To understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation
COBP105.2T	To learn how to Communicate effectively
COBP105.3T	To learn how to manage effectively team as a team player
COBP105.4T	To study how to develop interview skills
COBP105.5T	To learn about development of Leadership qualities and essentials
COBP105.6T	To learn communication skill in group discussion

Remedial Biology

<b>Statement</b>	
<b>The students should be able to:</b>	
COBP106.1 RBT	know the classification of five kingdoms of life



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COBP106.2 RBT	know the salient features of five kingdoms of life
COBP106.3 RBT	understand the basic components of anatomy of plant
COBP106.4 RBT	understand the basic components of physiology of plant
COBP106.5 RBT	know the basic components of anatomy of animal with special reference to human
COBP106.6 RBT	know the basic components of physiology of animal with special reference to human

Remedial Mathematics

<b>Statement</b>	
<b>The students should be able to:</b>	
COBP106.1 RMT	Know the theory and their applications in Pharmacy
COBP106.2 RMT	Solve different types of problems by applying theory
COBP106.3 RMT	Appreciate the important applications of mathematics in Pharmacy.
COBP106.4 RMT	Apply mathematical concepts and principles to perform computations for Pharmaceutical Sciences.
COBP106.5 RMT	Apply the knowledge of mathematics for solving different problems related to pharmacy.
COBP106.6 RMT	Create, use and analyze mathematical representations and mathematical relationships

Human Anatomy and Physiology –Practical

<b>Statement</b>	
<b>The students should be able to:</b>	
COBP107.1P	Explain the construction, working, care and handling of various instruments and equipments for understanding the practical
COBP107.2P	Clarify significance of hematological test and hemocytometry
COBP107.3P	Identification of axial bones and appendicular bones



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COBP107.4P	Enumeration of white blood cell (WBC) count
COBP107.5P	Enumeration of total red blood corpuscles (RBC) count
COBP107.6P	Estimation of haemoglobin content and determination of blood group.

Pharmaceutical Analysis I – Practical

<b>Statement</b>	
<b>The students should be able to:</b>	
COBP108.1P	To perform the standardization of 0.1N NaOH
COBP108.2P	To perform the standardization of 0.1N Sodium thiosulphate
COBP108.3P	To perform the assay of sodium benzoate I. P. by non aqueous titration
COBP108.4P	To perform the assay of ammonium chloride by acid-base titration
COBP108.5P	To perform the assay of calcium Gluconate I. P. by complexometry
COBP108.6P	To perform the conductometric titrations of 0.1N HCl against 0.1N NaOH

Pharmaceutics I – Practical

<b>Statement</b>
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<b>The students should be able to:</b>	
COBP109.1P	State the correct use of various equipments in Pharmaceutics laboratory relevant to practicals.
COBP109.2P	Explain formulation, evaluation and labeling of syrups, elixirs, suspensions, emulsions, suppositories, ointment and powder preparations.
COBP109.3P	Perform pharmaceutical calculations to determine evaluation parameters like density, viscosity, specific gravity, angle of repose, Carr's index, Hausner ratio of preparations.
COBP109.4P	Describe use of ingredients in formulation and category of formulation.
COBP109.5P	Select the suitable packaging material (container-closure) for the preparation.
COBP109.6P	Draw the labels in neat way including all the component/parts.

Pharmaceutical Inorganic Chemistry –Practical

<b>Statement</b>	
<b>The students should be able to:</b>	
COBP110.1P	State the correct use of various equipments in Pharmaceutics laboratory relevant to practicals.
COBP110.2P	Explain formulation, evaluation and labeling of syrups, elixirs, suspensions, emulsions, suppositories, ointment and powder preparations.
COBP110.3P	Perform pharmaceutical calculations to determine evaluation parameters like density, viscosity, specific gravity, angle of repose, Carr's index, Hausner ratio of preparations.
COBP110.4P	Describe use of ingredients in formulation and category of formulation.
COBP110.5P	Select the suitable packaging material (container-closure) for the preparation.
COBP110.6P	Draw the labels in neat way including all the component/parts.



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Communication skills – Practical

<b>Statement</b>	
<b>The students should be able to:</b>	
COBP111.1P	To learn about basic communication skill
COBP111.2P	To learn about basic pronunciation
COBP111.3P	To learn about Writing Skills
COBP111.4P	To study Interview Handling Skills
COBP111.5P	To learn E-Mail etiquette
COBP111.6P	To learn Presentation Skills

Remedial Biology – Practical

<b>Statement</b>	
<b>The students should be able to:</b>	
COBP112.1RBP	Study of cell and its inclusions
COBP112.2RBP	Study of Stem, Root, Leaf, seed, fruit, flower and their modifications
COBP112.3RBP	Identify types of bones
COBP112.4RBP	Determine of blood group
COBP112.5RBP	Determine of blood pressure
COBP112.6RBP	Determine of tidal volume



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**FIRST YEAR 2018-2019 SEM-II**

Human Anatomy and Physiology II

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP201.1T	Explain Basic fundamental structural and functional features of Nervous system.
CO BP201.2T	Explain anatomy and physiology of digestive system.
CO BP201.3T	Explain anatomical and physiological importance of respiratory system.
CO BP201.4T	Discuss the essentials of urinary systems involve in regulation of Body functions.
CO BP201.5T	Explain Basic fundamental structural and functional features of endocrine system.
CO BP201.6T	Explain Basic fundamental structural and functional features of reproductive system.

Pharmaceutical Organic Chemistry I

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP202.1T	1. To understand danger, and risk involved in an organic laboratory.





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CO BP202.2T	2. To learn several safety measures and first aid methods in case of accidental exposure to hazards.
CO BP202.3T	3. To be able to identify simple organic compounds based on their physical and chemical properties.
CO BP202.4T	4. To learn laboratory techniques used in organic chemistry laboratory as vacuum filtration, distillation, crystallization, and drying of synthesized compounds.
CO BP202.5T	5. To learn skills involved in scaling down of requirements for synthesizing simple organic compounds.
CO BP202.6T	6. To learn techniques for purifying compounds synthesized in an organic chemistry laboratory.

### Biochemistry

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP203.1T	To understand the role of organic chemistry in human physiology.
CO BP203.2T	Able to appreciate the chemistry of different nutrients.
CO BP203.3T	To understand the role and chemistry of biocatalysts and micronutrients like enzymes, vitamins and minerals.
CO BP203.4T	To be able to co-relate different physiological changes with the metabolic reactions.
CO BP203.5T	To be able to draw structures of amino acids as building blocks and perform theoretical peptide synthesis.
CO BP203.6T	To extend the chemistry of building blocks to genetic material.

### Pathophysiology



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<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP204.1T	Describe the etiology and pathogenesis of the selected disease states.
CO BP204.2T	Name the signs and symptoms of the diseases.
CO BP204.3T	Mention the complications of the diseases.
CO BP204.4T	Know the basic mechanism involved in the process of inflammation and repair:
CO BP204.5T	Know the various cardiovascular diseases like Hypertension, congestive heart failure, ischemic heart disease
CO BP204.6T	Know the infectious diseases like Meningitis, Typhoid, Leprosy, Tuberculosis Urinary tract infections and sexually transmitted diseases: AIDS, Syphilis, Gonorrhoea

Computer Applications in Pharmacy

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP205.1T	To understand different types of databases, applications of computers and databases in pharmacy.
CO BP205.2T	To illustrate the concept of number system in computers



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CO BP205.3T	To make use of web technologies such as HTML, XML, CSS, Programming languages, Web servers and pharmacy drug database.
CO BP205.4T	To appraise the applications of computers in pharmacy such as drug information services, pharmacokinetics, mathematical model in drug design, hospital and clinical pharmacy etc.,
CO BP205.5T	To explain about bioinformatics and its impact in vaccine discovery.
CO BP205.6T	To elaborate the applications of computers for data analysis in Preclinical development.

Environmental sciences

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP206.1T	Create the awareness about environmental problems among learners.
CO BP206.2T	Impart basic knowledge about the environment and its allied problems.
CO BP206.3T	Develop an attitude of concern for the environment.
CO BP206.4T	Motivate learner to participate in environment protection and environment improvement.
CO BP206.5T	Acquire skills to help the concerned individuals in identifying and solving environmental problems.
CO BP206.6T	Strive to attain harmony with Nature.

Human Anatomy and Physiology II –PR

<b>Statement</b>
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<b>The students should be able to:</b>	
CO BP207.1P	Demonstrate various parameters are use to check and regulate the normal functions of Human body.
CO BP207.2P	Explain structural and microscopical aspects of various organs of human system
CO BP207.3P	Enumeration of differential white blood cell count (TLC)
CO BP207.4P	Perform the arneth index.
CO BP207.5P	Demonstrate the function of olfactory nerve, different types of taste, visual acuity
CO BP207.6P	Determine the tidal volume and vital capacity.

Pharmaceutical Organic Chemistry I-PR

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP208.1P	To understand danger, and risk involved in an organic laboratory.
CO BP208.2P	To learn several safety measures and first aid methods in case of accidental exposure to hazards.
CO BP208.3P	To be able to identify simple organic compounds based on their physical and chemical properties.
CO BP208.4P	To learn laboratory techniques used in organic chemistry laboratory as vacuum filtration, distillation, crystallization, and drying of synthesized compounds.
CO BP208.5P	To learn skills involved in scaling down of requirements for synthesizing simple organic compounds.
CO BP208.6P	To learn techniques for purifying compounds synthesized in an organic chemistry laboratory.



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Biochemistry –PR

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP209.1P	To understand the role of organic chemistry in human physiology.
CO BP209.2P	Able to appreciate the chemistry of different nutrients.
CO BP209.3P	To understand the role and chemistry of biocatalysts and micronutrients like enzymes, vitamins and minerals.
CO BP209.4P	To be able to co-relate different physiological changes with the metabolic reactions.
CO BP209.5P	To be able to draw structures of amino acids as building blocks and perform theoretical peptide synthesis.
CO BP209.6P	To extend the chemistry of building blocks to genetic material.

Computer Applications in Pharmacy PR

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP210.1P	To demonstrate and make use of MS Office, MS Word, MS Excel, MS Access and MS Power point.
CO BP210.2P	To understand the paradigms of program languages and be exposed to at least one language from each model, C and SQL.
CO BP210.3P	To summarize the report and printing the report from patient Database
CO BP210.4P	To design a questionnaire using a word processing package to gather information about a particular disease.
CO BP210.5P	To create HTML web page to show personal information



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CO BP210.6P	To create mailing labels Using Label Wizard , generating label in MS WORD
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Pharmaceutical Organic Chemistry II - Theory

Statement	
<b>The students should be able to:</b>	
CO BP301.1T	To understand the phenomenon of isomerism and stereoisomerism.
CO BP301.2T	To understand, reproduce, and identify the stereoisomers in every family of organic compounds, normal and alicyclic compounds.
CO BP301.3T	To be able to name different stereoisomers using several theoretical projections.
CO BP301.4T	To understand the phenomenon of aromaticity, and study different aromatic compounds, reactions involved in their preparation and their reactions.
CO BP301.5T	To understand the theory of orientation and factors influencing reactivity in aromatic compounds.
CO BP301.6T	To be able to understand and devise synthetic schemes with rationale to synthesize simple organic compounds.

Physical Pharmaceutics-I

Statement	
<b>The students should be able to:</b>	
CO BP302.1T	Acquire knowledge related to Solutions and its types, their colligative properties, Raoult's law and its deviation.



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CO BP302.2T	Explain Distribution Phenomenon and apply them in the pharmaceutical practices and Know the applications of Phase Rule in the pharmacy.
CO BP302.3T	Investigate and apply various theories, laws and equations related to different states of Matter, Understand the basic behind aerosols and its principle
CO BP302.4T	Demonstrate use of physicochemical properties of drugs in the formulation Development and evaluation of dosage forms.
CO BP302.5T	Understand the surface and interfacial phenomenon, its measurement and role in the development of various pharmaceutical products.
CO BP302.6T	Distinguish the principles of complexation/ protein binding & to use them for calculations of drug release and stability constant.

Pharmaceutical Microbiology

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP303.1T	Elucidate the historical development, structural features, biology and characteristics of important microbes.
CO BP303.2T	Understand the importance of microbial limit test, preservative efficacy testing & standardization process.
CO BP303.3T	Explain classification, mechanism of action & effectiveness of disinfectants & sterilization process & their importance.
CO BP303.4T	Illustrate types of immunity, basic aspects like Antigen, Antibody & their various interactions.
CO BP303.5T	Focus on various aspects of immunology.
CO BP303.6T	To gain knowledge about the vaccines and its classification, types of vaccines and their methods of preparation.

Pharmaceutical Engineering



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<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP304.1T	Know the history of profession of pharmacy.
CO BP304.2T	Understand the basic concepts of dosage form design.
CO BP304.3T	Understand the professional way of handling the prescription.
CO BP304.4T	Calculate of drug dose according to age, body weight and surface area.
CO BP304.5T	Understand types and formulation aspects of conventional dosage forms.
CO BP304.6T	Remember physical, chemical & therapeutic incompatibility with respect to dosage form.

Pharmaceutical Organic Chemistry II

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP305.1P	To understand danger, and risk involved in an organic laboratory.
CO BP305.2P	To learn several safety measures and first aid methods in case of accidental exposure to hazards.
CO BP305.3P	To be able to separate mixtures of organic compounds based on physical and chemical differences existing in them.
CO BP305.4P	To learn laboratory techniques used in organic chemistry laboratory as vacuum filtration, distillation, crystallization, and drying of synthesized compounds.





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CO BP305.5P	To learn skills involved in scaling down of requirements for synthesizing simple organic compounds.
CO BP305.6P	To learn techniques for purifying compounds synthesized in an organic chemistry laboratory

Physical Pharmaceutics I PR

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP306.1P	To know the ways of determining solubility and factors affecting it.
CO BP306.2P	Partitioning Studies and its relevance to drugs absorption.
CO BP306.3P	Understanding behaviour of conjugate pairs and factors affecting the CST.
CO BP306.4P	Acquire knowledge related to the methods used for determining surface and interfacial tension and understand the effect of surfactant on it.
CO BP306.5P	Investigate various physicochemical properties of drugs
CO BP306.6P	Study role of adsorption isotherms

Pharmaceutical Microbiology PR

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP307.1P	Explain the principle, construction & working of various instruments & perform their operations.



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CO BP307.2P	To learn how to prepare & sterilize nutrient broth, nutrient agar, slant, stabs & plates by maintaining strictly aseptic conditions.
CO BP307.3P	Determination of motility of bacteria by hanging drop technique.
CO BP307.4P	Execute morphology of bacteria by simple, negative, gram & acid fast staining.
CO BP307.5P	To study isolation of bacteria by streak plate technique & other plate technique.
CO BP307.6P	Perform sterility testing, microbial assay & minimum inhibitory concentration techniques.

Pharmaceutical Engineering PR

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP308.1P	Calculate the efficiency of steam distillation process.
CO BP308.2P	Construct the drying curves for various powder materials.
CO BP308.3P	Understand construction, working and application of Pharmaceutical Machinery such as Rotary tablet Machine, capsule filling machine, tablet coating machine, autoclave, oven and dehumidifier.
CO BP308.4P	To evaluate size distribution of tablet granulations.
CO BP308.5P	Know the factors affecting Rate of Filtration and Evaporation (Surface area, Concentration and Thickness/ viscosity).
CO BP308.6P	Study the effect of time on the Rate of Crystallization.



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Pharmaceutical Organic Chemistry III

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP401.1T	To understand the influence of stereochemistry over the course of reactions.
CO BP401.2T	To understand the importance of several heterocyclic compounds.
CO BP401.3T	To learn and remember classification of heterocyclic compounds
CO BP401.4T	To learn the physical and chemical properties of several heterocyclic molecules.
CO BP401.5T	To appreciate the importance of heterocyclic compounds in biochemistry.
CO BP401.6T	To learn several rearrangement and name reactions.

Medicinal Chemistry I

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP402.1T	Understand the importance of medicinal chemistry in healthcare sector of the society
CO BP402.2T	Realize the role of organic chemistry, anatomy and physiology, natural chemistry, and biochemistry to learn medicinal chemistry. Appreciate the history of medicines and their development from medieval age to the modern era.
CO BP402.3T	Understand the receptor concept, their types and classifications, mechanism of activation, locations in the human body.
CO BP402.4T	Comprehend the chemistry of neurotransmitters, their biosynthesis, release, pharmacology and fate, in the body
CO BP402.5T	Grasp the aetiology, cure, mechanism of actions, of following therapeutic classes of drugs: Cholinergic, adrenergic, and cardiovascular.



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CO BP402.6T	Co-relate the organoleptic properties of drugs with their pharmacodynamics and pharmacokinetic parameters.
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Physical Pharmaceutics II

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP403.1T	Know types, properties and applications of colloids in the formulations and illustrate fundamentals & pharmaceutical applications of rheology.
CO BP403.2T	Acquire knowledge about the interfacial properties for successful formulation development of pharmaceutical coarse dispersions
CO BP403.3T	Understand the different types of flow in order to identify & choose suitable flow characteristics for the formulation. Understand the properties of particles & pharmaceutical powders, their significance in formulating pharmaceutical products & the common methods for characterizing these properties.
CO BP403.4T	Relate various physicochemical properties of drug and excipient molecules in designing the dosage forms.
CO BP403.5T	Distinguish the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations.
CO BP403.6T	Demonstrate the behavior and mechanism of drugs and excipients in the formulation development and evaluation of dosage forms.

Pharmacology I

<b>Statement</b>	
<b>The students should be able to:</b>	



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CO BP404.1T	Understand the pharmacological actions of different categories of drugs.
CO BP404.2T	To understand the basic concepts in pharmacology, National drug Policy, Essential drug concept
CO BP404.3T	Explain the mechanism of action at organ system/sub cellular/macromolecular levels.
CO BP404.4T	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
CO BP404.5T	Pharmacodynamics of drugs Understand receptor, drug receptor interaction
CO BP404.6T	Drug toxicity, drug interaction and adverse drug reactions

Pharmacognosy and Phytochemistry I

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP405.1T	Know the techniques in the cultivation and production of crude drugs.
CO BP405.2T	Know the crude drugs, their uses and chemical nature.
CO BP405.3T	Know the evaluation techniques for the herbal drugs.
CO BP405.4T	Classify and identify the crude drugs and secondary metabolites.
CO BP405.5T	Apply the plant Tissue culture technique in Pharmacognosy. Conservation of medicinal plants.
CO BP405.6T	Know chemistry, sources, preparation, evaluation, preservation, and storage, therapeutic used and commercial utility as Pharmaceutical Aids, plant products and marine drugs.

Medicinal Chemistry I

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP406.1P	To be able to operate structure-drawing software as ACD/Labs Freeware.



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CO BP406.2P	To be able to search synthetic schemes for few drugs from reference books
CO BP406.3P	To be able to perform several laboratory operations necessary for synthesizing organic molecules by routes involving multiple steps of reactions.
CO BP406.4P	To be able to scale-down the requirements (chemical and apparatus) for synthesis of organic molecules.
CO BP406.5P	To be able to purify synthesized molecules using techniques as crystallization and column chromatography.
CO BP406.6P	To be able to monitor the progress of reaction from the IR spectrum of synthesized compound.

Physical Pharmaceutics II

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP407.1P	Understand the role of micromeritics and determination of fundamental and derived properties of powders
CO BP407.2P	Acquire knowledge related to the role of rheology and determination of rheological properties
CO BP407.3P	To know the reaction kinetics and ways of determining rate of reaction.
CO BP407.4P	To understand the importance of stability testing in pharmaceuticals.
CO BP407.5P	To prepare coarse dispersion and evaluate the role of various excipients onto the stability



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	of it.
CO BP407.6P	Evaluate the role of salts or protective colloids on the stabilization of colloidal dispersion.

Pharmacology I

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP408.1P	Understand the CPCSEA guidelines for animal experimentations.
CO BP408.2P	Basic instruments used in experimental pharmacology.
CO BP408.3P	Learn Various routes of drug administration in experimental animals.
CO BP408.4P	To know the various methods for blood collection from experimental animals.
CO BP408.5P	Observe the effects of drugs on animal by simulated experiments.
CO BP408.6P	Understand the various animal experiments by simulation, software and videos.

Pharmacognosy and Phytochemistry I

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP409.1P	Identify the unorganized crude drugs by its chemical tests.
CO BP409.2P	Evaluate the leaf crude drugs by quantitative microscopy such as leaf constants.



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CO BP409.3P	Evaluate the crude drugs by quantitative microscopy such as size of calcium oxalate crystals, fibres etc.
CO BP409.4P	Evaluate the crude drug powder by Lycopodium spore method.
CO BP409.5P	Evaluate the crude drugs by its physico-chemical parameters such as moisture content, ash value and extractive value etc.
CO BP409.6P	Evaluate the crude drugs by swelling and foaming index.

Medicinal Chemistry II

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP501.1T	To understand the cellular mechanism underlying precipitating of ailments in cardiovascular system and endocrine system
CO BP501.2T	To understand the factors involved in ADMET of the drugs effective in treatment of ailments arising in CVS
CO BP501.3T	To understand the chemistry (SAR) of drugs effective in treatment of ailments arising in CVS
CO BP501.4T	To be able to remember structures of few drugs
CO BP501.5T	To be able to understand newer futuristic and recent strategies evolving to treat ailments arising in CVS
CO BP501.6T	To remember synthetic pathways of few drugs from each category included in treatment of ailments arising in CVS
CO BP501.7T	To understand the need, process, reactions of metabolism of drugs.

Formulative Pharmacy–





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<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP502.1T	To illustrate various pharmaceutical dosage forms and their manufacturing techniques.
CO BP502.2T	To describe various factors to be considered in development of pharmaceutical dosage forms
CO BP502.3T	Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality
CO BP502.4T	To learn the IPQC as per pharmacopoeial standards, equipments and apparatus needed for the preparation as per SOP.
CO BP502.5T	Formulate parenteral dosage forms and evaluate them for their quality
CO BP502.6T	To acquire student with knowledge of Packaging Materials Science.

Pharmacology II

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP503.1T	To understand the pharmacology of drugs used in various CVDs
CO BP503.2T	To Know the pharmacology of autacoids and related drugs.
CO BP503.3T	To understand the pharmacology of drugs acting on the endocrine system.
CO BP503.4T	To understand the pharmacology of diuretics and antidiuretic drugs.
CO BP503.5T	To learn Principles, applications and types of bioassay.
CO BP503.6T	To appreciate correlation of pharmacology with related medical sciences



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Pharmacognosy II

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP504.1T	To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents.
CO BP504.2T	To understand the production of Phytoconstituents /herbal formulation.
CO BP504.3T	To understand the metabolic pathways in formation of secondary metabolites and application of biogenetic studies.
CO BP504.4T	To carryout isolation and identification of phytoconstituents.
CO BP504.5T	Know the composition, chemistry & chemical classes, bio sources, methods of extraction, therapeutic uses and commercial applications of secondary metabolites. (Alkaloids, steroids, Volatile oils, tannins etc.)
CO BP504.6T	Know the industrial production, estimation and utilization of the commercially used phytoconstituents.

Pharmaceutical Jurisprudence

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP505.1T	Understand basic principles, purpose & dimension of pharmaceutical legislation in India.
CO BP505.2T	Get in-depth knowledge about important rules and regulations and procedures made to execute the laws.
CO BP505.3T	To learn the various pharmaceutical laws governing the import, manufacturing, sale, packaging & labeling of drugs.
CO BP505.4T	Memorise & recall the law related with narcotic drugs, pharmaceutical industry,



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	pharmacy education, drug pricing, objectionable advertisement & consumer.
CO BP505.5T	Define & explain about patents, procedure for patent application, generic drugs (India & U.S) and IPR.
CO BP505.6T	To understand the regulatory system for safety and effectiveness of medicine and quality of product.

Formulative Pharmacy – Practical

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP506.1P	To study various preformulation parameters for Active Pharmaceutical Ingredients and other pharmaceutical excipient
CO BP506.2P	Formulate solid, liquid and semisolid and Cosmetics dosage forms and evaluate them for their quality.
CO BP506.3P	To perform Quality control test as per pharmacopoeia for various marketed formulation.
CO BP506.4P	To perform formulation and evaluation of ophthalmic products and parenteral dosage forms
CO BP506.5P	To perform evaluation of packaging material as per pharmacopoeia.
CO BP506.6P	To study Importance and validation of aseptic area

Pharmacology II – Practical

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP507.1P	Basic instruments used in experimental pharmacology.



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CO BP507.2P	To know the composition of physiological salt solutions and the importance of the components of PSS.
CO BP507.3P	To learn Dose calculation in pharmacological experiments.
CO BP507.4P	To understand the effects of various drugs on heart rate and blood pressure using simulations, software and videos.
CO BP507.5P	To perform various bioassays using isolated tissue preparations.
CO BP507.6P	Learn about in vivo screening of drugs through computerized simulated software

Pharmacognosy II -PR

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP508.1P	Identify the crude drugs from its Morphology, histology and powder characteristics & extraction & detection by applying experimental.
CO BP508.2P	Isolate and identify the Phytoconstituents.
CO BP508.3P	Know the separation of sugars by paper chromatography.
CO BP508.4P	Know the basics and applications of Thin layer chromatography in identification and separation of phytoconstituents.
CO BP508.5P	Know the distillation of volatile oils and detection of phytoconstituents by TLC
CO BP508.6P	Identify the crude drugs from its Morphology, histology and powder characteristics & extraction & detection by applying experimental.



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Medicinal Chemistry III

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP601.1T	To be able to operate structure-drawing software as ACDLabs Freeware.
CO BP601.2T	To be able to search synthetic schemes for few drugs from reference books
CO BP601.3T	To be able to perform several laboratory operations necessary for synthesizing organic molecules by routes involving multiple steps of reactions.
CO BP601.4T	To be able to scale-down the requirements (chemical and apparatus) for synthesis of organic molecules.
CO BP601.5T	To be able to purify synthesized molecules using techniques as crystallization and column chromatography.
CO BP601.6T	To be able to assess the purity of synthesized compounds at laboratory level using simple techniques as TLC and determining melting points.

Pharmacology III

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP602.1T	Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
CO BP602.2T	Comprehend the principles of toxicology and treatment of various poisonings and



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	appreciate correlation of pharmacology with related medical sciences.
CO BP602.3T	Explain pharmacology of drugs acting on Respiratory system e.g.a. Anti -asthmatic drugs b. Drugs used in the management of and Pharmacology of drugs acting on the Gastrointestinal Tract e.g. a. Antiulcer agents. b. Drugs for constipation and diarrhoea.
CO BP602.4T	Understand general principles of chemotherapy, e.g. Sulfonamides and cotrimoxazole.
CO BP602.5T	Know the meaning of a. rhythm and cycles. b. Biological clock and their significance leading to chronotherapy.
CO BP602.6T	Understand the immunopharmacology e.g. a. Immunostimulants b. Immunosuppressant

Herbal Drug Technology –

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP603.1T	Understand raw material as source of herbal drugs from cultivation to herbal drug product .
CO BP603.2T	Know the WHO and ICH guidelines for evaluation of herbal drugs .
CO BP603.3T	Know the herbal cosmetics, natural sweeteners, nutraceuticals .
CO BP603.4T	Appreciate patenting of herbal drugs, GMP .
CO BP603.5T	Know the present scope and future prospects in herbal drugs industry.
CO BP603.6T	Understand good Manufacturing Practice of Indian systems of medicine



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Biopharmaceutics and Pharmacokinetics

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP604.1T	Understand the concept of Biopharmaceutics and its applications in formulation development.
CO BP604.2T	Study pharmacokinetic processes and their relevance in efficacy of dosage form.
CO BP604.3T	Able to Learn the concepts of bioavailability and bioequivalence studies
CO BP604.4T	Able to Learn various compartmental models and non compartmental analysis methods.
CO BP604.5T	Study Biopharmaceutical Classification System and its applications.
CO BP604.6T	Understand concept and mechanisms of dissolution and <i>In Vitro In Vivo Correlation</i> .

Pharmaceutical Biotechnology

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP605.1T	Understand importance of immobilized enzymes
CO BP605.2T	Understand the method of genetic engineering for production of Pharmaceuticals
CO BP605.3T	Able to understand monoclonal antibodies and their applications
CO BP605.4T	To get of enzymes and their uses by immobilization
CO BP605.5T	Know Use of microorganisms in fermentation technology
CO BP605.6T	To understand recombinant DNA technology and its use in production of pharmaceuticals



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Quality Assurance– Theory

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP606.1T	Describe the significance of quality in pharmaceutical manufacturing.
CO BP606.2T	Explain Current Good Manufacturing Practices
CO BP606.3T	Describe various aspects of documentation, SOPs and records
CO BP606.4T	Elaborate on the role of validation in assurance of quality in pharmaceutical industry
CO BP606.5T	Explain about quality by design
CO BP606.6T	Explain about ICH guidelines in stability testing and QMS

Medicinal chemistry III – Practical

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP607.1P	To be able to operate structure-drawing software as ACDLabs Freeware.





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CO BP607.2P	To be able to search synthetic schemes for few drugs from reference books
CO BP607.3P	To be able to perform several laboratory operations necessary for synthesizing organic molecules by routes involving multiple steps of reactions.
CO BP607.4P	To be able to scale-down the requirements (chemical and apparatus) for synthesis of organic molecules.
CO BP607.5P	To be able to purify synthesized molecules using techniques as crystallization and column chromatography.
CO BP607.6P	To be able to operate structure-drawing software as ACDLabs Freeware.

Pharmacology III – Practical

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP608.1P	Study anti-ulcer activity of a drug using pylorus ligand (SHAY) rat model and NSAIDS induced ulcer model.
CO BP608.2P	Study the effect of drugs on gastrointestinal motility
CO BP608.3P	Understand the effect of agonist and antagonists on guinea pig ileum
CO BP608.4P	Estimate the serum biochemical parameters by using semi- autoanalyser
CO BP608.5P	Study the effect of saline purgative on frog intestine
CO BP608.6P	Study the hypoglycemic effect of insulin in rabbit

Herbal Drug Technology – Practical



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<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP609.1P	Perform preliminary phytochemical screening of crude drugs.
CO BP609.2P	Determine the alcohol content of Asava and Arista
CO BP609.3P	Evaluate the efficacy of excipients of natural origin
CO BP609.4P	Formulate creams, lotions and shampoos using herbal extract and to evaluate them.
CO BP609.5P	Formulate syrups, mixtures and tablets using herbal extract and to evaluate them as per Pharmacopoeial requirements.
CO BP609.6P	Determine Aldehyde content, Phenol content and total alkaloids of herbal preparations.

BP701T Instrumental Methods of Analysis – Theory

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP701.1T	Illustrate the interaction of matter with electromagnetic radiations and
CO BP701.2T	Understand concepts of singlet, doublet and triplet electronic states, internal and external conversions, factors affecting fluorescence, quenching, instrumentation and applications.
CO BP701.3T	Justify applications of interaction of matter with electromagnetic radiation in drug analysis.
CO BP701.4T	Classify the chromatographic separation methods
CO BP701.5T	Choose appropriate chromatographic technique for analysis of drugs
CO BP701.6T	Design methods for performing quantitative & qualitative analysis of drugs using various analytical instruments

BP702T Industrial Pharmacy-II – Theory

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP702.1T	To Know the process of pilot plant and scale up of pharmaceutical dosage form



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CO BP702.2T	To Understand the process of technology transfer from lab scale to commercial batch
CO BP702.3T	To study different Laws and Acts that regulate pharmaceutical industry
CO BP702.4T	To Understand the approval process and regulatory requirements for drug products
CO BP702.5T	To study Quality management systems.
CO BP702.6T	To study SUPAC guidelines.

BP703T Pharmacy Practice – Theory

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP703.1T	To acquire the knowledge on organization of hospitals, various methods of distribution and hospital formulary in hospitals and apply it in the practice of pharmacy.
CO BP703.2T	To outline the organization and structure of community pharmacy and to build ability to design and run own community pharmacy.
CO BP703.3T	To demonstrate the knowledge of therapeutic drug monitoring, patient medication history interview and to apply the knowledge on assessment of drug related problems.
CO BP703.4T	To categorize and evaluate the role of hospital pharmacist in pharmacy and therapeutic committee, drug information services, patient counseling, education and training programmes in hospitals.
CO BP703.5T	To explain the principles of drug store management and inventory control methods during practice.
CO BP703.6T	To interpret clinical laboratory tests of specific disease states to provide better patient centered service.

BP704T Novel Drug Delivery System – Theory

<b>Statement</b>	
<b>The students should be able to:</b>	



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CO BP704.1T	Understand and rationalize fundamentals and polymers used in the design of controlled drug delivery systems.
CO BP704.2T	To outline the concepts of formulation and evaluation of oral, mucosal and implantable drug delivery system. C704.4 To illustrate the principles and fundamentals of drug targeting in the design of site specific drug delivery system.
CO BP704.3T	To develop and study oral, mucosal, dermal, pulmonary and Nasal drug delivery systems over conventional dosage forms for prolonged action.
CO BP704.4T	To illustrate the principles and fundamentals of drug targeting in the design of site specific drug delivery system
CO BP704.5T	To study the importance of site specific drug delivery systems or devices for ocular and intra uterine routes
CO BP704.6T	To predict the rate and maximize therapeutic compliance of site specific drug delivery systems by modifying conventional dosage

BP705P Instrumental Methods of Analysis – Practical

<b>Statement</b>	
<b>The students should be able to:</b>	
CO BP705P.1P	Determine absorption maxima and effect of solvent on absorption maxima of organic compounds
CO BP705P.2P	Calculate assay of Drug product by various methods
CO BP705P.3P	Perform simultaneous estimation of multicomponent formulation by UV spectroscopy
CO BP705P.4P	Study quenching of fluorescence
CO BP705P.5P	Separate drugs by different chromatography techniques.
CO BP705P.6P	Interpret spectra of organic compounds by IR spectroscopy as per pharmacopoeia

BP801T Biostatistics and Research Methodology



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<b>Statement</b>	
<b>The students should be able to:</b>	
BP801T.1T	Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment)
BP801T.2T	Know the operation of Excel
BP801T.3T	Know the operation of M.S. SPSS, R and MINITAB
BP801T.4T	Know the operation of DoE (Design of Experiment)
BP801T.5T	Know the various statistical techniques to solve statistical problems
BP801T.6T	Appreciate statistical techniques in solving the problems.

BP802T Social and Preventive Pharmacy

<b>Statement</b>	
<b>The students should be able to:</b>	
BP802T.1T	To Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.
BP802T.2T	To Have a critical way of thinking based on current healthcare development
BP802T.3T	To Evaluate alternative ways of solving problems related to health and pharmaceutical issues
BP802T.4T	To Recognize the concepts and evaluation of public health.
BP802T.5T	To Identify avoidable habits for personal hygiene and health.
BP802T.6T	

BP803ET Pharma Marketing Management

<b>Statement</b>	
<b>The students should be able to:</b>	



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BP803.1ET	To understand different concepts of sales and marketing.
BP803.2ET	To identify marketing mix for pharmaceutical products.
BP803.3ET	To classify different types of sales promotion.
BP803.4ET	To examine pharmaceutical marketing channels.
BP803.5ET	To compare pricing of the pharmaceutical products.
BP803.6ET	To adapt to emerging concepts of marketing.

BP809ET Cosmetic Science

<b>Statement</b>	
<b>The students should be able to:</b>	
BP809.1ET	Understand the concepts of cosmetics, anatomy of skin v/s hair, general excipients used in cosmetics and the concept of cosmeceuticals, difference between cosmetics & cosmeceuticals.
BP809.2ET	Explain formulation of cosmetics for skin & evaluation of creams like cold cream, vanishing cream etc.
BP809.3ET	Explain formulation of cosmetics for hair, manufacturing & evaluation of hair shampoos, chemistry and formulation of hair dye
BP809.4ET	Understand formulation of oral care products.
BP809.5ET	Study role of herbs in cosmetics for skin, hair and oral care.
BP809.6ET	Understand the concept of Quasi and OTC drug, principle of seumeter, corneometer.