

**BHARATI VIDYAPEETH (DEEMED TO BE UNIVERSITY)**

**POONA COLLEGE OF PHARMACY, PUNE**

**Course Outcomes for B. Pharm. (CBCS-2019 Course PCI) (Program Code: 922)**

<b>Year Semester:</b> First Year B. Pharm. Semester I
<b>Subject Name:</b> Human anatomy and Physiology-I (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20653
<b>Course Outcomes:</b>
CO1: Explain the terminologies related to human anatomy and physiology.
CO2: Discuss the anatomy and physiology of various systems of the human body.
CO3: Identify bones, joints and study their anatomy and physiology.
CO4: Relate the synchronous working of organs and use of modern technologies for evaluating physiological functions.
CO5: Interpret the imbalance of homeostasis responsible for various diseases.
CO6: Outline environmental conditions implied in lifestyle disorders.
<b>Year Semester:</b> First Year B. Pharm. Semester I
<b>Subject Name:</b> Pharmaceutical Analysis (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20654
<b>Course Outcomes:</b>
CO1: Understand the classification of different analytical techniques useful in drug analysis
CO2: Integrate physicochemical and electrochemical properties of drugs with analytical methods
CO3: Comprehend the importance of potential errors and apply strategies for its reduction
CO4: Remember the principle, advantages, challenges, and applications of electrochemical analysis
CO5: Describe principle and application of titrimetric methods
CO6: Choose the appropriate titrimetric/instrumental technique for evaluation of samples.
<b>Year Semester:</b> First Year B. Pharm. Semester I
<b>Subject Name:</b> Pharmaceutics (Theory)
<b>Course:</b> 2019 Syllabus (PCI)

<b>Course Code:</b> 20655
<b>Course Outcomes:</b>
CO1: Evaluate the prescription for rational drug therapy
CO2: Explain principles of modern dispensing practices
CO3: Recommend patients about pharmaceutical dosage forms
CO4: Compound and dispense dosage forms
CO5: Practice ethics in community pharmacy
CO6: Apply basic principles and calculations in formulation development
<b>Year Semester:</b> First Year B. Pharm. Semester I
<b>Subject Name:</b> Pharmaceutical Inorganic Chemistry (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20656
<b>Course Outcomes:</b>
CO1: Describe the relevance and significance of inorganic chemistry with reference to pharmaceutical sciences
CO2: Refer official Pharmacopoeias to detect impurities.
CO3: Understand monographs of inorganic pharmaceuticals.
CO4: Review the official electrolytes intended for replacement therapy and maintaining acid-base balance.
CO5: Discuss and apply the physicochemical properties, assay, and uses of inorganic gastrointestinal agents.
CO6: Gain information about measurement of radioactivity and handling of radioactive pharmaceutical substances
<b>Year Semester:</b> First Year B. Pharm. Semester I
<b>Subject Name:</b> Communication Skill (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21322
<b>Course Outcomes:</b>
CO1: Develop behavioural traits to function effectively in pharmaceutical operations.
CO2: Develop effective communication skill.
CO3: Organize and manage the team as a team player
CO4: Apply effective writing and listening skill at personal and professional level.
CO5: Communicate in interviews confidently.
CO6: Demonstrate entrepreneurship capabilities meticulously to succeed in today's competitive world.

<b>Year Semester:</b> First Year B. Pharm. Semester I
<b>Subject Name:</b> Remedial Mathematics (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21326
<b>Course Outcomes:</b>
CO1: To apply the theory and application statistics in Pharmacy
CO2: To develop problem solving approach by applying statistical theories
CO3: To apply of calculus differentiation and analytical geometry in pharmaceutical statistical data analysis.
CO4: To understand basic statistical concepts such as partial fraction, logarithms, function, limit and continuity and their application for problem solving.
CO5: To analyze matrices and determinant and their related equations.
CO6: To apply chemical kinetics and solving pharmacokinetics equations for given set of data
<b>Year Semester:</b> First Year B. Pharm. Semester I
<b>Subject Name:</b> Human anatomy and Physiology-I (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20657
<b>Course Outcomes:</b>
CO1: Examine blood samples for hematological parameters and correlate with clinical conditions
CO2: Measure and interpret the blood pressure and heart rate by different techniques.
CO3: Identify bones and explain their anatomy and physiology.
CO4: Describe the histology of various tissues.
CO5: Determine blood group and explain its significance.
CO6: Communicate effectively the importance of hematological parameters and healthcare to the society.
<b>Year Semester:</b> First Year B. Pharm. Semester I
<b>Subject Name:</b> Pharmaceutical Analysis (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20658
<b>Course Outcomes:</b>
CO1: Understand the significance of calibration in analytical chemistry and awareof safety measures

CO2: Identify inorganic impurities and discuss the principles of limit tests as per IP
CO3: Describe the principle involved in various electrochemical analytical methods for drug analysis
CO4: Prepare and standardize different reagents as per IP
CO5: Demonstrate analytical skills for evaluation of drugs by titrimetric methods
CO6: Observe, record, and communicate experimental data
<b>Year Semester:</b> First Year B. Pharm. Semester I
<b>Subject Name:</b> Pharmaceutics (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20659
<b>Course Outcomes:</b>
CO1: Interpret prescription
CO2: Apply skills in compounding and dispensing of pharmaceutical dosage forms
CO3: Counsel the patients for appropriate use of medicines
CO4: Understand the fundamentals of dosage forms
CO5: Maintain patient medication records
CO6: Create patient counselling aids
<b>Year Semester:</b> First Year B. Pharm. Semester I
<b>Subject Name:</b> Pharmaceutical Inorganic Chemistry (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21321
<b>Course Outcomes:</b>
CO1: Comprehend basic practical terms and concepts used inorganic chemistry.
CO2: Apply the monograph of pharmaceuticals from official compendia.
CO3: Prepare and determine purities of inorganic compounds.
CO4: Identify impurities in pharmaceutical compounds as per Indian Pharmacopoeia
CO5: Apply expertise intended for identification of official compounds
CO6: Compute, analyse and record data.
<b>Year Semester:</b> First Year B. Pharm. Semester I
<b>Subject Name:</b> Communication Skill (Practical)

<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21323
<b>Course Outcomes:</b>
CO1: Develop behavioral traits to function effectively in pharmaceutical operations.
CO2: Communicate confidently with a good understanding of people's skills.
CO3: Apply effective writing and listening skills at personal and professional level.
CO4: Illustrate presentation skills.
CO5: Communicate in interviews confidently.
CO6: Apply email etiquette in professional set up.
<b>Year Semester:</b> First Year B. Pharm. Semester II
<b>Subject Name:</b> Human Anatomy and Physiology-II (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20660
<b>Course Outcomes:</b>
CO1: Explain the structure and functions of various systems of the human body.
CO2: Describe the synchronous working of various organs and systems.
CO3: Outline modern technologies for evaluating physiological functions.
CO4: Understand the concept of imbalance of homeostasis in diseases.
CO5: Correlate the impact of social and environmental factors on body systems.
CO6: Comprehend the common disorders prevalent in the society.
<b>Year Semester:</b> First Year B. Pharm. Semester II
<b>Subject Name:</b> Pharmaceutical Organic Chemistry-I (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20661
<b>Course Outcomes:</b>
CO1: Write the structure and IUPAC name of the organic compound.
CO2: Understand method of preparation, reactions, kinetics, stereochemistry and stability of alkanes, alkenes, and conjugated dienes.
CO3: Illustrate and differentiate nucleophilic substitution reactions.
CO4: Demonstrate method of preparation and reactions of carbonyl compounds.
CO5: Interpret acidity and basicity of different carboxylic acids and aliphatic amines.

CO6: Describe structure, uses and qualitative tests of different organic compounds.
<b>Year Semester:</b> First Year B. Pharm. Semester II
<b>Subject Name:</b> Biochemistry (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20662
<b>Course Outcomes:</b>
CO1: Paraphrase structure- function relationship of bio-molecules from living system.
CO2: Recognize the importance of metabolism and regulation of pathways with reference to homeostasis of key metabolites.
CO3: Identify the structural elements of carbohydrates, proteins and lipids along with their physiological role.
CO4: Summarize enzymes as biocatalyst
CO5: Understand bioenergetics in biochemical reaction.
CO6: Describe DNA manipulation, inheritance and recombinant DNA technology.
<b>Year Semester:</b> First Year B. Pharm. Semester II
<b>Subject Name:</b> Pathophysiology (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20663
<b>Course Outcomes:</b>
CO1: Understand the etiopathogenesis of diseases.
CO2: Correlate the pathological changes with clinical course and identify therapeutic targets.
CO3: Summarize the signs and symptoms of diseases.
CO4: Describe conventional and modern techniques for diagnosis of diseases.
CO5: Interpret the complications of diseases and their implications in society.
CO6: Communicate effectively the measures for prevention of diseases to the society.
<b>Year Semester:</b> First Year B. Pharm. Semester II
<b>Subject Name:</b> Computer Applications in Pharmacy (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21433
<b>Course Outcomes:</b>
CO1: Understand applications of computer in pharmacy.

CO2: Describe the types of databases and number systems
CO3: Apply Information Systems and Softwares in planning and project management
CO4: Employ use of bioinformatics in vaccine discovery
CO5: Use various Web technologies
CO6: Analyze preclinical data using Computer
<b>Year Semester:</b> First Year B. Pharm. Semester II
<b>Subject Name:</b> Environmental Sciences (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21434
<b>Course Outcomes:</b>
CO1: Understand basics of environment and its associated problems.
CO2: Summarise the ethical, cross-cultural, and historical context of environmental issues
CO3: Develop concern and awareness about environmental problems.
CO4: Evaluate and apply the tools to attain harmony with Nature.
CO5: Apply knowledge in environment protection and environment improvement.
CO6: Recommend solution for identified environmental problems.
<b>Year Semester:</b> First Year B. Pharm. Semester II
<b>Subject Name:</b> Human Anatomy and Physiology-II (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20664
<b>Course Outcomes:</b>
CO1: Understand the role of special sense organs.
CO2: Explain the anatomy and physiology of various human systems with simulated models.
CO3: Interpret the physiological feedback mechanisms.
CO4: Describe the histology of various organs and tissues.
CO5: Determine the respiratory volumes and assess its implications in respiratory diseases.
CO6: Communicate effectively the importance of different family planning devices to the society.
<b>Year Semester:</b> First Year B. Pharm. Semester II
<b>Subject Name:</b> Pharmaceutical Organic Chemistry-I (Practical)

<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20665
<b>Course Outcomes:</b>
CO1: Recognize colour/Odor and detect the elements present in the organic compound.
CO2: Perform solubility test of different organic compounds.
CO3: Analyze organic compounds qualitatively having different functional groups.
CO4: Prepare solid derivatives of different organic compounds.
CO5: Identify organic compounds and their derivatives using melting and boiling point.
CO6: Construct molecular models.
<b>Year Semester:</b> First Year B. Pharm. Semester II
<b>Subject Name:</b> Biochemistry (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21432
<b>Course Outcomes:</b>
CO1: Develop skills for handling laboratory instruments and biological samples.
CO2: Estimate proteins, sugars and Vitamins.
CO3: Isolate and characterize proteins.
CO4: Describe and evaluate of kinetic parameters and factors affecting enzymatic reaction.
CO5: Qualitative identification of carbohydrates and amino acids
CO6: Compute, analyze and record biochemical data.
<b>Year Semester:</b> First Year B. Pharm. Semester II
<b>Subject Name:</b> Computer Applications in Pharmacy (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21435
<b>Course Outcomes:</b>
CO1: Apply use of MS WORD and MS Access
CO2: Create web page and documents
CO3: Design product information leaflet using software
CO4: Create patient database
CO5: Retrieve the information of a drug using online tools



CO6: Create and work with queries in MS access
<b>Year Semester:</b> Second Year B. Pharm. Semester III
<b>Subject Name:</b> Pharmaceutical Organic Chemistry-II (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20666
<b>Course Outcomes:</b>
CO1: Write the structure and IUPAC name of the organic compound.
CO2: Understand method of preparation, reactions, kinetics, stereochemistry and stability of alkanes, alkenes, and conjugated dienes.
CO3: Illustrate and differentiate nucleophilic substitution reactions.
CO4: Demonstrate method of preparation and reactions of carbonyl compounds.
CO5: Interpret acidity and basicity of different carboxylic acids and aliphatic amines.
CO6: Describe structure, uses and qualitative tests of different organic compounds.
<b>Year Semester:</b> Second Year B. Pharm. Semester III
<b>Subject Name:</b> Physical Pharmaceutics I (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20667
<b>Course Outcomes:</b>
CO1: Understand physicochemical properties of drugs and excipients.
CO2: Use modern analytical tools to assess physicochemical properties of drugs
CO3: Relate physicochemical properties of pharmaceuticals for formulation design.
CO4: Classify and analyse drug complexes.
CO5: Justify the role of stable formulations for effective therapeutic outcome.
CO6: Analyze and tackle problems encountered in formulation development.
<b>Year Semester:</b> Second Year B. Pharm. Semester III
<b>Subject Name:</b> Pharmaceutical Microbiology (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20668
<b>Course Outcomes:</b>
CO1: Apply techniques for identification of microorganisms.

CO2: Understand process of sterilization and disinfection
CO3: Explain aseptic conditions in pharmaceutical laboratories as per GLP
CO4: Describe microbiological standardization and sterility testing of pharmaceuticals.
CO5: Review cell culture technology in pharmacy.
CO6: Create social awareness regarding biohazards.
<b>Year Semester:</b> Second Year B. Pharm. Semester III
<b>Subject Name:</b> Pharmaceutical Engineering (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20669
<b>Course Outcomes:</b>
CO1: Understand and conceptualize significance of pharmaceutical unit operations.
CO2: Apply material handling techniques.
CO3: Describe unit processes involved in pharmaceutical manufacturing.
CO4: Employ approaches to prevent environmental pollution.
CO5: Design plant layout for optimum use of resources.
CO6: Recommend methods to minimize corrosion in pharmaceutical industries.
<b>Year Semester:</b> Second Year B. Pharm. Semester III
<b>Subject Name:</b> Pharmaceutical Organic Chemistry II (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21436
<b>Course Outcomes:</b>
CO1: Recognize color/odor and detect the elements present in the organic compound.
CO2: Perform solubility test of different organic compounds.
CO3: Analyze organic compounds qualitatively having different functional groups.
CO4: Prepare solid derivatives of different organic compounds.
CO5: Identify organic compounds and their derivatives using melting and boiling point.
CO6: Record, compute and analyse the data.
<b>Year Semester:</b> Second Year B. Pharm. Semester III
<b>Subject Name:</b> Physical Pharmaceutics I (Practical)

<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21437
<b>Course Outcomes:</b>
CO1: Evaluate physicochemical properties of drug molecules using modern analytical tools.
CO2: Understand significance of physicochemical properties of pharmaceuticals in formulation development.
CO3: Estimate stability constant of complexes.
CO4: Justify use of buffers in pharmaceutical and biological systems.
CO5: Compute, analyse and record data.
CO6: Identify and tackle problems encountered in formulation development by working in a team.
<b>Year Semester:</b> Second Year B. Pharm. Semester III
<b>Subject Name:</b> Pharmaceutical Microbiology (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21438
<b>Course Outcomes:</b>
CO1: Use microscopes for pharmaceutical research.
CO2: Identify and isolate various microorganisms.
CO3: Apply sterilization and disinfection techniques in pharmacy.
CO4: Determine efficacy of antibiotics using microbial testing.
CO5: Implement ethical practices in microbial laboratory.
CO6: Compute, analyse and record data.
<b>Year Semester:</b> Second Year B. Pharm. Semester III
<b>Subject Name:</b> Pharmaceutical Engineering (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21439
<b>Course Outcomes:</b>
CO1: Demonstrate pharmaceutical unit operations
CO2: Explain the functioning of pharmaceutical equipments.
CO3: Select and recommend appropriate pharmaceutical packaging materials.
CO4: Apply the concept of industrial safety.
CO5: Select cost effective process to quality products.

CO6: Comprehend the various safety precautions in pharmaceutical industries.
<b>Year Semester:</b> Second Year B. Pharm. Semester IV
<b>Subject Name:</b> Pharmaceutical Organic Chemistry III (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20670
<b>Course Outcomes:</b>
CO1. Understand the principles and procedures of synthesis of drugs
CO2. Explain need and basic principle and applications of different chemical synthesis and methods thereof.
CO3. Have knowledge of the chemistry of the organic pharmaceuticals
CO4. Appreciate the importance of organic pharmaceuticals in preventing and curing the disease.
CO5. To highlight the nature of the organic compounds used in Pharmaceuticals as drugs
CO6. Critical understanding of key reactions used in synthesis of therapeutics.
<b>Year Semester:</b> Second Year B. Pharm. Semester IV
<b>Subject Name:</b> Medicinal Chemistry I (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20671
<b>Course Outcomes:</b>
CO 1. Understand the chemistry of drugs with respect to their pharmacological activity
CO 2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs alkanes, alkenes and conjugated dienes.
CO 3. Know the Structural Activity Relationship (SAR) of different class of drugs
CO 4. Write the chemical synthesis of some drugs
CO 5. Knowledge about the mechanism pathways of different class of medicinal compounds
CO6. Helps in correlating between pharmacology of a disease and its mitigation or cure.
<b>Year Semester:</b> Second Year B. Pharm. Semester IV
<b>Subject Name:</b> Physical Pharmaceutics II (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20672
<b>Course Outcomes:</b>

CO1: Understand physicochemical properties of drugs and excipients.
CO2: Use modern analytical tools to assess physicochemical properties of drugs
CO3: Relate physicochemical properties of pharmaceuticals for formulation design.
CO4: Apply principles of chemical kinetics in stability testing and estimation of shelf life of formulations.
CO5: Understand factors governing stability of finished pharmaceutical products.
CO6: Analyze and tackle problems encountered in formulation development.
<b>Year Semester:</b> Second Year B. Pharm. Semester IV
<b>Subject Name:</b> Pharmacology I (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20673
<b>Course Outcomes:</b>
CO1: Describe the fundamental concepts of pharmacology.
CO2: Explain the pharmacological basis of therapeutics.
CO3: Comprehend the concept of adverse effects and drug interactions.
CO4: Justify correlation of pharmacology with other bio medical sciences.
CO5: Apply the pharmacological knowledge in the prevention and treatment of various diseases.
CO6: Recommend to the society about measures to minimize adverse drug effects and drug interactions.
<b>Year Semester:</b> Second Year B. Pharm. Semester IV
<b>Subject Name:</b> Pharmacognosy and Phytochemistry I (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20674
<b>Course Outcomes:</b>
CO1: Understand the concept of Pharmacognosy, drug classification.
CO2: Reviewing the evaluation techniques for the herbal drug.
CO3: Discuss Cultivation, Collection, Processing, and storage of drugs of natural origin.
CO4: Explain the role of Pharmacognosy in various systems of medicine.
CO5: Comprehend the concept of plant tissue culture.
CO6: Explain about various primary, secondary metabolites, natura fibers and marine drugs.
<b>Year Semester:</b> Second Year B. Pharm. Semester IV

<b>Subject Name:</b> Medicinal Chemistry I (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21440
<b>Course Outcomes:</b>
CO 1. Recognize color/odor and detect the elements present in the organic compound.
CO 2. Perform solubility test of different organic compounds.
CO 3. Analyze organic compounds qualitatively having different functional groups.
CO 4. Prepare solid derivatives of different organic compounds.
CO 5. Identify organic compounds and their derivatives using melting and boiling point.
CO6. Record, compute and analyse the data.
<b>Year Semester:</b> Second Year B. Pharm. Semester IV
<b>Subject Name:</b> Physical Pharmaceutics II (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21441
<b>Course Outcomes:</b>
CO1: Evaluate physicochemical properties of drug molecules using modern analytical tools.
CO2: Understand significance of various physicochemical properties of drug molecules in formulation development.
CO3: Estimate chemical kinetic parameters.
CO4: Calculate shelf life of pharmaceuticals.
CO5: Compute, analyse and record data.
CO6: Identify and tackle problems encountered in formulation development by working in a team.
<b>Year Semester:</b> Second Year B. Pharm. Semester IV
<b>Subject Name:</b> Pharmacology I (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21442
<b>Course Outcomes:</b>
CO1: Outline the basic concepts of experimental pharmacology.
CO2: Explain maintenance of laboratory animals as per CPCSEA guidelines.
CO3: Observe the effect of drugs using simulated experiments.
CO4: Design appropriate laboratory technique for preclinical studies.

CO5: Illustrate the importance of preclinical screening in drug discovery process.
CO6: Apply the experimental pharmacology concepts for environmental sustainability.
<b>Year Semester:</b> Second Year B. Pharm. Semester IV
<b>Subject Name:</b> Pharmacognosy and Phytochemistry I (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21443
<b>Course Outcomes:</b>
CO1: Analyze and identify crude drugs based chemical tests.
CO2: Evaluating various leaf constants.
CO3: Experimenting the dimensions of starch grains.
CO4: Plan and execute Lycopodium spore method of evaluation.
CO5: Estimating dimensions of natural fibres.
CO6: Assessing various physicochemical properties of crude drugs.
<b>Year Semester:</b> Third Year B. Pharm. Semester V
<b>Subject Name:</b> Medicinal Chemistry II (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20675
<b>Course Outcomes:</b>
CO1: Understand the chemistry of drugs with respect to their pharmacological activity.
CO2: Understand the drug metabolic pathways, adverse effect, and therapeutic value of drugs.
CO3: Know the Structural Activity Relationship of different class of drugs.
CO4: Study the chemical synthesis of selected drugs.
CO5: Sketch the structure and name the drugs and their intermediates
CO6: Explain mechanism of action of various categories of drugs
<b>Year Semester:</b> Third Year B. Pharm. Semester V
<b>Subject Name:</b> Industrial Pharmacy I (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20676
<b>Course Outcomes:</b>

CO1: Know the various pharmaceutical dosage forms and their manufacturing techniques.
CO2: Know various considerations in development of pharmaceutical dosage forms
CO3: Formulate solid, liquid, and semisolid dosage forms and evaluate them for their quality
CO4: Review evaluation parameters of pharmaceutical dosage forms and cosmetics
CO5: Identify appropriate quality control equipments for pharmaceuticals.
CO6: Select and recommend appropriate packaging for solid dosage form
<b>Year Semester:</b> Third Year B. Pharm. Semester V
<b>Subject Name:</b> Pharmacology-II (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20677
<b>Course Outcomes:</b>
CO1: Identify drug targets considering pathophysiology of diseases.
CO2: Correlate the molecular basis of drug action with clinical uses.
CO3: Understand the adverse effects and drug interactions.
CO4: Suggest appropriate drug therapy for diseases comparing efficacy, safety and cost-effectiveness of drug therapy.
CO5: Apply appropriate bioassay to demonstrate its action on specific receptor.
CO6: Recommend measures for prevention and management of inflammatory and lifestyle diseases.
<b>Year Semester:</b> Third Year B. Pharm. Semester V
<b>Subject Name:</b> Pharmacognosy and Phytochemistry II (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20678
<b>Course Outcomes:</b>
CO1: Understand production of secondary metabolites in higher plants.
CO2: Reviewing the role of radioactive isotopes in the investigation of Biogenetic studies.
CO3: Comprehend the composition, chemistry, and role of secondary metabolites.
CO4: Discuss Isolation, Identification and Analysis of Phytoconstituents.
CO5: Estimation, Industrial production, and utilization of phytoconstituents.
CO6: Explain methods of extraction and isolation.
<b>Year Semester:</b> Third Year B. Pharm. Semester V



<b>Subject Name:</b> Pharmaceutical Jurisprudence (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20679
<b>Course Outcomes:</b>
CO1: Understand Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
CO2: Explain the role of regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
CO3: Apply and practice the code of ethics during the pharmaceutical practice
CO4: Comprehend various Indian Pharmaceutical Acts and Laws
CO5: Discuss the Right to Information Act for the benefit of society
CO6: Illustrate various Intellectual Property Rights.
<b>Year Semester:</b> Third Year B. Pharm. Semester V
<b>Subject Name:</b> Industrial Pharmacy I (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21444
<b>Course Outcomes:</b>
CO1: Review of marketed drug products of various dosage forms.
CO2: Justify the composition, containers, labels, expiry period, economy, acceptance drug Products.
CO3: Formulate solid, liquid, semisolid dosage forms and cosmetics preparations
CO4: Select appropriate manufacturing equipment's.
CO5: Evaluate quality of pharmaceuticals and cosmetics
CO6: Adapt Good Laboratory Practices
<b>Year Semester:</b> Third Year B. Pharm. Semester V
<b>Subject Name:</b> Pharmacology II (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21445
<b>Course Outcomes:</b>
CO1: Understand the importance of use of animals in drug discovery and development
CO2: Apply ethical principles in animal experimentation.
CO3: Outline the principles and applications of bioassay and demonstrate various receptor actions using isolated tissue preparation.
CO4: Justify the need of alternatives to animals.

CO5: Demonstrate computer simulated animal experiments.
CO6: Appreciate correlation of pharmacology with related medical sciences
<b>Year Semester:</b> Third Year B. Pharm. Semester V
<b>Subject Name:</b> Pharmacognosy and Phytochemistry II (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21446
<b>Course Outcomes:</b>
CO1: Analyze and identify crude drugs based on Morphology, histology, and powder characteristics
CO2: Experimenting isolation & detection of active principles from crude drugs.
CO3: Experimenting separation of sugar by paper chromatography
CO4: Plan and execute TLC of herbal extract
CO5: Design Distillation of volatile oils and detection of phytoconstituents by TLC
CO6: Evaluate crude drugs by chemical tests
<b>Year Semester:</b> Third Year B. Pharm. Semester VI
<b>Subject Name:</b> Medicinal Chemistry III (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20680
<b>Course Outcomes:</b>
CO1: Understand the importance of drug design and different techniques of drug design
CO2: Understand the chemistry of drugs with respect to their biological activity.
CO3: Know the metabolism, adverse effects and therapeutic value of drugs.
CO4: Know the importance of SAR of drugs.
CO5: Understand the principles of drug design and QSAR.
CO6: Explain the principles of combinatorial chemistry and microwave assisted drug synthesis
<b>Year Semester:</b> Third Year B. Pharm. Semester VI
<b>Subject Name:</b> Pharmacology III (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20681
<b>Course Outcomes:</b>

CO1: Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases
CO2: Illustrate the clinical uses of drugs.
CO3: Analyze the adverse effects and drug interactions with measures to minimize them.
CO4: Appreciate correlation of pharmacology with related medical sciences.
CO5: Sensibilise the society about use of nasal decongestants and pumps used for asthma
CO6: Comprehend the principles of toxicology and treatment of various poisoning
<b>Year Semester:</b> Third Year B. Pharm. Semester VI
<b>Subject Name:</b> Herbal Drug Technology (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20682
<b>Course Outcomes:</b>
CO1: Understand the concept of herbal raw material its cultivation, processing, and product development
CO2: Describe Biodynamic Agricultural practices
CO3: Summarize the concept of Indian Systems of Medicine
CO4: Exemplify Patenting, Regulatory requirements of natural products and herbal drug industry
CO5: Explain about herbal cosmetics, excipients, formulations, and herb drug interactions.
CO6: Discuss WHO and ICH guidelines for evaluation of herbal drugs
<b>Year Semester:</b> Third Year B. Pharm. Semester VI
<b>Subject Name:</b> Biopharmaceutics and Pharmacokinetics (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20683
<b>Course Outcomes:</b>
CO1: Understand the basic concepts and significance in biopharmaceutics
CO2: Describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
CO3: Apply the concepts of bioavailability and bioequivalence of drug products.
CO4: Articulate pharmacokinetic parameters, their significance & applications.
CO5: Design Bioavailability-Bioequivalence study protocol for New Drug Application and Abbreviated New Drug Application
CO6: Review the role of biopharmaceutics in drug development.
<b>Year Semester:</b> Third Year B. Pharm. Semester VI

<b>Subject Name:</b> Pharmaceutical Biotechnology (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20684
<b>Course Outcomes:</b>
CO1: Recall types, characteristics, and origin of DNA, RNAs and genetic code.
CO2: Illustrate techniques involved in DNA manipulation
CO3: Demonstrate recombinant DNA technology and its applications in pharmacy
CO4: Review antigen-antibody reactions and immune responses
CO5: Explain enzyme immobilization techniques and fermentation process
CO6: Enculcate biotechnological aptitude and values required for self-motivated, lifelong learning and professional development.
<b>Year Semester:</b> Third Year B. Pharm. Semester VI
<b>Subject Name:</b> Pharmaceutical Quality Assurance (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20685
<b>Course Outcomes:</b>
CO1: Understand the concept of Quality control, Quality assurance and cGMP in a pharmaceutical industry
CO2: Understand the principles and procedures of NABL accreditation
CO3: Explain the concept of QbD, ISO standardization and Quality Management System
CO4: Apply good documentation practices and good laboratory practices in pharmaceutical industry
CO5: Implement knowledge in validation and calibration of pharma equipment and instruments
CO6: Practice ethics and inculcate human values in pharma sector
<b>Year Semester:</b> Third Year B. Pharm. Semester VI
<b>Subject Name:</b> Medicinal chemistry III (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21447
<b>Course Outcomes:</b>
CO1: Apply principles of organic chemistry for synthesis of intermediates and drugs.
CO2: Apply principles of quantitative analysis of drugs
CO3: Determine physicochemical parameters like partition coefficient, MR, and dissociation constant
CO4: Apply microwave assisted techniques for synthesis of drug and drug intermediates

CO5: Sketch the structures and reactions using Softwares
CO6: Compute, analyse and record the observations
<b>Year Semester:</b> Third Year B. Pharm. Semester VI
<b>Subject Name:</b> Pharmacology III (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21448
<b>Course Outcomes:</b>
CO1: Understand the importance of animal experimentation in drug discovery and development.
CO 2: Understand the ex- vivo experiments
CO 3 :Analyze the effect of drugs on GIT
CO 4: Appreciate correlation of toxicology in drug discovery
CO 5 : Justify the need of alternatives to animals
CO6: Demonstrate computer simulated animal experiments.
<b>Year Semester:</b> Third Year B. Pharm. Semester VI
<b>Subject Name:</b> Herbal Drug Technology (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 21449
<b>Course Outcomes:</b>
CO1: Experimenting Phytochemical screening of crude drugs Analyze Interpret Experimenting
CO2: Develop and evaluate herbal cosmetics.
CO3: Determination of the alcohol content of Asava and Arishta
CO4: Formulate herbal formulations and their standardization and evaluate the excipients of natural origin.
CO5: Analyze monographs of herbal drugs from recent Pharmacopoeia
CO6: Experimenting aldehyde content, phenol content and total alkaloid.
<b>Year Semester:</b> Final Year B. Pharm. Semester VII
<b>Subject Name:</b> Instrumental Methods of Analysis (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20686
<b>Course Outcomes:</b>
CO1: Comprehend the basic concepts of UV visible spectroscopy and IR spectroscopy

CO2: Understand and apply the chromatographic separation for analysis of drugs.
CO3: Describe the basics of Fluorimetry, Flame photometry, atomic absorption and Nepheloturbidometry techniques and their applications
CO4: Explain instrumentation and their functions of spectroscopic and chromatographic instruments.
CO5: Elaborate the protocols for quantitative and qualitative analysis of drugs using various analytical instruments.
CO6: Select and apply suitable instrumental analytical techniques to assess purity and safety of pharmaceuticals for the benefit of society
<b>Year Semester:</b> Final Year B. Pharm. Semester VII
<b>Subject Name:</b> Industrial Pharmacy II (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20687
<b>Course Outcomes:</b>
CO1: Know the process of pilot plant and scale up of pharmaceutical dosage forms.
CO2: Understand the process of technology transfer from lab scale to commercial batch.
CO3: Know different Laws and Acts that regulate pharmaceutical industry.
CO4: Recognize the approval process and regulatory requirements for drug products.
CO5: Understand and able to apply principles of quality management systems.
CO6: Know organization structure and responsibilities of Indian regulatory agencies.
<b>Year Semester:</b> Final Year B. Pharm. Semester VII
<b>Subject Name:</b> Pharmacy Practice (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20688
<b>Course Outcomes:</b>
CO1: Describe the stores management and inventory control
CO2: Recognize and explain roles and responsibilities of hospital pharmacist
CO3: Prepare relevant drug or medicine information and counsel the patients
CO4: Solve and manage Adverse Drug Reactions
CO5: Formulate evidence-based drug information for better practices to be followed by physicians.
CO6: Justify and appraise quality assurance of pharmaceutical care services

<b>Year Semester:</b> Final Year B. Pharm. Semester VII
<b>Subject Name:</b> Novel Drug Delivery System (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20689
<b>Course Outcomes:</b>
CO1: Apply different approaches for development of novel drug delivery systems.
CO2: Explore the criteria for selection of drugs and polymers for development of novel drug delivery systems.
CO3: Understand controlled and sustained drug delivery systems along with approaches for their development.
CO4: Evaluate various Novel drug delivery systems including transdermal, nasopulmonary, targeted and gastroprotective drug delivery system.
CO5: Analyze the formulation and evaluation parameters of various novel drug delivery systems.
CO6: Remember the need, design and concept of customized sustained and controlled release dosage forms.
<b>Year Semester:</b> Final Year B. Pharm. Semester VII
<b>Subject Name:</b> Instrumental Methods of Analysis (Practical)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20690
<b>Course Outcomes:</b>
CO1: Perform suitable analytical technique to assess purity and safety of pharmaceuticals
CO2: Design protocol for quantitative analysis of drugs and formulations
CO3: Handle selected analytical instruments
CO4: Demonstrate HPLC and Gas chromatography
CO5: Apply problem solving approach in pharmaceutical analysis
CO6: Compute, analyse and record data
<b>Year Semester:</b> Final Year B. Pharm. Semester VIII
<b>Subject Name:</b> Biostatistics and Research Methodology (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20691
<b>Course Outcomes:</b>
CO1: Know the operation of M.S. Excel, SPSS, R and MINITAB®
CO2: Understand the concept of DoE (Design of Experiment)

CO3: Know the various statistical techniques to solve statistical problems
CO4: Appreciate statistical techniques in solving the problems.
CO5: Develop biostatistical aptitude and values required for self-motivated, lifelong learning and professional development.
CO 6. Develop biostatistical aptitude and values required for self-motivated, lifelong learning and professional development.
<b>Year Semester:</b> Final Year B. Pharm. Semester VIII
<b>Subject Name:</b> Social and Preventive Pharmacy (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20692
<b>Course Outcomes:</b>
CO1: To Identify current issues related to health and pharmaceutical problems within the country and worldwide.
CO2: Recognize Social causes and concept of diseases
CO3: Prepare relevant drug or medicine information and counsel the patients
CO4: Categorize ailments and provide appropriate management
CO5: Formulate alternative ways of solving problems related to health and pharmaceutical issues
CO6: Appraise critical way of thinking based on current healthcare development.
<b>Year Semester:</b> Final Year B. Pharm. Semester VIII
<b>Subject Name:</b> Pharma Marketing Management (Theory)
<b>Course:</b> 2019 Syllabus (PCI)
<b>Course Code:</b> 20693
<b>Course Outcomes:</b>
CO1: Understand the concept of marketing.
CO2: Apply the concept of product management in pharmaceutical industry.
CO3: Assess and design sales promotion technique for a product.
CO4: Recommend appropriate pricing strategy and pharmaceutical marketing channel.
CO5: Recognize role and responsibility of professional sales representative.
CO6: Review the DPCO and NNPA guidelines.
<b>Year Semester:</b> Final Year B. Pharm. Semester VIII
<b>Subject Name:</b> Advanced Instrumentation Techniques (Theory)
<b>Course:</b> 2019 Syllabus (PCI)



**Course Code:** 20701

**Course Outcomes:**

CO1: Comprehend the basic concepts of NMR spectroscopy, Mass spectrometry, Thermal analytical methods, and X ray diffraction techniques.

CO2: Explain instrumentation and their functions of NMR spectroscopy and Mass spectrometry thermal methods and X-ray diffraction

CO3: Understand the principle and methods of extraction, Radioimmunoassay, and hyphenated techniques.

CO4: Describe procedures of calibration of different analytical instruments and validation of analytical methods following ICH and USFDA guidelines

CO5: Develop problem solving skills in basic interpretation aspects of analytical techniques

CO6: Select and apply suitable instrumental analytical techniques to asses purity and safety of pharmaceuticals for the benefit of society