



Course Name: B. Pharmacy

Duration: 4 years

S.No.	Code	Program Outcomes
1	PO1	Pharmacy Knowledge: Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
2	PO2	Planning Abilities: Demonstrate effective planning abilities including time management, resource management, delegation skills and organizational skills. Develop and implement plans and organize work to meet deadlines.
3	PO3	Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice. Find, analyze, evaluate and apply information systematically and shall make defensible decisions.
4	PO4	Modern tool usage: Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
5	PO5	Leadership skills: Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfillment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and well-being.
6	PO6	Professional Identity: Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
7	PO7	Pharmaceutical Ethics: Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behavior that recognizes cultural and personal variability in values, communication and lifestyles. Use ethical frameworks; apply ethical principles while making decisions and take responsibility for the outcomes associated with the decisions.
8	PO8	Communication: Communicate effectively with the pharmacy community and with society at large, such as, being able to comprehend and write effective reports, make effective presentations and documentation, and give and receive clear instructions.
9	PO9	The Pharmacist and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety and legal issues and the consequent responsibilities relevant to the professional pharmacy practice.
10	PO10	Environment and sustainability: Understand the impact of the professional pharmacy solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
11	PO11	Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.



1st Semester Course Outcomes

S.No.	Code	Subject	Course Outcomes
1	BP101T	HUMAN ANATOMY AND PHYSIOLOGY-I (Theory)	<ol style="list-style-type: none">1. Explain the gross morphology, structure and functions of various organs of the human body.2. Describe the various homeostatic mechanisms and their imbalances.3. Identify the various tissues and organs of different systems of human body.4. Perform the various experiments related to special senses and nervous system.5. Appreciate coordinated working pattern of different organs of each system
2	BP102T	PHARMACEUTICAL ANALYSIS (Theory)	<ol style="list-style-type: none">1. Understand the principles of volumetric and electro chemical analysis2. Carryout various volumetric and electrochemical titrations3. Develop analytical skills
3	BP103T	PHARMACEUTICS-I (Theory)	<ol style="list-style-type: none">1. Know the history of profession of pharmacy2. Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations3. Understand the professional way of handling the prescription4. Preparation of various conventional dosage forms
4	BP104T	PHARMACEUTICAL INORGANIC CHEMISTRY (Theory)	<ol style="list-style-type: none">1. Know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals2. Understand the medicinal and pharmaceutical importance of inorganic compounds
5	BP105T	COMMUNICATION SKILLS (Theory)	<ol style="list-style-type: none">1. Understand the behavioural needs for a pharmacist to function effectively in the areas of pharmaceutical operation2. Communicate effectively (Verbal and Non-Verbal)3. Effectively manage the team as a team player4. Develop interview skills5. Develop Leadership qualities and essentials
6	BP 106RBT	REMEDIAL BIOLOGY (Theory)	<ol style="list-style-type: none">1. Know the classification and salient features of five kingdoms of life2. Understand the basic components of anatomy & physiology of plant3. Know understand the basic components of anatomy & physiology animal with special reference to human
7	BP 106RMT	REMEDIAL MATHEMATICS (Theory)	<ol style="list-style-type: none">1. Know the theory and their application in Pharmacy2. Solve the different types of problems by applying theory4. Appreciate the important application of mathematics in Pharmacy



2nd Semester Course Outcomes

S.No.	Code	Subject	Course Outcomes
1	BP 201T	HUMAN ANATOMY AND PHYSIOLOGY-II (Theory)	<ol style="list-style-type: none">1. Explain the gross morphology, structure and functions of various organs of the human body.2. Describe the various homeostatic mechanisms and their imbalances.3. Identify the various tissues and organs of different systems of human body.4. Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.5. Appreciate coordinated working pattern of different organs of each system6. Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body
2	BP202T	PHARMACEUTICAL ORGANIC CHEMISTRY –I (Theory)	<ol style="list-style-type: none">1. Write the structure, name and the type of isomerism of the organic compound2. Write the reaction, name the reaction and orientation of reactions3. Account for reactivity/stability of compounds,4. Identify/confirm the identification of organic compound
3	BP203 T	BIOCHEMISTRY (Theory)	<ol style="list-style-type: none">1. Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.2. Understand the metabolism of nutrient molecules in physiological and pathological conditions.3. Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
4	BP 204T	PATHOPHYSIOLOGY (THEORY)	<ol style="list-style-type: none">1. Describe the etiology and pathogenesis of the selected disease states;2. Name the signs and symptoms of the diseases; and3. Mention the complications of the diseases.
5	BP205 T	COMPUTER APPLICATIONS IN PHARMACY (Theory)	<ol style="list-style-type: none">1. Know the various types of application of computers in pharmacy2. Know the various types of databases3. Know the various applications of databases in pharmacy
6	BP 206 T	ENVIRONMENTAL SCIENCES (Theory)	<ol style="list-style-type: none">1. Create the awareness about environmental problems among learners.2. Impart basic knowledge about the environment and its allied problems.3. Develop an attitude of concern for the environment.4. Motivate learner to participate in environment protection and environment improvement.5. Acquire skills to help the concerned individuals in identifying and solving environmental problems.



3rd Semester Course Outcomes

S.No.	Code	Subject	Course Outcomes
1	BP301T	PHARMACEUTICAL ORGANIC CHEMISTRY –II (Theory)	<ol style="list-style-type: none">1. Write the structure, name and the type of isomerism of the organic compound2. Write the reaction, name the reaction and orientation of reactions3. Account for reactivity/stability of compounds,4. Prepare organic compounds
2	BP302T	PHYSICAL PHARMACEUTICS-I (Theory)	<ol style="list-style-type: none">1. Understand various physicochemical properties of drug molecules in the designing the dosage forms2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms
3	BP 303 T	PHARMACEUTICAL MICROBIOLOGY (Theory)	<ol style="list-style-type: none">1. Understand methods of identification, cultivation and preservation of various microorganisms2. To understand the importance and implementation of sterilization in pharmaceutical processing and industry3. Learn sterility testing of pharmaceutical products.4. Carried out microbiological standardization of Pharmaceuticals.5. Understand the cell culture technology and its applications in pharmaceutical industries.
4	BP 304 T	PHARMACEUTICAL ENGINEERING (Theory)	<ol style="list-style-type: none">1. To know various unit operations used in pharmaceutical industries.2. To understand the material handling techniques.3. To perform various processes involved in pharmaceutical manufacturing process.4. To carry out various test to prevent environmental pollution.5. To appreciate and comprehend significance of plant lay out design for optimum use of resources.6. To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.



4th Semester Course Outcomes

S.No.	Code	Subject	Course Outcomes
1	BP401T	PHARMACEUTICAL ORGANIC CHEMISTRY –III (Theory)	<ol style="list-style-type: none">1. Understand the methods of preparation and properties of organic compounds2. Explain the stereo chemical aspects of organic compounds and stereo chemical reactions3. Know the medicinal uses and other applications of organic compounds
2	BP402T	MEDICINAL CHEMISTRY – I (Theory)	<ol style="list-style-type: none">1. Understand the chemistry of drugs with respect to their pharmacological activity2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs3. Know the Structural Activity Relationship (SAR) of different class of drugs4. Write the chemical synthesis of some drugs
3	BP 403 T	PHYSICAL PHARMACEUTICS-II (Theory)	<ol style="list-style-type: none">1. Understand various physicochemical properties of drug molecules in the designing the dosage forms2. Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations3. Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.
4	BP 404 T	PHARMACOLOGY-I (Theory)	<ol style="list-style-type: none">1. Understand the pharmacological actions of different categories of drugs2. Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.3. Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.4. Observe the effect of drugs on animals by simulated experiments5. Appreciate correlation of pharmacology with other bio medical sciences
5	BP 405 T	PHARMACOGNOSY AND PHYTOCHEMISTRY I (Theory)	<ol style="list-style-type: none">1. To know the techniques in the cultivation and production of crude drugs2. To know the crude drugs, their uses and chemical nature3. Know the evaluation techniques for the herbal drugs4. To carry out the microscopic and morphological evaluation of crude drugs



5th Semester Course Outcomes

S.No.	Code	Subject	Course Outcomes
1	BP501T	MEDICINAL CHEMISTRY – II (Theory)	<ol style="list-style-type: none">1. Understand the chemistry of drugs with respect to their pharmacological activity2. Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs3. Know the Structural Activity Relationship of different class of drugs4. Study the chemical synthesis of selected drugs
2	BP 502 T	INDUSTRIAL PHARMACY-I (Theory)	<ol style="list-style-type: none">1. Know the various pharmaceutical dosage forms and their manufacturing techniques.2. Know various considerations in development of pharmaceutical dosage forms3. Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality
3	BP503 T	PHARMACOLOGY-II (Theory)	<ol style="list-style-type: none">1. Understand the mechanism of drug action and its relevance in the treatment of different diseases2. Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments3. Demonstrate the various receptor actions using isolated tissue preparation4. Appreciate correlation of pharmacology with related medical sciences
4	BP504 T	PHARMACOGNOSY AND PHYTOCHEMISTRY II (Theory)	<ol style="list-style-type: none">1. To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents2. To understand the preparation and development of herbal formulation.3. To understand the herbal drug interactions4. To carryout isolation and identification of phytoconstituents
5	BP 505 T	PHARMACEUTICAL JURISPRUDENCE (Theory)	<ol style="list-style-type: none">1. The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.2. Various Indian pharmaceutical Acts and Laws3. The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals4. The code of ethics during the pharmaceutical practice



6th Semester Course Outcomes

S.No.	Code	Subject	Course Outcomes
1	BP601T	MEDICINAL CHEMISTRY – III (Theory)	<ol style="list-style-type: none">1. Understand the importance of drug design and different techniques of drug design.2. Understand the chemistry of drugs with respect to their biological activity.3. Know the metabolism, adverse effects and therapeutic value of drugs.4. Know the importance of SAR of drugs.
2	BP602 T	PHARMACOLOGY-III (Theory)	<ol style="list-style-type: none">1. Understand the mechanism of drug action and its relevance in the treatment of different infectious diseases2. Comprehend the principles of toxicology and treatment of various poisonings and3. Appreciate correlation of pharmacology with related medical sciences.
3	BP 603 T	HERBAL DRUG TECHNOLOGY (Theory)	<ol style="list-style-type: none">1. Understand raw material as source of herbal drugs from cultivation to herbal drug product2. Know the WHO and ICH guidelines for evaluation of herbal drugs3. Know the herbal cosmetics, natural sweeteners, nutraceuticals4. Appreciate patenting of herbal drugs, GMP
4	BP 604 T	BIOPHARMACEUTICS AND PHARMACOKINETICS (Theory)	<ol style="list-style-type: none">1. Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance.2. Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.3. To understand the concepts of bioavailability and bioequivalence of drug products and their significance.4. Understand various pharmacokinetic parameters, their significance
5	BP 605 T	PHARMACEUTICAL BIOTECHNOLOGY (Theory)	<ol style="list-style-type: none">1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries2. Genetic engineering applications in relation to production of pharmaceuticals3. Importance of Monoclonal antibodies in Industries4. Appreciate the use of microorganisms in fermentation technology
6	BP 606T	PHARMACEUTICAL QUALITY ASSURANCE (Theory)	<ol style="list-style-type: none">1. Understand the cGMP aspects in a pharmaceutical industry2. Appreciate the importance of documentation3. Understand the scope of quality certifications applicable to pharmaceutical industries4. Understand the responsibilities of QA & QC departments



7th Semester Course Outcomes

S.No.	Code	Subject	Course Outcomes
1	BP701T	INSTRUMENTAL METHODS OF ANALYSIS (Theory)	<ol style="list-style-type: none">1. Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis2. Understand the chromatographic separation and analysis of drugs.3. Perform quantitative & qualitative analysis of drugs using various analytical instruments.
2	BP 702 T	INDUSTRIAL PHARMACY-II(Theory)	<ol style="list-style-type: none">1. Know the process of pilot plant and scale up of pharmaceutical dosage forms2. Understand the process of technology transfer from lab scale to commercial batch3. Know different Laws and Acts that regulate pharmaceutical industry4. Understand the approval process and regulatory requirements for drug products
3	BP 703 T	PHARMACY PRACTICE (Theory)	<ol style="list-style-type: none">1. Know various drug distribution methods in a hospital2. Appreciate the pharmacy stores management and inventory control3. Monitor drug therapy of patient through medication chart review and clinical review4. Obtain medication history interview and counsel the patients5. Identify drug related problems6. Detect and assess adverse drug reactions7. Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states8. Know pharmaceutical care services9. Do patient counselling in community pharmacy10. Appreciate the concept of Rational drug therapy
4	BP 704 T	NOVEL DRUG DELIVERY SYSTEMS (Theory)	<ol style="list-style-type: none">1. To understand various approaches for development of novel drug delivery systems.2. To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation



8th Semester Course Outcomes

S.No.	Code	Subject	Course Outcomes
1	BP801T	BIOSTATISTICS AND RESEARCH METHODOLOGY (Theory)	<ol style="list-style-type: none">1. Know the operation of M.S. Excel, SPSS, R and MINITAB DoE (Design of Experiment)2. Know the various statistical techniques to solve statistical problems3. Appreciate statistical techniques in solving the problems.
2	BP 802T	SOCIAL AND PREVENTIVE PHARMACY(Theory)	<ol style="list-style-type: none">1. Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.2. Have a critical way of thinking based on current healthcare development.3. Evaluate alternative ways of solving problems related to health and pharmaceutical issues
3	BP803ET	PHARMA MARKETING MANAGEMENT (Theory)	<ol style="list-style-type: none">1. The course aims to provide an understanding of marketing concepts and techniques and their applications in the pharmaceutical industry
4	BP804ET	PHARMACEUTICAL REGULATORY SCIENCE (Theory)	<ol style="list-style-type: none">1. Know about the process of drug discovery and development2. Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals3. Know the regulatory approval process and their registration in Indian and international markets



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S.No.	Code	Subject	Course Outcomes
5	BP 805T	PHARMACOVIGILANCE (Theory)	<ol style="list-style-type: none">1. Why drug safety monitoring is important?2. History and development of pharmacovigilance3. National and international scenario of pharmacovigilance4. Dictionaries, coding and terminologies used in pharmacovigilance5. Detection of new adverse drug reactions and their assessment6. International standards for classification of diseases and drugs7. Adverse drug reaction reporting systems and communication in pharmacovigilance8. Methods to generate safety data during pre clinical, clinical and post approval phases of drugs' life cycle9. Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation10. Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India11. ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning12. CIOMS requirements for ADR reporting13. Writing case narratives of adverse events and their quality.
6	BP 806 ET	QUALITY CONTROL AND STANDARDIZATION OF HERBALS (Theory)	<ol style="list-style-type: none">1. Know WHO guidelines for quality control of herbal drugs2. Know Quality assurance in herbal drug industry3. Know the regulatory approval process and their registration in Indian and international markets4. Appreciate EU and ICH guidelines for quality control of herbal drugs
7	BP 807 ET	COMPUTER AIDED DRUG DESIGN (Theory)	<ol style="list-style-type: none">1. Design and discovery of lead molecules2. The role of drug design in drug discovery process3. The concept of QSAR and docking4. Various strategies to develop new drug like molecules.5. The design of new drug molecules using molecular modeling software



S.No.	Code	Subject	Course Outcomes
8	BP808ET	CELL AND MOLECULAR BIOLOGY (Theory)	<ol style="list-style-type: none">1. Summarize cell and molecular biology history.2. Summarize cellular functioning and composition.3. Describe the chemical foundations of cell biology.4. Summarize the DNA properties of cell biology.5. Describe protein structure and function.6. Describe cellular membrane structure and function.7. Describe basic molecular genetic mechanisms.8. Summarize the Cell Cycle
9	BP809ET	COSMETIC SCIENCE (Theory)	<ol style="list-style-type: none">1. Understand the design and properties of Cosmetics.2. Understand the effect of cosmetics on human body
10	BP810 ET	PHARMACOLOGICAL SCREENING METHODS (Theory)	<ol style="list-style-type: none">1. Appreciate the applications of various commonly used laboratory animals.2. Appreciate and demonstrate the various screening methods used in preclinical research3. Appreciate and demonstrate the importance of biostatistics and research methodology Design and execute a research hypothesis independently
11	BP 811 ET	ADVANCED INSTRUMENTATION TECHNIQUES (Theory)	<ol style="list-style-type: none">1. Understand the advanced instruments used and its applications in drug analysis2. Understand the chromatographic separation and analysis of drugs.3. Understand the calibration of various analytical instruments4. Know analysis of drugs using various analytical instruments.
12	BP 812 ET	DIETARY SUPPLEMENTS AND NUTRACEUTICALS	<ol style="list-style-type: none">1. Understand the need of supplements by the different group of people to maintain healthy life.2. Understand the outcome of deficiencies in dietary supplements.3. Appreciate the components in dietary supplements and the application.4. Appreciate the regulatory and commercial aspects of dietary supplements including health claims.
13	Semester VIII	ELECTIVE COURSE ON PHARMACEUTICAL PRODUCT DEVELOPMENT	<ol style="list-style-type: none">1. Understand the various product development techniques2. Understand the Optimization techniques in pharmaceutical product development