



# VIGNAN

**INSTITUTE OF PHARMACEUTICAL TECHNOLOGY**

(Approved By AICTE, PCI New Delhi & Affiliated to JNTUK - Kakinada)

An ISO 9001:2015, ISO 14001:2015 & OHSAS 18001:2007 Certified Institution

## **Program Outcomes:**

Program outcomes are statements conveying the intent of a program of study. Specifically, program outcomes refer to what a student should know or be able to do at the end of a program. They are often seen as the knowledge and skills students will have obtained by the time, they have received their intended degree.

### **Program Outcomes for Bachelor of Pharmacy (B.Pharmacy) Program**

- 1. Pharmacy Knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioural, social, and administrative pharmacy sciences; and manufacturing practices.
- 2. 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. 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. 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. Leadership skills:** Understand and consider the human reaction to change, motivation issues, leadership and team-building when planning changes required for fulfilment of practice, professional and societal responsibilities. Assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing.
- 6. 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. Pharmaceutical Ethics:** Honour personal values and apply ethical principles in professional and social contexts. Demonstrate behaviour 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. 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. 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. 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. 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.

## Course Outcomes:

Course Outcomes are narrower statements that describe what students are expected to know, and be able to do at the end of each course. These relate to the skills, knowledge, and behaviour that students acquire in their enrolment through the course.

Name of the Course	Course Code	Course Outcome Code	Course Outcome Statements
Human Anatomy and Physiology-I	BP101T	BP101T.1	Explain the gross morphology, structure and functions of various organs of the human body.
		BP101T.2	Summarize the various homeostatic mechanisms and their imbalances
		BP101T.3	Distinguish various tissues and organs of different systems of human body
		BP101T.4	Illustrate coordinated working pattern of different organs of each system
Pharmaceutical Analysis- I	BP102T	BP102T.1	Understand the concept of standardization by volumetric methods.
		BP102T.2	Understand the analysis of some compounds by gravimetric method.
		BP102T.3	Explain the concept of standardization and assays using oxidation – reduction titrations.
		BP102T.4	Summarize the principles of electro chemical methods
Pharmaceutics-I	BP103T	BP103T.1	Recognise and interpret various parts of prescription
		BP103T.2	Summarize the basics of compounding and dispensing of Solid, liquid and semisolid dosage forms.
		BP103T.3	Understand the pharmaceutical incompatibilities and pharmaceutical calculations
		BP103T.4	Know the history of profession of pharmacy and development of pharmacy in India
Pharmaceutical Inorganic Chemistry	BP104T	BP104T.1	Recognize the sources of impurities and Methods to control and determine the impurities in inorganic drugs and pharmaceuticals.
		BP104T.2	Classify and enlist inorganic pharmaceuticals based on their use.
		BP104T.3	Know the properties and assay methods for inorganic compounds with medicinal uses.
		BP104T.4	Understand the preparation, safe, effective usage and handling of pharmaceutical important inorganic compounds and radioactive pharmaceuticals.
Communication Skills	BP105T	BP105T.1	Illustrate the life of eminent personalities for developing the skill of vocabulary and grammar
		BP105T.2	Examine the technological advancements with major emphasis on biographical details
		BP105T.3	Discuss the art of thinking and writing clearly and

			logically
		BP105T.4	Correlate the importance of environment and sustainability with an emphasis on language skills
		BP105T.5	Review the relevance of cultures and traditions for enhancing writing skills through literature
Remedial Biology/ Remedial Mathematics	BP106T	BP106T.1	Apply mathematical concepts and principles to perform computations for pharmaceutical sciences
		BP106T.2	Create, use and analyze mathematical representations and mathematical relationships.
		BP106T.3	Communicate mathematical knowledge and understanding to help in the field of Pharmacy.
		BP106T.4	Summarize the classification and salient features of five kingdoms of life
		BP106T.5	Discuss the basic components of anatomy & physiology of plant
		BP106T.6	Explain the basic components of anatomy & physiology animal with special reference to human
Human Anatomy and Physiology-I Practical	BP107P	BP107P.1	Outline the microscopic characteristics of various tissues.
		BP107P.2	Identify the skeletal structure of human body
		BP107P.3	Estimate the various haematological parameters such as WBC, RBC, BT, CT, Hb, ESR and Blood group
		BP107P.4	Determine the various physical parameters such as BP, Pulse, Heart rate
Pharmaceutical Analysis- I Practical	BP108P	BP108P.1	Perform Limit tests
		BP108P.2	Carryout electrochemical titrations
		BP108P.3	Develop analytical skills
		BP108P.4	Perform Quantitative analysis of various drugs by volumetric analysis
Pharmaceutics-I Practical	BP109P	BP109P.1	Review basic requirements in the compounding and dispensing of pharmaceutical products
		BP109P.2	Demonstrate skill in the operation of common pharmaceutical measuring, weighing and compounding devices.
		BP109P.3	Identify and differentiate between various solid and liquid dosage forms for oral and topical use.
		BP109P.4	Describe the advantages and disadvantages of various solid, liquid and semisolid dosage forms.

Pharmaceutical Inorganic Chemistry Practical	BP110P	BP110P.1	Identify and control the impurities like Chlorides, sulphates, iron, heavy metals and arsenic in pharmaceuticals
		BP110P.2	Plan the preparation of inorganic pharmaceuticals mentioned in syllabus
		BP110P.3	Test for the presence of few anions and cations present in inorganic pharmaceuticals
		BP110P.4	Perform the tests for purity for pharmaceuticals as per procedure mentioned in Indian Pharmacopoeia
Communication Skills Practical	BP111P	BP111P.1	Dramatize the roles with proper body language
		BP111P.2	Interact with others by using proper functions
		BP111P.3	Disseminate the relevant skills while performing GDs, interviews and proper body language
		BP111P.4	Organize proper skills for their employability
Remedial Biology Practical	BP112P	BP112P.1	Understand the handling of microscope and permanent slide preparation technique.
		BP112P.2	Explain the structure of cell and its inclusions.
		BP112P.3	Identify various plant parts, and to organize their modifications
		BP112P.4	Assess the microscopical study and identification of tissues pertinent to stem, root, leaf, seed, fruit and flower.
Human Anatomy and Physiology II	BP201T	BP201T.1	Explain the gross anatomy and physiology of Central Nervous System
		BP201T.2	Illustrate the different structure and function of digestive, endocrine, urinary, respiratory, reproductive systems.
		BP201T.3	Judge the various disorders of human body
		BP201T.4	Discuss the structure & importance of genetic materials.
Pharmaceutical Organic Chemistry I	BP202T	BP202T.1	Understand the nomenclature , classification, structure , preparation and uses of organic compounds
		BP202T.2	Explain the reaction, mechanism and applications of reactions
		BP202T.3	Apply knowledge on identification of organic compounds
		BP202T.4	Explain the acidity and basicity of organic compounds
Biochemistry	BP203T	BP203T.1	Outline the concepts of biological oxidation, bioenergetics and Biomolecule.
		BP203T.2	Acquire chemistry and biological importance of biological macromolecules ( Carbohydrates & Lipids).
		BP203T.3	Understand the importance of Metabolism of nucleic acids and protein biosynthesis.
		BP203T.4	Explain the application of enzyme inhibition in pharmaceutical industry.

Pathophysiology	BP204T	BP204T.1	Explain the basic principles and mechanism involved in the Cell injury, Adaptation, inflammation and repair.
		BP204T.2	Identify the ethology and pathogenesis of the human infectious diseases and cancer.
		BP204T.3	Judge the various possible treatments for the pathogenic diseases.
		BP204T.4	Discuss the signs, symptoms and complications of the diseases
Computer Applications in Pharmacy	BP205T	BP205T.1	Apply the knowledge of web technologies for comparative analysis of results in pharmaceutical and clinical studies
		BP205T.2	Design and develop solutions to analyze pharmaceutical problems using computers.
		BP205T.3	Apply the knowledge of MS office, Excel, Power point and Access for pharmaceutical and clinical studies
		BP205T.4	Solve and work with a professional context pertaining to ethics, social, cultural and regulations with regard to Pharmacy.
Environmental Sciences	BP206T	BP206T.1	Acquire knowledge about the environment and its allied problems.
		BP206T.2	Develop an attitude of concern for the environment.
		BP206T.3	Explain about environmental problems.
		BP206T.4	Identify and solve environmental problems.
Human Anatomy and Physiology II Practical	BP207P	BP207P.1	Explain the human organ systems, pregnancy diagnosis test & family planning devices with the help of models, charts and specimens.
		BP207P.2	Demonstrate the function of olfactory nerve, visual acuity, reflex activity, positive and negative feedback mechanism.
		BP207P.3	Examine the Permanent slides of vital organs and gonads.
		BP207P.4	Determine the basal mass index, body temperature, tidal volume, vital capacity & blood count
Pharmaceutical Organic Chemistry I Practical	BP208P	BP208P.1	Identify the functional group and extra elements of unknown organic compound by using systematic qualitative analysis
		BP208P.2	Prepare and characterize the derivatives of organic compound
		BP208P.3	Analyse the unknown organic compound by determining their melting point / boiling point
		BP208P.4	Construct and identify the molecular models

Biochemistry Practical	BP209P	BP209P.1	Detect and identify proteins, amino acids and carbohydrates by various qualitative as well as quantitative tests.
		BP209P.2	Determine the blood creatinine, sugar & serum total cholesterol
		BP209P.3	Prepare the buffer solution and measurement of pH
		BP209P.4	Demonstrate action of salivary amylase on starch
Computer Applications in Pharmacy Practical	BP210P	BP210P.1	Apply the knowledge of statistical tools for comparative analysis of results in pharmaceutical and clinical studies
		BP210P.2	Design and develop solutions to analyze pharmaceutical problems using computers.
		BP210P.3	Apply the knowledge of MS office, Excel, Power point and Access for pharmaceutical and clinical studies
		BP210P.4	Solve and work with a professional context pertaining to ethics, social, cultural and regulations with regard to Pharmacy.
Pharmaceutical Organic Chemistry-II	BP301T	BP301T.1	Summarize the rules of aromaticity, preparation, reactivity, orientation and reactions of benzene and polynuclear hydrocarbons
		BP301T.2	Explain the structure and medicinal uses of pharmaceutical organic compounds
		BP301T.3	Identify the purity of fats and oils by acid value, saponification value and iodine value
		BP301T.4	Understand the concept of Baeyer's strain theory and Sachse Mohr theory
Physical Pharmaceutics- I	BP302T	BP302T.1	Understand various physicochemical properties of drug molecules in designing the dosage form
		BP302T.2	Describe different states of matter and the concept of interfacial phenomena with their properties
		BP302T.3	Explain complexation with drugs based on their physicochemical properties for showing its action
		BP302T.4	Understand the importance of pH, buffers and buffer system in pharmaceutical and biological system
Pharmaceutical Microbiology	BP303T	BP303T.1	Understand diversity of microorganisms with relevance to their nutritional and physical growth requirements for culturing
		BP303T.2	Identify bacteria by staining and biochemical reactions and apply controlling methods
		BP303T.3	Categorize disinfecting agents and analyze concentration of disinfectants, antibiotics, vitamins etc., using microorganisms
		BP303T.4	Classify types of spoilage and assess source of contamination in pharmaceutical products



Pharmaceutical Engineering	BP304T	BP304T.1	Demonstrate basic concepts in unit operations used in pharmaceutical industries.
		BP304T.2	Enumerate the principles, construction, working, mechanisms and applications of equipment used in laboratory and industry.
		BP304T.3	Sort out the suitable equipment, environmental condition and material for the plant construction for manufacturing of bulk drugs and formulations.
		BP304T.4	Appreciate various preventive methods used for corrosion, analyze problems occurring in the preparation of bulk drugs and formulations.
Pharmaceutical Organic Chemistry-II Practical	BP305P	BP305P.1	Demonstrate the different recrystallization and steam distillation techniques used in pharmaceutical chemistry.
		BP305P.2	Estimate the analytical constants of fats and oils.
		BP305P.3	Plan and perform the synthesis of organic compounds by using named reactions.
		BP305P.4	prepare, purify, calculate theoretical and percentage yields of organic compound derivatives.
Physical Pharmaceutics- I Practical	BP306P	BP306P.1	Understand the physical properties of drug substances
		BP306P.2	Determine the solubility, pKa
		BP306P.3	Estimate the surface tension, HLB value, CMC and adsorption constant
		BP306P.4	Analyse complexation between donor and acceptor
Pharmaceutical Microbiology Practical	BP307P	BP307P.1	Prepare and sterilize the different culture media
		BP307P.2	Isolate the pure cultures of microorganisms and identify the microorganisms by staining and biochemical tests
		BP307P.3	Determine the concentration of antibiotics by microbiological assay
		BP307P.4	Assess the quality of pharmaceuticals by sterility testing
Pharmaceutical Engineering Practical	BP308P	BP308P.1	Perform basic unit operations used in pharmaceutical industries.
		BP308P.2	Demonstrate of the equipment used laboratory and industry.
		BP308P.3	Determine specific constants of materials used in industry.
		BP308P.4	Select the suitable equipment and environmental condition for manufacturing of bulk drugs and formulations.

Pharmaceutical Organic Chemistry III	BP401T	BP401T.1	Explain the stereochemical aspects of organic compounds and stereochemical reactions
		BP401T.2	Assign the relative, absolute and geometrical configurations to stereoisomers
		BP401T.3	Outline on nomenclature, aromaticity, reactivity, methods of preparation reactions and uses of heterocyclic compounds
		BP401T.4	Elaborate on the reaction and synthetic importance of metal hydrides (NaBH <sub>4</sub> & LiAlH <sub>4</sub> ), Clemmensen reduction, Oppenauer oxidation and Beckmann rearrangement
Medicinal Chemistry I	BP402T	BP402T.1	Categorize the importance of Physicochemical properties and metabolism of significant drugs
		BP402T.2	Explain the mechanism of action of drugs and their therapeutic uses
		BP402T.3	Differentiate rational uses, side effects of drugs acting on Autonomic and Central nervous system
		BP402T.4	Identify the SAR and Synthesis of various therapeutic agents
Physical Pharmaceutics II	BP403T	BP403T.1	Understand various physicochemical properties of drug molecules in the designing the dosage form
		BP403T.2	Describe the chemical kinetics and to use them for stability testing and determination of expiry date of formulations
		BP403T.3	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms
		BP403T.4	Outline the properties and evaluation of coarse and colloidal dispersions
Pharmacology I	BP404T	BP404T.1	Explain the pharmacological & molecular mechanism of actions of different categories of drugs
		BP404T.2	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases
		BP404T.3	Relate the use, adverse reaction, contraindication, drug interaction of various drugs
		BP404T.4	Summarize the importance of pharmacology, pharmacovigilance and drug discovery process
Pharmacognosy and Phytochemistry I	BP405T	BP405T.1	Explain the scope and evolution of Pharmacognosy and rephrase role of herbal drugs in traditional systems of medicine
		BP405T.2	Summarize the chemical nature, uses and evaluation of crude drugs
		BP405T.3	Plan on cultivation, collection and processing of drugs of natural origin
		BP405T.4	List the medicinal uses of marine drugs and compare the morphological characteristics of market samples with the authentic drugs



Medicinal Chemistry I Practical	BP406P	BP406P.1	Describe the importance of laboratory reagents, their quality and biohazardous nature, green chemicals for the protection of environment
		BP406P.2	Categorize the type of assays and apparatus used
		BP406P.3	Establish the use of chemicals in different quantities for a synthetic reaction with safety precautions and eco-friendly nature
		BP406P.4	Demonstrate the synthetic protocol and purification techniques with good laboratory skills and analyse the yield, results.
Physical Pharmaceutics II Practical	BP407P	BP407P.1	Analyse of micromeritic properties
		BP407P.2	Estimate of viscosity by Ostwald's viscometer and Brookfield viscometer
		BP407P.3	Determine sedimentation volume of suspension
		BP407P.4	Perform kinetic studies
Pharmacology I Practical	BP408P	BP408P.1	Explain the instruments, route of administration, sampling techniques in experimental pharmacology
		BP408P.2	Demonstrate the effect of hepatic microsomal enzyme inducers on the phenobarbitone sleeping time in mice.
		BP408P.3	Determine the effect of drugs on animals by simulated experiments
		BP408P.4	Discuss the importance of anaesthesia, euthanasia and maintenance of laboratory animals as per CPCSEA guidelines
Pharmacognosy and Phytochemistry I Practical	BP409P	BP409P.1	Identify unorganized crude drugs by chemical tests.
		BP409P.2	Evaluate the quality and purity of crude drugs
		BP409P.3	Perform linear measurements for crude drug identification
		BP409P.4	Develop quality control methods for standardisation of herbal drugs.
Medicinal chemistry II	BP501T	BP501T.1	Understand the chemistry of drugs with respect to their pharmacological activity
		BP501T.2	Outline the drug metabolic pathways, adverse effect and therapeutic value of drugs
		BP501T.3	Explain the Structural Activity Relationship of different class of drugs
		BP501T.4	Describe the chemical synthesis of selected drugs

Industrial Pharmacy-I	BP502T	BP502T.1	Understand preformulation parameters of drug and excipients on the stability and bioavailability of formulations
		BP502T.2	Outline various excipients, methods used in the preparation of various dosage forms and its evaluation
		BP502T.3	Apply preformulation considerations in development of various dosage forms
		BP502T.4	Analyze the formulation and packaging of various cosmetics preparations and packaging materials used in pharmacy
Pharmacology II	BP503T	BP503T.1	Recognize Appropriate drugs for effective treatment of various hormone related complications.
		BP503T.2	Identify the relative pros and cons in the use of drugs for various cardiac complications.
		BP503T.3	Identify major classes of drugs currently used in medical practice for treatment of allergic reactions
		BP503T.4	Summarize the theoretical considerations and principle of biological assays
		BP503T.5	Recognize various urine forming agents in treatment of urinary disorders
Pharmacognosy and Phytochemistry II	BP504T	BP504T.1	Outline techniques employed in the elucidation of biosynthetic pathway and formation of different secondary metabolites through these pathways.
		BP504T.2	Summarize the source, chemistry and therapeutic/commercial applications of secondary metabolites
		BP504T.3	Choose the suitable method of isolation and identification for various phytoconstituents
		BP504T.4	Compare and contrast the techniques used in the isolation, identification and analysis of crude drugs
Pharmaceutical Jurisprudence	BP505T	BP505T.1	Understand Indian pharmaceutical laws
		BP505T.2	Explain various regulatory authorities governing the manufacture and sale of pharmaceuticals
		BP505T.3	Explain offenses and penalties related to various acts
		BP505T.4	Understand various schedules related to the profession of pharmacy in India
Industrial Pharmacy-I Practical	BP506P	BP506P.1	Plan preformulation studies for API
		BP506P.2	Prepare and evaluate tablets, capsules.
		BP506P.3	Prepare Parenterals, ophthalmic and Cosmetic products
		BP506P.4	Evaluate marketed tablets, capsules, glass containers

Pharmacology II Practical	BP507P	BP507P.1	Understand the pharmacological actions of different categories of drugs.
		BP507P.2	Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels.
		BP507P.3	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
		BP507P.4	Appreciate correlation of pharmacology with other bio medical sciences.
		BP507P.5	Observe the effect of drugs on animals by simulated experiments.
Pharmacognosy and Phytochemistry II Practical	BP508P	BP508P.1	Identify crude drugs by morphological and microscopical characteristics
		BP508P.2	Isolate phytoconstituents from crude drug and Experiment with Paper and Thin Layer Chromatography
		BP508P.3	Analyze volatile oils isolated by distillation.
		BP508P.4	Evaluate unorganized crude drugs by chemical tests.
Medicinal chemistry III	BP601T	BP601T.1	Understand the importance of drug design and different techniques of drug design
		BP601T.2	Understand the mechanism of action and chemistry of drugs with respect to their biological activity
		BP601T.3	Explain the synthesis, metabolism, adverse effects and therapeutic value of drugs
		BP601T.4	Outline classification and SAR of drugs
Pharmacology III	BP602T	BP602T.1	Predict the basic principles of toxicology and clinically manage the poisoned patient.
		BP602T.2	Analyze the mechanism of action of chemotherapeutic agents and their role in the treatment of various infectious diseases.
		BP602T.3	Analyze biological clocks and circadian rhythms in symptom intensity of chronic diseases
		BP602T.4	Identify the relative pros and cons in the use of drugs for various respiratory and gastrointestinal diseases
Herbal Drug Technology	BP603T	BP603T.1	Explain WHO guidelines for Good agricultural and collection practices of herbal raw materials
		BP603T.2	Categorize various nutraceuticals, herbal cosmetics, herbal excipients, herbal formulations and herb drug interactions
		BP603T.3	Compare and contrast WHO & ICH guidelines for the assessment of herbal drugs
		BP603T.4	Outline patents, regulatory issues of natural products and herbal drug industry.

Biopharmaceutics and Pharmacokinetics	BP604T	BP604T.1	Enumerate the concept of absorption, Distribution & Elimination and their significance in drug kinetics in the body
		BP604T.2	Summarise various regulations related to the developing BA-BE studies for the new drug molecule
		BP604T.3	Estimate various pharmacokinetic parameters of drug by using one or multi compartment models
		BP604T.4	Outline the factors causing non linearity and measure nonlinear kinetics
Pharmaceutical Biotechnology	BP605P	BP605P.1	Understand the design, working and applications of an industrial fermenter
		BP605P.2	Make use of various advanced biotechnology procedure for medical and pharmaceutical applications
		BP605P.3	Summarize the principles of immunity, immunological reactions and production of vaccines
		BP605P.4	Understand the genetic organization of eukaryotes and prokaryotes
Quality Assurance	BP606T	BP606T.1	Understand the cGMP aspects in a pharmaceutical industry
		BP606T.2	Appreciate the importance of documentation
		BP606T.3	Explain the scope of quality certifications applicable to pharmaceutical industries
		BP606T.4	Outline the responsibilities of QA and QC departments
Medicinal chemistry III Practical	BP607P	BP607P.1	Assay the drugs as per the monograph and determine percentage purity.
		BP607P.2	Organize the synthesis of few intermediates using Microwave irradiation protocol.
		BP607P.3	Drawing structures and reactions using chemistry software.
		BP607P.4	Screen a class of drugs in theory course for drug likeliness using drug design software.
Pharmacology III Practical	BP608P	BP608P.1	Appreciate correlation of pharmacology with related medical sciences.
		BP608P.2	Comprehend the principles of toxicology and treatment of various poisonings.
		BP608P.3	Understand the drug action and its relevance in the treatment of different infectious diseases.
		BP608P.4	Identifying the appropriate cause of disorders by computational methods
		BP608P.5	Comprehend the Biostatistical principles in experimental pharmacology

Herbal Drug Technology Pratical	BP609P	BP609T.1	Perform phytochemical screening of the extracts
		BP609T.2	Formulate herbal preparations and herbal cosmetics using standardised extracts
		BP609T.3	Evaluate excipients of natural origin
		BP609T.4	Carryout monograph analysis of herbal drugs
Instrumental Methods of Analysis	BP701T	BP701T.1	Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
		BP701T.2	Understand the chromatographic separation and analysis of drugs
		BP701T.3	Discuss quantitative & qualitative analysis of drugs by using various analytical instruments
		BP701T.4	Outline principles, instrumentations and applications of Electrophoresis
Industrial Pharmacy-II	BP702T	BP702T.1	Outline the process of pilot plant and scale up of pharmaceutical dosage forms
		BP702T.2	Understand the process of technology transfer from lab scale to commercial batch
		BP702T.3	Summarize different laws and acts that regulate pharmaceutical industry
		BP702T.4	Explain the approval process and regulatory requirements for drug products
Pharmacy Practice	BP703T	BP703T.1	Explain Organization of Hospital, Pharmacy therapeutic Comittee and Pros and cons of drug distribution system , Contents of Hospital formulary
		BP703T.2	Classify drug interactions and adverse drug reactions and conduct therapeutic drug monitoring
		BP703T.3	Enumerate the steps involved in Patient Councelling by obtaining medication history interview and performing medication chart review
		BP703T.4	Illustate the role of Pharmacist in interdepartmental communication and community health education, Interpretion of Clinical laboratory results
Novel Drug Delivery System	BP704T	BP704T.1	Understand various approaches for development of Novel drug delivery system
		BP704T.2	Outline the criteria for selection of drugs and polymers for development of Microencapsulation, Mucosal,Implantaable drug delivery systems
		BP704T.3	Summarize Basic components used,methods and types of formulation in transdermal,Gastroretentive and Nasopulmonary and Targeted drug delivery systems
		BP704T.4	Explain the concepts of Intrauterine systems with its applications , intraocular barriers and formulations

Instrumental Methods of Analysis Practical	BP705P	BP705P.1	Perform quantitative & qualitative analysis of drugs using various analytical instruments.
		BP705P.2	Understand the principles and Perform Chromatographic Separations
		BP705P.3	Demonstrate HPLC
		BP705P.4	Handle analytical instruments
Practice School	BP706PS	BP706PS.1	Understand the importance of realistic learning through practice in various domains such as community pharmacy, drug testing and manufacturing, preclinical testing, clinical practice, patent filing, regulatory filing accounting, green audit and article writing.
		BP706PS.2	Understand aspects of realistic practice in the domain of interest.
		BP706PS.3	Acquire knowledge and skills related to practical learning in the domain of interest.
		BP706PS.4	Analyze the problems encountered during realistic practice and make use of theoretical knowledge to resolve those problems.
Biostatistics and Research Methodology	BP801T	BP801T.1	Explain qualitative and quantitative design of research methodology
		BP801T.2	Interpret the various statistical methods to solve statistical problems
		BP801T.3	Analyze the experiments by using factorial design and design of experiments
		BP801T.4	Determine the measures of central tendency and dispersion, correlation, regression, probability and hypothesis
Social and Preventive Pharmacy	BP802T	BP802T.1	Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.
		BP802T.2	Create awareness on prevention and control of various diseases
		BP802T.3	Have a critical way of thinking based on current healthcare development
		BP802T.4	Evaluate alternative ways of solving problems related to health and pharmaceutical issues
Pharma Marketing Management	BP803ET	BP803ET.1	Understand the quantitative and qualitative aspects of market
		BP803ET.2	Explain the principles of product life cycle and product management in pharmaceutical industry
		BP803ET.3	Develop the concepts in organization, distribution, and marketing
		BP803ET.4	Contract Pharma industry distribution management and tasks.



Pharmaceutical Regulatory Science	BP804ET	BP804ET.1	Understand the process of drug discovery and development
		BP804ET.2	Outline the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
		BP804ET.3	Describe the clinical trials monitoring, GCP, pharmacovigilance
		BP804ET.4	Explain the regulatory approval process and their registration in Indian and international markets
Pharmacovigilance	BP805ET	BP805ET.1	Establish pharmacovigilance centres in hospitals
		BP805ET.2	Appreciate drug evaluation, ICH guidelines CIOMS requirements for ADR reporting
		BP805ET.3	Aware on drug safety monitoring, history and development of Pharmacovigilance
		BP805ET.4	Describe dictionaries used in pharmacovigilance and ICD classification of diseases
Quality Control and Standardization of Herbals	BP806ET	BP806ET.1	Recall the basic tests and quality control tests as per WHO guidelines for evaluating commercial herbal medicines
		BP806ET.2	Explain CGMP, GLP, GAP and GACP for quality assurance in herbal industry as per WHO
		BP806ET.3	Outline research methods as per EU or ICH guidelines for assessing safety, efficacy and QC of herbal medicines
		BP806ET.4	Assess and improve the safety of herbal medicines by markers, pharmacovigilance, herbal pharmacopoeias and other regulatory guidelines.
Computer Aided Drug Design	BP807ET	BP807ET.1	Apply the CADD techniques in various stages of drug discovery
		BP807ET.2	Examine the role of CADD techniques in drug discovery
		BP807ET.3	Analyze the physicochemical properties and the techniques involved in QSAR
		BP807ET.4	Execute the various structure-based drug design methods (Molecular docking, de novo drug design)
Cell and Molecular Biology	BP808ET	BP808ET.1	Make use of microbial or mammalian cellular properties in drug discovery
		BP808ET.2	Apply molecular information in genetic engineering
		BP808ET.3	Categorize regulatory proteins that regulate genes.
		BP808ET.4	Choose an appropriate molecular genetics mechanism in the development of transgenics.

Cosmetic Science	BP809ET	BP809ET.1	Understand the concepts of various classes of cosmetics and cosmeceuticals
		BP809ET.2	Apply the formulation principles in building various skin care, hair care and oral care products
		BP809ET.3	Distinguish the role of herbs in formulating various skin care, hair care and oral care products.
		BP809ET.4	Evaluate various skin care, hair care and oral care cosmetic products.
Experimental Pharmacology	BP810ET	BP810ET.1	Outline various preclinical screening models for diuretics, nootropics, anti- asthmatics and drugs acting on CNS
		BP810ET.2	Construct preclinical screening models for drugs acting on ANS, eye and local anaesthetics
		BP810ET.3	Analyze the preclinical screening models for drug acting on CVS
		BP810ET.4	Compile research methodology and biostatistics.
Advanced Instrumentation Techniques	BP811ET	BP811ET.1	Understand the advanced instruments used and its applications in drug analysis
		BP811ET.2	Apply principles of chromatographic separation in the analysis of drugs
		BP811ET.3	Outline the calibration of various analytical instruments
		BP811ET.4	Explain the analysis of drugs using various analytical instruments
Project Work	BP812PW	BP812PW.1	Select and plan a concept in pharmaceutical sciences for the project.
		BP812PW.2	Adapt appropriate research methodology in developing a project.
		BP812PW.3	Demonstrate the skill of present, exhibit and document project work
		BP812PW.4	Appraise the value of team work to meet societal needs.