



Criteria 2: Teaching-learning and Evaluation

Key Indicator 2.6: Student Performance and Learning Outcomes

2.6.1

Programme Outcomes (POs) and Course Outcomes (COs) for all Programmes offered by the institution are stated and displayed on website



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PROGRAM EDUCATIONAL OBJECTIVES

PEO 1: Knowledge Domain

To generate and dissipate updated knowledge in pharmaceutical and allied fields including; Pharmaceutical chemistry, Pharmaceutics, Pharmacology, Pharmacognosy, Pharmaceutical analysis, Quality assurance, Clinical testing and pharmacovigilance, Microbiology and immunology, Molecular biology and biotechnology, Bio-statistics etc.

PEO 2: Skill Domain

To instil technical, professional, leadership and interpersonal skills in the graduates in pharmaceutical sciences

PEO 3: Values System Domain

- To develop attitude of self-awareness, self-discipline, honesty, empathy, self-motivation, 'lifelong learning', social skills etc by encouraging graduates to organize and participate various activities including workshops, conferences, seminars, symposiums, competitions etc.
- To ingrain creativity, innovation and diverse thinking in the graduates
- To develop entrepreneurial mindset and employability in the graduates



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PROGRAM OUTCOMES

PO1	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
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
PO3	Problem analysis: Utilize the principles of scientific enquiry, thinking analytically, clearly and critically, while solving problems and making decisions during daily practice; and also find, analyze, evaluate and apply information systematically and shall make defensible decisions
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
PO5	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; also assume participatory roles as responsible citizens or leadership roles when appropriate to facilitate improvement in health and wellbeing
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)
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
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
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
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
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; and also self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis

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Name of the Program and Semester	Name of the Course	Course Outcomes
B. Pharm. 1st Semester	BP101T Human anatomy and Physiology-I	<ol style="list-style-type: none"> 1. Understanding of structure and functions of cells, tissues, organs of human body 2. Knowledge about various homeostatic mechanisms and their imbalances 3. Ability to perform various experiments related to special senses and the nervous system 4. Understanding of the coordinated functioning of the various organs of each system
	BP102T Pharmaceutical Analysis-I	<ol style="list-style-type: none"> 1. Understanding of the fundamentals of analytical chemistry 2. Skills to prepare solutions of different strengths 3. Ability to predict and identify the sources of mistakes and errors in analytical chemistry 4. Understanding of the fundamentals of volumetric analytical skills 5. Knowledge of the principles of electrochemical analytical techniques
	BP103T Pharmaceutics-I	<ol style="list-style-type: none"> 1. Know the history of pharmacy profession 2. Understanding of the basics of different pharmaceutical dosage forms 3. Understanding of the concept of posology, and paediatric dose calculation 4. Ability to do pharmaceutical calculations 5. Ability to identify and avoid pharmaceutical incompatibilities 6. Understanding of parts of prescriptions and ability of handling of prescriptions 7. Knowledge of basic methods of preparation and evaluation studies of various conventional dosage forms
	BP104T Pharmaceutical Inorganic Chemistry	<ol style="list-style-type: none"> 1. Knowledge of the sources of impurities and methods of impurities determination in inorganic drugs and pharmaceuticals 2. Understanding of the medicinal and pharmaceutical importance of inorganic compounds 3. Knowledge of different types of diagnostic agents, dialysis fluids and dental products



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		<ol style="list-style-type: none"> Understanding of definitions, methods of preparations and assay procedures of gastrointestinal agents, expectorants, haematinics, astringents and antidotes Knowledge of storage conditions and pharmaceutical applications of radiopharmaceuticals, measurement methods of radioactivity
	BP105T Communication Skills	<ol style="list-style-type: none"> Understanding of the behavioural needs for a pharmacist to function effectively in the areas of pharmaceutical operations Ability to communicate effectively (verbal and non-verbal) Ability to effectively manage the team as a team player Understanding of Do's and Don'ts of an interview Ability to apply communication skills effectively Understanding of essential leadership qualities
	BP106RMT Remedial Maths	<ol style="list-style-type: none"> Understanding of the role and applications of mathematics in pharmacy Ability to solve problems of trigonometry, calculus, and matrices and others Understanding of creative techniques to the solutions of mathematical problems Ability to apply a range of techniques effectively to solve problems including theory of deduction, approximation, and simulation
	BP106RBT Remedial Biology	<ol style="list-style-type: none"> Knowledge of the basic nature of plant and animal cells Understanding of classification of plants and animals Understanding of structures and functions of various plant and animal cells, tissues, and organs systems Knowledge of the 'theory of evolution' Understanding of anatomy and physiology of plants and animals
	BP107P Human anatomy and Physiology Practical	<ol style="list-style-type: none"> Understanding of human anatomy and physiology Understanding of the various physiological processes

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		<ol style="list-style-type: none"> 3. Knowledge of structures and functions of human cells, tissues, organs and systems 4. Ability to do experiments related to special senses and the nervous system
	BP108P Pharmaceutical Analysis-1 Practical	<ol style="list-style-type: none"> 1. Skills to determine concentration of primary standards 2. Skills to do assay and necessary calculations to determine % purity independently 3. Ability to perform electrochemical analysis and do necessary calculations independently
	BP109P Pharmaceutics-I Practical	<ol style="list-style-type: none"> 1. Skills in compounding and dispensing of pharmaceutical dosage forms 2. Understanding of the prescription and commonly used Latin terms in pharmacy practice 3. Ability to prepare monophasic and biphasic liquid formulations independently 4. Skills of compounding, labelling and dispensing of extemporaneous preparations
	BP110P Pharmaceutical Inorganic Chemistry Practical	<ol style="list-style-type: none"> 1. Skills to perform limit test for given sample 2. Ability to perform identification of inorganic salts through various qualitative tests independently 3. Ability to perform tests for purity for different compounds as per IP 4. Knowledge and skills to prepare inorganic salts -boric acid, potash alum and ferrous sulphate
	BP111P Communication Skills Practical	<ol style="list-style-type: none"> 1. Ability to speak and write English impeccably and with enthusiasm 2. Knowledge of different styles of communication 3. Understanding of the nuance of communication 4. Skills of effective presentation 5. Comprehending various aspects of interview skills 6. Ability to design efficient and effective resume, CV, biodata
	BP112RBP Remedial Biology Practical	<ol style="list-style-type: none"> 1. Understanding of functioning of different types of microscopes 2. Knowledge of the functions of cell and tissues 3. Understanding of various equipment and techniques used to check different body part functions



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Name of the Program and Semester	Name of the Course	Course Outcomes
B. Pharm. 2 nd Semester	BP201T Human Anatomy and Physiology-II	<ol style="list-style-type: none"> 1. In-depth Knowledge of gross morphology, structure and functions of various organs of the human body 2. Ability to describe various homeostatic mechanisms and their imbalances 3. Skills to identify the various tissues and organs of different systems of human body 4. Understanding of the coordinated working pattern of different organs of each system 5. Understanding of the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body
	BP202T Pharmaceutical Organic Chemistry-I	<ol style="list-style-type: none"> 1. Knowledge of the classification of organic compounds and nomenclature 2. Understanding of the concept of classification isomerism and explain structural isomerism 3. Knowledge of hybridisation in alkenes, alkenes and stabilities of alkenes, conjugated dienes 4. Understanding of the mechanism, orientation of elimination, Electrophilic, free radical and Nucleophilic addition reaction 5. Knowledge of the mechanism, kinetics, stereochemistry and factors affecting SN1 & SN2 reaction 6. Understanding of the acidity of carboxylic acids and basicity of amines 6. Through understanding of the mechanism of some named reaction
	BP203T Biochemistry	<ol style="list-style-type: none"> 1. Understanding of the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes 2. Understanding of the metabolism of nutrient molecules in physiological and pathological conditions 3. Understanding of the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins



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		<ol style="list-style-type: none"> Knowledge of how physiological conditions influence the structures and re-activities of biomolecules Knowledge of bioenergetics
	BP204T Pathophysiology	<ol style="list-style-type: none"> Knowledge of the etiology and pathogenesis of the disease states Ability to identify signs and symptoms of the different illnesses Ability to find complications of the diseases Understanding of the pathophysiological conditions and its mechanisms
	BP205T Computer Applications in Pharmacy	<ol style="list-style-type: none"> Knowledge of the concept of number system in computers Ability to make use of web technologies such as HTML, XML, CSS, programming languages, Web servers and pharmacy drug database Competency applying computers in pharmacy such as drug information services, pharmacokinetics, mathematical model in drug design, hospital and clinical pharmacy etc. Knowledge of computers for data analysis in preclinical development
	BP206T Environmental Sciences	<ol style="list-style-type: none"> Knowledge of ecological perspective and value of environment Understanding of the significance of various natural resources and its management Comprehensive understanding of world's biodiversity and the importance of its conservation Knowledge of different types of pollutions and their control measures as well as effective methods of waste treatments Ability to analyze global environmental problems and come out with best possible solutions Understanding of environmental laws and sustainable development
	BP207P Human Anatomy and Physiology- II Practical	<ol style="list-style-type: none"> Skills to identify the various tissues and organs of different systems of human body Understanding of the coordinated working pattern of different organs of each system Ability to perform the various experiments related to special senses and nervous system Ability to perform the experiments like neurological reflex, body temperature



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		<p>measurement, olfaction, gustation reflex and eye sight etc.</p> <p>6. Knowledge of application of qualitative test and structure of organic compounds of medicinal importance</p>
	BP208P Pharmaceutical Organic Chemistry-1 Practical	<p>1. Knowledge of safety measures in organic chemistry laboratory and various laboratory techniques</p> <p>2. Understanding of steps involved in identification of unknown organic compound</p> <p>3. Ability to prepare suitable solid derivatives from organic compounds</p> <p>5. Skills to prepare stereo models containing various functional groups</p>
	BP209P Biochemistry Practical	<p>1. Ability to perform qualitative analysis of carbohydrates and proteins, independently</p> <p>2. Ability to estimate blood glucose and blood cholesterol levels, independently</p> <p>3. Skills to perform qualitative analysis of urine for abnormal constituent</p> <p>4. Ability to determine salivary amylase activity and study the effect of temperature on salivary amylase activity, independently</p>
	BP210P Computer Applications in Pharmacy Practical	<p>1. Competency to use MS Word, independently</p> <p>2. Skills to create HTML web page, independently</p> <p>3. Ability to generate MS access database to store the data of patient and drug information, independently</p> <p>4. Ability to create mailing labels using Label wizard in MS Word, independently</p>

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Name of the Program and Semester	Name of the Course	Course Outcomes
B. Pharm. 3rd Semester	BP301T Pharmaceutical Organic Chemistry-II	<ol style="list-style-type: none"> 1. Ability to draw structures, identify names and types of isomerism of organic compounds 2. Knowledge and skill of writing reactions, identifying names of the reactions and solve the problems associated 3. Understanding of reactivity and stability of organic compounds 4. Ability to synthesize organic compounds
	BP302T Physical Pharmaceutics-I	<ol style="list-style-type: none"> 1. Understanding of physicochemical properties of drugs influencing drug product development 2. Knowledge of principles of chemical kinetics and its applications in stability studies and shelf-life determination 5. Ability to related effect of physicochemical properties on performance of drug product
	BP303T Pharmaceutical Microbiology	<ol style="list-style-type: none"> 1. Knowledge of the structures, classifications, and morphology of microorganisms 2. Understanding of the applications of microorganisms in various industries, including pharmaceuticals, food, milk, oil, etc 3. Comprehending the methods of cultivation, preservation, and identification of microorganisms 4. Understanding of the significance of sterilisation in pharmaceuticals and other industries and the sterility testing of pharmaceuticals 5. Ability to perform microbiological standardisation of pharmaceuticals 3. Understanding of microbial spoilage of pharmaceuticals and ways to preserve pharmaceuticals
	BP304T Pharmaceutical Engineering	<ol style="list-style-type: none"> 1. Understanding of the nature of flow of fluids and its applications in pharmaceutical industry 2. Knowledge and skills to apply knowledge about the size reduction and size separation to produce pharmaceutical dosage forms 3. Understanding of and design pharmaceutical plant layouts with optimum use of resources 4. Ability to apply various preventive methods used for corrosion control in pharmaceutical industries



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		<p>5. Competencies to apply knowledge about pharmaceutical processing equipment in evaporation, drying, distillation etc. in qualifying, calibrating and validating the equipment</p> <p>6. Understanding of the concepts of heat transfer and apply it in equipment selection, process designing and optimization</p>
	BP305P Pharmaceutical Organic Chemistry-II Practical	<p>1. Skills to carry recrystallisation and steam distillation, independently</p> <p>2. Ability to perform separation and identification of qualitative analysis of solid-solid organic binary mixtures</p> <p>3. Ability to determine the saponification value of oil sample, independently</p> <p>6. Synthesize the different organic compounds and Understanding of the reaction mechanisms</p>
	BP306P Physical Pharmaceutics-I Practical	<p>1. Ability to do solubility measurement, independently</p> <p>2. Skills to determine partition coefficient, independently</p> <p>3. Ability to develop phase diagram and determine CST</p> <p>4. Skills to determine surface and interfacial tension values by different methods, independently</p> <p>5. Ability to determine HLB, CMC, saponification values of surfactants, independently</p> <p>6. Knowledge of adsorption isotherms, protein binding and complexation in dosage forms</p> <p>4. Ability to determine stability constant, independently</p>
	BP307P Pharmaceutical Microbiology Practical	<p>1. Ability to use various equipment used in pharmaceutical microbiology</p> <p>2. Skills to prepare and sterilize different types of media required for the cultivation of microorganisms</p> <p>3. Competencies to identify the type of microorganisms by staining techniques and motility by hanging drop technique, independently</p> <p>4. Ability to perform and interpret biochemical tests, bacteriological analysis, and microbiological assay</p> <p>7. Skills to follow aseptic practices</p>



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	BP308P Pharmaceutical Engineering Practical	<ol style="list-style-type: none">1. Ability to construct the drying curve and determine the time required for drying, independently2. Competencies to determine the loss on drying and moisture content by themselves3. Ability to determine air humidity, independently4. Skills to determine the factors affecting the pharmaceutical engineering process and its application for product development5. Ability to perform particle size reduction and analysis, independently
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B. Pharm. 4 th Semester	BP401T Pharmaceutical Organic Chemistry-III	<ol style="list-style-type: none"> 1. Knowledge of the classification of organic compounds and nomenclature 2. Understanding of the concept of classification isomerism and explain structural isomerism 3. Knowledge of hybridisation in alkenes, alkenes and stabilities of alkenes, conjugated dienes 4. Understanding of the mechanism, orientation of elimination, electrophilic, free radical and nucleophilic addition reaction 5. Knowledge of the mechanism, kinetics, stereochemistry and factors affecting SN1 & SN2 reaction 6. Understanding of the acidity of carboxylic acids and basicity of amines 7. Understanding of the mechanism of some named reaction
	BP402T Medicinal Chemistry-I	<ol style="list-style-type: none"> 1. Ability to correlate the disease pharmacology with chemical aspects of drugs 2. Understanding of the metabolic pathways, adverse effects, and therapeutics of drugs 3. Understanding of the structural correlations of different classes of drugs 4. Skills to synthesize drug, independently 5. Knowledge of the mechanistic pathways of different classes of medicinal compounds
	BP403T Physical Pharmaceutics-II	<ol style="list-style-type: none"> 1. Knowledge of physicochemical properties of drugs and ability to apply it further in drug product development 2. Competencies carrying stability studies and determining expiry dating of pharmaceuticals 3. Understanding of physicochemical properties of drug and excipient significant to development and evaluation of dosage forms 4. Understanding of the role of surfactants, interfacial phenomenon and thermodynamics in product development
	BP404T Pharmacology-I	<ol style="list-style-type: none"> 1. Understanding of the pharmacological actions of various categories of drugs 2. Recognizing how drugs work at the organ, sub-cellular, macromolecular levels



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		<ol style="list-style-type: none"> 3. Ability to apply basic pharmacological knowledge in preventing and treating various illnesses 5. Ability to analyse the impact of drugs on animals through simulation experiments
	BP405T Pharmacognosy and Phytochemistry-I	<ol style="list-style-type: none"> 1. Knowledge regarding herbs, and their science 2. Ability to classify medicinal plants and their phytochemistry 3. Understanding of pharmacology and toxicity of herbal formulations 4. Knowledge of how herbs influence our physiology and can be helpful against several disorders 5. Understanding of complementation of traditional systems of medicines to modern medical science (allopathy) 6. Ability to identify adulteration and contamination in herbs
	BP406P Medicinal Chemistry-I Practical	<ol style="list-style-type: none"> 1. Skills in various purification techniques of solvents/ liquids used in synthesis. 2. Understanding of safety measures in the chemistry laboratory 3. Competencies synthesizing drugs and evaluating for their physicochemical properties 4. Knowledge of basic chromatographic techniques like TLC, and column chromatography for the identification and purification of compounds 5. Understanding of the reaction mechanism of synthesized organic compounds
	BP407P Physical Pharmaceutics-II Practical	<ol style="list-style-type: none"> 1. Ability to determine the powder characteristics of drug like particle size, size distribution by sieving and microscopic methods, independently 2. Skills to determine the viscosity of liquid with the help of Brookfield viscometer by their own 3. Ability to determine the effect of various excipients on flow properties of the powder materials and its applications in product development 4. Skills to perform the accelerated stability study of the product and to determine the stability of product
	BP408P Pharmacology-I Practical	<ol style="list-style-type: none"> 1. Understanding of the pharmacological actions of different categories of drugs 2. Ability to observe any analyse effect of drugs on animals by simulated experiments

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		5. Ability to appreciate correlation of pharmacology with other bio medical science
	BP409P Pharmacognosy and Phytochemistry-I Practical	<ol style="list-style-type: none"> 1. Understanding of the chemical nature of crude drug by chemical tests 2. Skills to perform stomatal number, stomatal index, vein islet number, vein islet termination and palisade ratio of leaf drug 3. Ability to determine size of starch grains, calcium oxalate crystals, length and width of fiber of the sample 4. Competencies to perform ash value, extractive values, moisture content, swelling and foaming index for the evaluation of crude drug

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B. Pharm. 5th Semester	BP501T Medicinal Chemistry-II	<ol style="list-style-type: none"> 1. Ability to explore the disease pharmacology and its mitigation or cure 2. Knowledge of chemical synthesis of some drugs 3. Understanding of the structural modifications with respect to chemical classes 4. Knowledge of the mechanism and pathways of different classes of medicinal compounds 5. Knowledge of cancer therapeutics 6. Ability to generate new ideas from chemistry and pharmacology for the development of possible lead
	BP502T Industrial Pharmacy-I	<ol style="list-style-type: none"> 1. Understanding of physicochemical properties of drugs as a tool in the optimization of solid and liquid dosage forms 2. Knowledge of various considerations in development of pharmaceutical dosage forms and their manufacturing techniques 3. Understanding of formulating solid, liquid and semisolid dosage forms and evaluate them for their quality 4. Knowledge of the facilities and standards necessary for the industrial production of sterile dosage forms 5. Ability to select containers, closures, and propellants for different types of aerosol systems, and evaluate appropriate packaging materials for various pharmaceutical dosage forms 6. Competency to evaluate the pharmaceutical dosage forms for quality and stability and compare with standards prescribed in the pharmacopoeia
	BP503T Pharmacology-II	<ol style="list-style-type: none"> 1. In-depth knowledge of mechanism of drug action and its relevance in the treatment of different diseases 2. Skills to isolate different organs/ tissues from the laboratory animals by simulated experiments 3. Understanding of the various receptor actions using isolated tissue preparation 4. Knowledge of the newer targets of several disease conditions for treatment 5. Ability to describe pharmacotherapy of CVS disorders and Respiratory tract disorders



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	BP504T Pharmacognosy and Phytochemistry-II	<ol style="list-style-type: none"> 1. Knowledge of mechanism of drug action and its relevance in the treatment of different diseases 2. Understanding of the various receptor actions using isolated tissue preparation 3. Understanding of the relationship of pharmacology with related medical sciences 4. Knowledge of the newer targets of several disease conditions for treatment. 6. Ability to describe pharmacotherapy of CVS disorders and respiratory tract disorders
	BP505T Pharmaceutical Jurisprudence	<ol style="list-style-type: none"> 1. Knowledge of provisions of Drugs and Cosmetics Act, 1940 and its rules 1945 2. Understanding of the importance of various regulatory procedures, pharmaceutical acts, and its rules with their offense and penalties 3. Understanding of code of ethics during the pharmaceutical practice 4. Knowledge of the pharmaceutical legislations in India and rules therein 5. Understanding of impacts of DPCO & NLEM on pricing of pharmaceuticals
	BP506P Industrial Pharmacy-I Practical	<ol style="list-style-type: none"> 1. Understanding of effects of physicochemical properties of drugs on development of solid and liquid dosage forms 2. Skills to formulate and prepare tablets, capsules and liquid orals 3. Knowledge of the facilities and standards necessary for the industrial production of sterile dosage forms 4. Ability to prepare different types of parenteral and ophthalmic dosage forms, independently 5. Skills to evaluate the pharmaceutical dosage forms for quality and stability and check compliance 6. Ability to formulate cosmetic formulations
	BP507P Pharmacology-II Practical	<ol style="list-style-type: none"> 1. Skills to visualise how to isolate different organs/tissues from the laboratory animals 2. Ability to imagine the effect of drugs on isolated organs/tissues by simulated experiments 3. Skills to observe the effect of drugs on through different bioassay methods 4. Ability to determine PA2 value, PD2 value, effect of spasmogens and spasmolytics, anti-inflammatory activity and analgesic activity



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	BP508P Pharmacognosy and Phytochemistry-II Practical	<ol style="list-style-type: none">1. Ability to perform histological studies, powder characteristics, extraction and detection of crude drugs2. Ability to carry out isolation and detection of active principles, independently3. Competencies to separate sugars by paper chromatography and TLC studies of plant extract4. Ability to carry out distillation of volatile oils and analysis of crude drugs by chemical tests
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B. Pharm. 6 th Semester	BP601T Medicinal Chemistry-III	<ol style="list-style-type: none"> 1. Knowledge of the importance of the physico-chemical properties of drugs 2. Understanding of the new drug design tools like pharmacophore modeling and docking technique 3. Knowledge about targets in chemotherapy, microbial diseases, and anti-viral study 4. Understanding of insights about the mechanism pathways of different classes of medicinal compounds 5. Understanding of variety of drug classes and their pharmacological properties 6. Knowledge of thrust areas of research
	BP602T Pharmacology-III	<ol style="list-style-type: none"> 1. Understanding of mechanism of drug action and its significance in the treatment of different infectious diseases 2. Knowledge of the principles of toxicology and treatment of various poisonings conditions 3. Understanding of symptoms of poisonings and toxicity profile of various drugs 4. Knowledge of the correlation of pharmacology with related medical sciences
	BP603T Herbal Drug Technology	<ol style="list-style-type: none"> 1. Knowledge of concepts in herbal drug development 2. Ability to carry out technical and management tasks in transforming medicinal herbs, managing the quality of processes, marketing of medicinal plants and their derivatives used in medicines and cosmetics 3. Ability to recognise, collect and preserve medicinal plants 4. Ability to analyse and herbal actives and their dosage forms including nutraceuticals 5. Competency managing quality of medicinal plant products and derivatives as health, food and cosmetics products 6. Acquittance of marketed herbal products
	BP604T Biopharmaceutics and Pharmacokinetics	<ol style="list-style-type: none"> 1. Understanding of the ADME properties and its significance

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		<ol style="list-style-type: none"> 2. Ability to analyze the absorption, distribution, metabolism, excretion, elimination pattern of the depending on the plasma drug concentration 3. Ability to determine the bioavailability and bioequivalence of drug products 4. Understanding of various pharmacokinetic parameters, their significance & applications
	BP605T Pharmaceutical Biotechnology	<ol style="list-style-type: none"> 1. Understanding of the basic concepts in biotechnology and research in diagnostics and therapeutics 2. Understanding of the applications of biosensors, enzymes immobilisation, and rDNA technology in the pharmaceutical industry 3. Knowledge of immune system and design and development of vaccines 4. Comprehending the storage conditions and stability of biological products 5. Knowledge of immunological tests in diagnosis 6. Understanding of fermentation concepts to design fermenters to produce compounds of industrial significance
	BP606T Pharmaceutical Quality Assurance	<ol style="list-style-type: none"> 1. Understanding of the cGMP, GLP and quality concept in pharmaceutical industry 2. Knowledge of different records in industry and its importance 3. Understanding of the responsibilities of QA & QC departments 4. Ability to perform calibration and validation, independently 5. Skills of material management
	BP607P Medicinal Chemistry-III Practical	<ol style="list-style-type: none"> 1. Skills in various purification techniques of solvents/ liquids used in synthesis 2. Understanding of safety measures in the laboratory 3. Ability to synthesize and evaluate drugs and determine their physicochemical properties 4. Ability to perform TLC, and column chromatography for the identification and purification of compounds, independently 5. Understanding of the reaction mechanisms of synthesized organic compounds
	BP608P Pharmacology-III Practical	<ol style="list-style-type: none"> 1. Ability to perform dose calculation in pharmacological experiments, independently 2. Understanding of the agonist and antagonist effect of drugs



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		<ol style="list-style-type: none"> 3. Ability to evaluate the toxicity aspects of drugs and related products 4. Ability to apply biostatistics in pharmacokinetic studies
	<p>BP609P Herbal Drug Technology Practical</p>	<ol style="list-style-type: none"> 1. Understanding of herbal drugs from cultivation to herbal product development 2. Skills to perform qualitative and quantitative evaluations of herbal crude drugs 3. Competencies in herbal formulation development and standardization 4. Knowledge of monograph analysis of herbal materials 5. Knowledge of the strategies for the good manufacturing practice for Indian systems of medicine



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B. Pharm. 7 th Semester	BP701T Instrumental Methods of Analysis	<ol style="list-style-type: none"> 1. Understanding of the electronic transitions in matter when energy is bombarded 2. Knowledge of the theoretical principles and instrumentations of spectroscopic methods of analysis 3. Knowledge of the basic principles, instrumentations and techniques involved in chromatographical techniques 4. Competency to perform analysis of drugs using various analytical instrument 5. Knowledge of the applications of various chromatographic techniques for organic, inorganic and natural products
	BP702T Industrial Pharmacy-II	<ol style="list-style-type: none"> 1. Knowledge of the process of pilot plant and scale up of pharmaceutical dosage forms 2. Understanding of the process of technology transfer from lab scale to commercial batch 3. Knowledge of different Laws and Acts that regulates pharmaceutical industry 4. Understanding of the approval process and regulatory requirements for drug products
	BP703T Pharmacy Practice	<ol style="list-style-type: none"> 1. Knowledge of various drug distribution methods in a hospital 2. Understanding of the pharmacy stores management and inventory control systems. 3. Ability to monitor drug therapy of patient through medication chart review and clinical review 4. Skills to obtain medication history interview and counsel the patients 5. Competency identifying drug related problems and detect and assess adverse drug reactions 6. Ability to interpret selected laboratory results of specific disease states
	BP704T Novel Drug Delivery Systems	<ol style="list-style-type: none"> 1. Knowledge of novel drug delivery systems 2. Understanding of various approaches for development of novel drug delivery systems 3. Knowledge of the criteria for selection of polymers in drug product development 4. Understanding of the principles and technologies used in the design of sustained release,

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		transdermal, gastroretentive, nasopulmonary and controlled release drug delivery systems 5. Knowledge of various approaches for the development of targeted drug delivery system, ocular formulations and intra uterine devices
	BP705P Instrumental Methods of Analysis	1. Ability to perform analysis of drug from different dosage forms by using different spectroscopic techniques 2. Ability to carry separation and determination of amino acids and drugs by using chromatography techniques 3. Understanding of the instrumentation and working of HPLC, GC, HPTLC

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Name of the Program and Semester	Name of the Course	Course Outcomes
B. Pharm. 8th Semester	BP801T Biostatistics and Research Methodology	<ol style="list-style-type: none"> 1. Knowledge of biostatistics and its applications in pharmaceutical research 2. Ability to determine type of data i.e. parametric vs non-parametric, paired vs non-paired etc. 3. Understanding of basic concepts in statistics including probability, regression, correlation, DoE, optimization, test of significance etc. 4. Competency selecting suitable statistical tools/ tests for our own research data 5. Skills using various software used in optimization and statistical analysis of data 6. Understanding of research methodology, and research designs 7. Competency of report writing and presentation of research outcomes
	BP802T Social and Preventive Pharmacy	<ol style="list-style-type: none"> 1. Knowledge about the measures to control and prevent spread of diseases and ability applying it further to avoid spread of the disease 2. Understanding of the different types of national health programs and their objectives and ability to create aware ness in society 3. Understanding of the importance of community services 4. Competency to analyse social health problems and to contribute in public health
	BP803ET Pharma Marketing Management	<ol style="list-style-type: none"> 1. Understanding of basic concepts of pharma marketing management, types of pharmaceutical markets 2. Knowledge of the pharmaceutical product management and product decision 3. Understanding of pharmaceutical product promotion 4. Knowledge of pharmaceutical marketing channels and roles and responsibilities of professional sales representative 5. Understanding of pricing strategies and laws related to the pricing of pharmaceutical products in India 6. Awareness of emerging concepts in marketing



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BP804ET Pharmaceutical Regulatory Science	<ol style="list-style-type: none"> 1. Knowledge of the regulatory requirements for approval of new drug/ drug product in regulated, semi-regulated, domestic market and ROW 2. Understanding of the process of drug discovery and development 3. Knowledge of the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals 4. Understanding of the regulatory approval process and their registration in Indian and international markets
BP805T Pharmacovigilance	<ol style="list-style-type: none"> 1. Understanding of the meaning, scope and importance of pharmacovigilance 2. Knowledge of detection, assessment, reporting of new adverse drug reactions 3. Information about PvPI and guidelines related to ADR reporting 4. Comprehending methods of safety data during pre-clinical, clinical and post approval phases of drugs' life cycle 5. Ability to write case narratives of adverse events and their quality
BP806ET Quality Control and Standardization of Herbals	<ol style="list-style-type: none"> 1. Knowledge of WHO guidelines for quality control of herbal drugs 2. Understanding of concepts in quality assurance of herbal drug products 3. Information about regulatory approvals of herbal products in India and abroad 4. Understanding of EU and ICH guidelines relevant to herbal drug industry
BP 807 ET Computer Aided Drug Design	<ol style="list-style-type: none"> 1. Understanding of the design and discovery process of lead molecules 2. Knowledge of the classification of drug design tools for drug discovery process 3. Understanding of various strategies to develop drug like molecules 4. Knowledge of various molecular modelling software to design new drug molecule
BP808ET Cell and Molecular Biology	<ol style="list-style-type: none"> 1. Understanding of the cell as chemical industry 2. Knowledge of structure and functions of cell organelles, DNA/ RNA proteins 3. Understanding of basic molecular genetics mechanisms

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		4. Understanding of the cell signalling pathways with their regulations and role in disease progress
	BP809ET Cosmetic Science	<ol style="list-style-type: none"> 1. Knowledge of basics of cosmetics and cosmeceutical products 2. Understanding of principles of formulation and building blocks of skin and hair care products 3. Knowledge of evaluation of cosmetic products 4. Knowledge of skin and hair associated problems and role of cosmeceuticals in treating those
	BP810ET Pharmacological Screening Methods	<ol style="list-style-type: none"> 1. Knowledge of routinely used laboratory animals 2. Understanding of various screening methods used in preclinical research 3. Knowledge of role of biostatistics and research methodology in preclinical investigations of drug and drug products 5. Ability to frame and test research hypothesis
	BP811ET Advanced Instrumentation Techniques	<ol style="list-style-type: none"> 1. Understanding of spectroscopic techniques used in pharmaceutical industry 2. Knowledge of chromatographical techniques employed in pharmaceuticals 3. Understanding of thermal methods of drug analysis 4. Ability to do calibration and validation of various analytical instruments, independently 5. Knowledge of the advanced instruments used and its applications in drug analysis
	BP812ET Dietary Supplements and Nutraceuticals	<ol style="list-style-type: none"> 1. Understanding of the need of supplements by the different group of people to maintain healthy life 2. Understanding of the outcome of deficiencies in dietary supplements 3. Recognizing the components in dietary supplements and their applications 4. Information about the regulatory and commercial aspects of dietary supplements including health claims

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Name of the Program and Semester	Name of the Course	Course Outcomes
M. Pharm. Pharmaceutics 1st Semester	MPH101T Modern Pharmaceutical Analytical Techniques	<ol style="list-style-type: none"> 1. Knowledge of theories and principles of advanced analytical instrumental techniques 2. Ability to apply knowledge and technical skills of instrumental operations for the identification, characterization, and quantification of drugs and excipients 3. Ability to do the quantitative analysis of various drugs in single and combination dosage forms 4. Capability to compile, organise, communicate, and defend information on concepts in pharmaceutical quality assurance
	MPH102T Drug Delivery Systems	<ol style="list-style-type: none"> 1. Knowledge of different types of drug carriers and drug delivery systems 2. Understanding of the criteria for selection of excipients and polymers for the development of drug delivery systems 3. Knowledge about drug supply chain 4. Ability to design and develop personalized drug delivery systems 5. Skills developing and evaluating drug delivery systems to serve to improve efficacy and safety 6. Knowledge about approaches of delivering biologics
	MPH103T Modern Pharmaceutics	<ol style="list-style-type: none"> 1. Comprehending the concept and significance of preformulation studies 2. Knowledge of physics of tablet making 3. Competency to use optimization techniques in formulation development 4. Understanding of sterility and stability testing 5. Knowledge of packaging of pharmaceuticals 6. Knowledge of validation, its importance, types and its regulatory requirements 7. Understanding of the significance of cGMP 8. Realizing the significance of materials and process management in pharmaceutical manufacturing



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	MPH104T Regulatory Affairs	<ol style="list-style-type: none"> 1. Understanding of the concepts of different types drug product developments 2. Knowledge of regulatory guidance and guidelines globally 3. Understanding of dossier development and submissions in regulated, semi-regulated market and rest of world (ROW) 4. Knowledge about how phase III & IV clinical trials are conducted 5. Ability to do CTD/ eCTD submissions 6. Understanding of post approval submissions
	MPH105P Pharmaceutics Practical-I	<ol style="list-style-type: none"> 1. Skill to evaluate pharmaceuticals using spectroscopic and chromatographical techniques 2. Competency to formulate and evaluate sustained-release matrix tablets, transdermal patches 3. Competency to study <i>in vitro</i> dissolution of sustained and controlled release formulations 4. Understanding about physical pharmaceutics concepts involved in dissolution of OSDs 5. Knowledge of preformulation aspects and drug release mechanisms of tablets
M. Pharm. Pharmaceutics 2nd Semester	MPH201T Molecular Pharmaceutics	<ol style="list-style-type: none"> 1. Understanding of the science of drug targeting 2. Knowledge of different drug targeting approaches 3. Understanding of various targeting strategies including nanoparticles, liposomes, microspheres 4. Ability to formulate and evaluate various particulate systems including nanoparticles, liposomes, microspheres, phytosomes, electrosomes etc.
	MPH202T Advanced Biopharmaceutics and Pharmacokinetics	<ol style="list-style-type: none"> 1. Understanding of mechanisms of drug absorption and factors influencing 2. Realizing importance of dissolution testing and the concept of IVIVC 3. Understanding of compartmental and non-compartment models in PK studies 4. Knowledge of dosage regimens and PK/ PD behaviour of the drug 5. Knowledge of drug interactions affecting the PK of drugs



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		6. Understanding of the concept of BA/ BE in new drug or dosage form developments
	MPH203T Computer-aided Drug Delivery	<ol style="list-style-type: none"> 1. Knowledge of use of computers in pharmaceutical development 2. Understanding of use of statistics, optimization techniques and QbD in pharmaceutical research and development 3. Comprehending the concept of computational fluid dynamics (CFD) 4. Knowledge about computational modeling of drug disposition and transporters 5. Understanding impact and applications of AI, automation and robotics in pharma industry 7. Knowledge of computer aided biopharmaceutical characterizations
	MPH204T Cosmetics and Cosmeceuticals	<ol style="list-style-type: none"> 1. Understanding of basic science of developing cosmetics and cosmeceuticals 2. Realizing regulatory requirements for obtaining license to manufacture and sale of cosmetics 3. Knowledge of scientific approach to develop cosmetics and cosmeceuticals with desired safety, stability and efficacy 4. Understanding of current technologies involved in developing cosmetics and cosmeceuticals 5. Information of guidelines in development of herbal cosmetics
	MPH 205P Pharmaceutics Practical-II	<ol style="list-style-type: none"> 1. Know-how of designing, formulating and evaluating micro and nanoparticle formulations 2. Ability to analyse and correlate the <i>in vitro</i> and <i>in vivo</i> performance of pharmaceuticals 3. Ability of using QbD and statistical tools in design and development of pharmaceutical products 4. Ability to develop cosmetic products by proper selection of excipients 5. Skills to use design expert and other software in pharmaceutical development 6. Knowledge of computational simulation techniques in PK/ PD studies

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Name of the Program and Semester	Name of the Course	Course Outcomes
M. Pharm. Pharmaceutical Quality Assurance 1st Semester	MQA101T Modern Pharmaceutical and Analytical Techniques	<ol style="list-style-type: none"> 1. Knowledge of theories and principles of advanced analytical instrumental techniques 2. Ability to apply knowledge and technical skills of instrumental operations for the identification, characterization, and quantification of drugs and excipients 3. Ability to do the quantitative analysis of various drugs in single and combination dosage forms 4. Capability to compile, organise, communicate, and defend information on concepts in pharmaceutical quality assurance
	MQA102T Quality Management System	<ol style="list-style-type: none"> 1. Understanding the importance of quality and QMS 2. Recognizing ISO and its importance in quality management 3. Ability to apply their understanding about tools for quality improvement, resolve threats to quality of pharmaceuticals 4. Skills evaluating pharmaceuticals for their safety, efficacy and hence for identity, strength and purity 5. Ability to carry stability testing of drug substances and pharmaceuticals 6. Competency using statistical concepts in pharmaceutical quality systems
	MQA103T Quality Control and Quality Assurance	<ol style="list-style-type: none"> 1. Knowledge of cGMP and its importance in pharmaceutical industry 2. Understanding of importance of documentation 3. Knowing the scope of quality certifications in pharmaceutical industries 4. Ability to work competently as QA executive
	MQA104T Product Development and Technology Transfer	<ol style="list-style-type: none"> 1. Understanding about the science of new product development 2. Ability to do preformulation studies, pilot scale up and selection of suitable pharmaceutical packaging



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		<ol style="list-style-type: none"> Competency in transferring the technology from R&D to pilot and then to manufacturing scale Knowledge of regulatory aspects of technology transfer in the pharmaceutical industry
	MQA105P Quality Assurance Practical-I	<ol style="list-style-type: none"> Ability to analyze the excipients, API, and formulations Ability to resolve the quality related issues in pharmaceutical development and manufacturing Skill and knowledge to perform the pre-formulation studies efficiently Understanding of importance of solubility in development of dosage forms
M. Pharm. Pharmaceutical Quality Assurance 2nd Semester	MQA201T Hazards and Safety Management	<ol style="list-style-type: none"> Understanding role of environmental and ecosystem and its impact on industrial processes Knowledge about types of hazards Understanding of prevention of hazards and hazard management systems in pharmaceuticals Knowledge of rules, regulations and industrial guidelines on risk assessment and management
	MQA202T Pharmaceutical Validation	<ol style="list-style-type: none"> Knowledge of concepts in calibration, qualification and validation in pharmaceutical industry Ability to do qualification of equipment and instruments Competency to perform process/ cleaning/ analytical method validation Knowledge of process of utility and electronic system validation
	MQA204T Pharmaceutical Manufacturing Technology	<ol style="list-style-type: none"> Understanding of development of pharmaceuticals Ability to design plant layout and do production planning Understanding of aseptic process technology, process automation and lyophilization, and advanced sterile manufacturing technologies Know-how of basic and advanced technologies manufacturing of non-sterile pharmaceutical products

**Criteria 2: Teaching-learning and Evaluation****Key Indicator 2.6: Student Performance and Learning Outcomes**

		<ol style="list-style-type: none"> 5. Ability to test quality of pharmaceutical containers and closures 6. Knowledge about QbD and PAT
	MQA205P Quality Assurance Practical-II	<ol style="list-style-type: none"> 1. Ability to analyse impurity and contaminants in pharmaceuticals 2. Competency to do qualifications of instruments and processes in pharmaceutical industry 3. Ability to design layout of pharmaceutical industry 4. Ability to use quality tools for effective quality assurance and improvement of pharmaceuticals
	MPA203T Audits and Regulatory Compliances	<ol style="list-style-type: none"> 1. Knowledge of auditing in the pharmaceutical industry 2. Ability to participate in the audit process of various departments 3. Skills to prepare audit reports 4. Ability to design and prepare the checklists for the auditing 5. Ability to compile, organise, communicate, and defend information on pharmaceutical quality assurance

**Criteria 2: Teaching-learning and Evaluation****Key Indicator 2.6: Student Performance and Learning Outcomes**

Name of the Program and Semester	Name of the Course	Course Outcomes
M. Pharm. Pharmaceutics & Pharmaceutical Quality Assurance 3 rd Semester	MRM301T Research Methodology and Biostatistics	<ol style="list-style-type: none"> 1. Ability to identify research problems 2. Understanding of steps to follow selection of suitable statistical tests for the analysis of research data 3. Empowered to follow ethics in medical research including clinical research 4. Ability to handle and take care of experimental animals in most human way and efficiently carry animal studies 5. Understanding how to follow regulations in medical research