K.G.R.L.COLLEGE OF PHARMACY:: BHIMAVARAM

COURSE OUTCOMES & PROGRAM OUTCOMES (CO & PO)

Programme: B. Pharm. Degree Program **Duration of the program**: The course of study for B.Pharm shall extend over a period of eight semesters (four academic years) and six semesters (three academic years) for lateral entry students	
Programme 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; behavioral, 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. 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 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. 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:** Honor 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. **Ethics**: Apply ethical principles and commit to professional ethics and responsibilities and norms of the Pharmacy practice. PO9. **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. PO10. **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. PO11. **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. PO12. **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.

Programme Specific Outcomes	PSO 1: To prepare graduate to success in technical or professional careers in various pharmaceutical industry and/ or institute and /or Health care system through excellent real time exposure to rigorous education. PSO 2: To prepare graduate of the program to learn and adapt in a globe of constantly developing trends PSO 3: To prepare the graduate to have foundation in science, formulation technology, synthetic knowledge, Discovery tools as per the requirement of Pharmaceutical sectors. PSO 4: To strengthen the professional and ethical attitude, effective communication skills, teamwork skills, multidisciplinary approach, and an ability to relate pharmaceutical sciences issues to broader social context. PSO 6: To streams a lifelong career of personal and practicing professional growth with ethical codes and self-esteem.

Name of the Program and semester	Name of the Course	Course Outcome
B.Pharm 1st Sem	Human anatomy and Physiology-I	1. Students would have studied about the gross morphology, structure and functions of cell, skeletal, muscular, cardiovascular system of the human body. 2. They would have understood the various homeostatic mechanisms and their imbalances. 3. Students would able to identify the different types of bones in human body. 4. Students would be able to identify the various tissues of different systems of human body. 5. Students would learn about the various experimental techniques related to physiology. 6. They would have learnt various techniques like blood group determination, blood pressure measurement, blood cells counting
	Pharmaceutical analysis I	1. Learning this subject content will develop the ideas with the fundamental of analytical chemistry among the pupil. 2. It constructs the fundamental methodology to prepare different strength of solutions. 3. It facilitate the fellow pupil to predict the sources of mistakes and errors. 4. It helps to develop the fundamentals of volumetric analytical skills. 5. It peculates the basic knowledge in the principles of electrochemical analytical techniques 6. The student interpretation skills will be improve by the course content in terms of choice of analytical techniques to perform the estimation of different category drugs.
	Pharmaceutics I	1. Upon completion of this program the student will have fundamental knowledge in preparing conventional dosage forms
	Pharmaceutical inorganic chemistry	1. Well acquainted with the principles of limit tests. 2. Familiar with different classes of inorganic pharmaceuticals and their analysis 3. Identification of different anions, cations and different inorganic pharmaceuticals. 4. Knowledge about the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals 5. Understand the medicinal and pharmaceutical importance of inorganic compounds 6. To have been introduced to a variety of inorganic drug classes.
	Communication skills	1. Understand the behavioral needs for a Pharmacist to function effectively in the 2. Areas of pharmaceutical operation 3. Communicate effectively (Verbal and Non Verbal) 4. Effectively manage the team as a team player 5. Develop interview skills

		6. Develop Leadership qualities and essentials
	Remedial Biology	1. Cell biology (Basic Nature of Plant cell and Animal cell) 2. Classification System of both Plants & Animals 3. Various tissue system and organ system in plant and animals 4. Theory of evolution 5. Anatomy and Physiology of plants and animals
	Remedial Mathematics	1. Apply mathematical concepts and principles to perform computations for Pharmaceutical Sciences. 2. Create, use and analyze mathematical representations and mathematical relationships 3. Communicate mathematical knowledge and understanding to help in the field of Clinical Pharmacy 4. Perform abstract mathematical reasoning
B.Pharm 2nd sem	Human anatomy and physiology II	1. Students would have studied about the gross morphology, structure and functions of cell, skeletal, muscular, cardiovascular system of the human body. 2. They would have understood the various homeostatic mechanisms and their imbalances. 3. Students would able to identify the different types of bones in human body. 4. Students would be able to identify the various tissues of different systems of human body. 5. Students would learn about the various experimental techniques related to physiology. 6. They would have learnt various techniques like blood group determination, blood pressure measurement, blood cells counting
	Pharmaceutical organic chemistry I	1. Write the structure, name of the organic compound 2. Knowledge about the type of isomerism 3. Write the reaction, name the reaction and orientation of reactions 4. Account for reactivity/stability of compounds, 5. Identify/confirm the unknown organic compound 6. Knowledge about the naming reactions of carbonyl compounds 7. To perform common laboratory techniques including reflux, distillation, recrystallization, vacuum filtration, etc.
	Biochemistry	1. To understand the importance of metabolism of substrates. 2. Will acquire chemistry and biological importance of biological macromolecules. 3. To acquire knowledge in qualitative and quantitative estimation of the biological macromolecules. 4. To know the interpretation of data emanating from a Clinical Test Lab.

		5. To know how physiological conditions influence the structures and re -activities of biomolecules. 6. To understand the basic principles of protein and polysaccharide structure.
	Pathophysiology	1. Describe the etiology and pathogenesis of the selected disease states 2. Knowledge of signs and symptoms of the diseases 3. Identify the complications of the diseases. 4. Know most commonly encountered pathophysiological state(s) and/or disease mechanism(s), as well as any clinical testing requirement
	Computer applications in pharmacy	1. Apply the knowledge of mathematics and computing fundamentals to pharmaceutical applications for any given requirement 2. Design and develop solutions to analyze pharmaceutical problems using computers. 3. Integrate and apply efficiently the contemporary IT tools to all Pharmaceutical related activities 4. Solve and work with a professional context pertaining to ethics, social, cultural and regulations with regard to Pharmacy.
	Environmental sciences	This program shall create an awareness about environmental problems, develop an attitude towards of concern for the environment.
B.Pharm 3rdSem	Pharmaceutical organic chemistry II	1. Basic knowledge regarding general methods of preparation of organic compounds. 2. Understand the reactions of some organic compounds. 3. To understand Reactivity of organic compounds. 4. Special emphasis on mechanisms and orientation of chemical reactions 5. To acquire knowledge in heterocyclic compounds 6. To acquire knowledge about the electrophilic and nucleophilic reactions
	Physical pharmaceutics I	1. State the physicochemical properties of drug molecules, pH, and solubility 2. Explain the role of surfactants, interfacial phenomenon and thermodynamics 3. Describe the flow behavior of fluids and concept of complexation 4. Analyze the chemical stability tests of various drug products 5. Understand the physical properties of solutions, buffers, isotonicity, disperse systems and rheology. 6. Understand of physicochemical properties of drugs including solubility, distribution, adsorption, and stability. 7. Have basic knowledge of pharmaceutical suspensions and colloids.

		8. Have basic understanding of the pharmaceutical applications of various physical 9. Principles such as lyophilization, aerosols, condensed systems, and phase diagram.
	Microbiology	1. Students will be able to acquire, articulate, retain and apply specialized language and knowledge relevant to microbiology. 2. Students will acquire and demonstrate competency in laboratory safety and in routine and specialized microbiological laboratory skills applicable to microbiological research or clinical methods, including accurately reporting observations and analysis. 3. Students will communicate scientific concepts, experimental results and analytical arguments clearly and concisely, both verbally and in writing. 4. Students will demonstrate isolation of and identification of microbes. 5. Students can able to design microbiology laboratory considering all the aspects of safety 6. Students will acquire knowledge about validating the microbiological equipment and reporting the observations
	Pharmaceutical Engineering	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 6. Use of resources. 7. To appreciate the various preventive methods used for corrosion control in 8. Pharmaceutical industries
	Pharmaceutical Jurisprudence	1Pharmaceutical jurisprudence Know the Pharmaceutical legislations and their implications in the development and marketing 2. Know various Indian pharmaceutical Acts, Laws and schedule 3. Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals 4. Know code of ethics during the Pharmaceutical practice
B.Pharm 4th Sem	Pharmaceutical organic chemistry III	1. To acquire the knowledge and understanding of the basic experimental principles of heterocyclic chemistry. 2. To draw the structures and synthesize simple pharmaceutically active organic compounds having five and six membered heterocyclic compounds. 3. To describe detailed mechanisms for common naming reactions. 4. To be able to run experimental techniques, procedures and safe laboratory practices.

		5. Stereo-chemical features including conformation and stereo electronic effects; Geometrical isomers
	Medicinal chemistry I	1. Helps in correlating between pharmacology of a disease and its mitigation or cure. 2. To understand the drug metabolic pathways, adverse effect and therapeutic value of drugs 3. To know the structural activity relationship of different class of drugs. 4. Well acquainted with the synthesis of some important class of drugs. 5. Knowledge about the mechanism pathways of different class of medicinal compounds 6. To understand the chemistry of drugs with respect to their pharmacological activity
	Physical pharmaceutics II	1. State the physicochemical properties of drug molecules, pH, and solubility 2. Explain the role of surfactants, interfacial phenomenon and thermodynamics 3. Describe the flow behavior of fluids and concept of complexation 4. Analyze the chemical stability tests of various drug products 5. Understand the physical properties of solutions, buffers, isotonicity, disperse systems and rheology. 6. Understand of physicochemical properties of drugs including solubility, distribution, adsorption, and stability. 7. Have basic knowledge of pharmaceutical suspensions and colloids. 8. Have basic understanding of the pharmaceutical applications of various physical 9. Principles such as lyophilization, aerosols, condensed systems, and phase diagram.
	Pharmacology I	1. Students would have understood the pharmacological actions of different categories of drugs 2. They would have studied in detailed about mechanism of drug action at organ system/sub cellular/ macromolecular levels. 3. They would have understood the application of basic pharmacological knowledge in the prevention and treatment of various diseases. 4. They would have observed the effect of drugs on animals by simulated experiments 5. They would got an idea about correlation of pharmacology with other bio medical sciences. 6. They would have understood the signal transduction mechanism of various receptors
	Pharmacognosy I	1. Herbs, and their Science. 2. Classification of Medicinal Plants, Phytochemistry, Carbohydrates, Lipids, 3. Terpenes, Polyphenols, Alkaloids, Pharmacology, Toxicity, Formulations and Preparations of Herbal Medicines. 4. How herbs influence our physiology and can be helpful against several disorders. 5. Relations between Phyto -therapy and the Elderly, Phyto therapy and Children, Understanding

		Herbal Action, and Understanding the Material Medica. 6. The recognition of medicinal plants, identification of adulteration and Contamination. 7. Ethnobotany & Ethno pharmacology in drug discovery process. 8. DNA Finger printing.
B.Pharm 5th Sem	Medicinal chemistry II	1. Helps in correlating between pharmacology of a disease and its mitigation or cure. 2. To write the chemical synthesis of some drugs. 3. To know the structural activity relationship of different class of drugs. 4. Knowledge about the mechanism pathways of different class of medicinal compounds. 5. To acquire knowledge about the chemotherapy for cancer. 6. To understand the chemistry of drugs with respect to their pharmacological activity.
	Formulative Pharmacy	1. After successful completion of the course student will be able to understand the various drug delivery system and its mechanisms. 2. Students will learn advanced drug delivery system early stage. 3. Developing a preparation of the drug which is both stable and acceptable to the patient. 4. They know very well about orally administered drugs, injectable, aerosol and semisolid preparations with standard protocols. 5. Formulated drugs are stored in a suitable container closure system for extended periods of time. 6. Also they know the stability study and its standard evaluation procedure for better storage conditions.
	Pharmacology II	1. Students would have understood the mechanism of drug action and its relevance in the treatment of different diseases 2. They would be trained with isolation of different organs/tissues from the laboratory animals by simulated experiments 3. They would have observed the various receptor actions using isolated tissue preparation 4. Students would appreciate the correlation of pharmacology with related medical sciences 5. They would have understood the cell communication mechanism 6. They would appreciate the newer targets of several disease conditions for treatment
	Pharmacognosy II	1. Herbs, and their Science. 2. Classification of Medicinal Plants, Phytochemistry, Carbohydrates, Lipids 3. Terpenes, Polyphenols, Alkaloids, Pharmacology, Toxicity, Formulations and Preparations of Herbal Medicines. 4. How herbs influence our physiology and can be helpful against several disorders.

		5. Relations between Phyto -therapy and the Elderly, Phytotherapy and Children, Understanding Herbal Action, and Understanding the Material Medica. 6. The recognition of medicinal plants, identification of adulteration and Contamination. 7. Ethnobotany & Ethno-pharmacology in drug discovery process. 8. DNA Finger printing.
	Pharmaceutical Biotechnology	1. Students will understand the various techniques used in modern biotechnology. 2. Students can design research strategy with step -by -step instructions to address a research problem 3. Students can able to provide examples of current applications of biotechnology and advances in the different areas like medical, microbial, environmental, bioremediation, agricultural, plant, animal, and forensic 4. Students can explain the concept and application of monoclonal antibody technology 5. Students can demonstrate and Provide examples on how to use microbes and mammalian cells for the production of pharmaceutical products 6. Students can able to explain the general principles of generating transgenic plants, animals and microbes
B.Pharm 6th Sem	Medicinal chemistry III	1. To develop an understanding of the physico-chemical properties of drugs. 2. To understand how current drugs were developed by using pharmacophore modeling and docking technique. 3. To acquire knowledge in the chemotherapy for cancer and microbial diseases and different anti-viral agents. 4. To acquire knowledge about the mechanism pathways of different class of medicinal compounds. 5. To have been introduced to a variety of drug classes and some pharmacological properties. 6. To acquire knowledge on thrust areas fir further research.
	Pharmacology III	1. Students would have studied elaborately on mechanism of drug action and its relevance in the treatment of different infectious diseases 2. They comprehended the principles of toxicology and treatment of various poisonings 3. They came across the methods of toxicity studies 4. They studied about symptoms of several poisonings 5. They studied about treatment of several poisonings 6. Students understood the toxicity profile of each drugs
	Herbal drug	1. The aim of the degree course is to provide graduates with a good knowledge of the basic and

	technology	Applied know-how and professional skills in Herbal drug Science and Technology and the necessary training for admission to the postgraduate courses in this field. 2. They will acquire operative know-how and be able to carry out technical 3. Management tasks and professional activities in the areas of transformation of medicinal herbs, management of the quality of the processes, marketing of medicinal plants and derivatives for use in herbal, food and cosmetic products 4. Guaranteeing conformity with the national and EU laws in force.
	Biopharmaceutics and pharmacokinetics	1. Understand the concept of ADME of drug in human body. 2. Determine the various pharmacokinetic parameters from either plasma concentration or urinary excretion data for drug 3. Apply the various regulations related to developing BA -BE study protocol for the new drug molecule.
	Pharmaceutical biotechnology	1. Understanding the importance of Immobilized enzymes in Pharmaceutical Industries 2. Genetic engineering applications in relation to production of pharmaceuticals 3. Importance of Monoclonal antibodies in Industries 4. Appreciate the use of microorganisms in fermentation technology
	Pharmaceutical quality assurance	1. The students understand the importance of quality in pharmaceutical products. 2. The students is explored into importance of Good practices such as GMP, GLP. 3. The factors affecting the quality of pharmaceutical is explored. 4. He understands the regulatory aspects of pharmaceutical taught to the student. 5. The process involved in manufacturing of pharmaceuticals different section/department and activity is learnt. 6. The various documentation process is highlighted to the student.
B.Pharm 7thSem	Medicinal chemistry II	1. Helps in correlating between pharmacology of a disease and its mitigation or cure. 2. To write the chemical synthesis of some drugs. 3. To know the structural activity relationship of different class of drugs. 4. Knowledge about the mechanism pathways of different class of medicinal compounds. 5. To acquire knowledge about the chemotherapy for cancer. 6. To understand the chemistry of drugs with respect to their pharmacological activity.
	Pharmacology II	1. Students understood the mechanism of drug action and its relevance in the treatment of different diseases 2. They comprehended the principles of toxicology and treatment of various poisonings. 3. They are able to locate and isolate different organs/tissues from the laboratory animals used

		in pharmacological experiments 4. They studied in detailed about various receptor actions using isolated tissue preparation 5. They understood the correlation of pharmacology with related medical sciences 6. Students were studied about the various methods of toxicity studies
	Advanced Pharmacognosy	1. Definition and objectives of Pharmacognosy. Information about the use of Medicinal plants. Plant as a source of drugs of pharmaceutical interest. 2. Extraction procedures for natural compounds, their differences and their applications the main pathways of aromatic amino acids, alkaloids, phenyl propanoids 3. Biogenesis and biological activity of natural products coming from mevalonate: terpenoids and steroids; 4. The biological activities of several compounds belonging to polypeptides, terpenoids and steroids; and their traditional use and application in pharmaceutical and/or nutraceutical field. 5. Indian Traditional systems of Medicine. 6. Use of microscopic methods in the identification of natural drugs and herbal products, with emphasis on the use of light and scanning electron microscopes. 7. Principles and concepts in plant taxonomy, which include identification, classification, nomenclature, discussion of major recent/modern systems, family characterization and field work methods. 8. Marine natural product chemistry. Include examples of marine antineoplastic agents, marine toxins, and other pharmaceutically relevant marine natural products from various marine organisms. 9. Introduction to Herbal cosmetics and Nutrients.
	Formulative and Industrial pharmacy	1. Know the various pharmaceutical dosage forms and their manufacturing techniques. 2. know various considerations in development of pharmaceutical dosage forms 3. formulate solid, liquid and semisolid dosage forms and evaluate them for their quality
	Instrumental method of analysis	The student will learn to 1. The basic theoretical knowledge of the instrumentation techniques available. 2. Theoretically understand the aspects of separation for multi components. 3. Practical skills for the analysis of drugs and excipients using various instrumentation techniques. 4. To make accurate analysis and report the results in defined formats. 5. To learn documentation and express the observations with clarity.

		6. To understand the professional and safety responsibilities for working in the analysis Laboratory.
	Pharmacy Practice	1. Students will demonstrate knowledge of and ability to use principles of therapeutics, quality improvement, communication, economics, health behavior, social and administrative aspects, health policy and legal issues in the practice of pharmacy. 2. Students will use knowledge of drug distribution methods in hospital and apply it in the practice of pharmacy. 3. Students will effectively apply principles of drug store management and inventory control to medication use. 4. Students will provide patient-centered care to diverse patients using the best available evidence and monitor drug therapy of patient through medication chart review, obtain medication history interview and counsel the patients, identify drug related problems. 5. Students will engage in innovative activities by making use of the knowledge of clinical trials 6. Students will exhibit professional ethics by producing safe and appropriate medication use throughout society
B.Pharm 8thSem	Biostatistics and research methodology	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 problems 3. Appreciate statistical techniques in solving the problems**.**
	Social and preventive pharmacy	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.
	Pharma marketing management	1. The course aims to provide an understanding of marketing concepts and techniques 2. Their applications in the pharmaceutical industry.
	Pharmaceutical regulatory science	1. Know about the process of drug discovery and development 2. Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals 3. Know the regulatory approval process and their registration in Indian and international markets

	Pharmacovigilance	1. To know why drug safety monitoring is important? 2. .know history and development of pharmacovigilance 3. To know national and international scenario of pharmacovigilance 4. Dictionaries, coding and terminologies used in pharmacovigilance 5. Detection of new adverse drug reactions and their assessment 6. International standards for classification of diseases and drugs 7. Adverse drug reaction reporting systems and communication in pharmacovigilance 8. Methods to generate safety data during pre-clinical, clinical and post approval phases of 9. drugs' life cycle 10. Drug safety evaluation in pediatrics, geriatrics, pregnancy and lactation 11. Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India 12. ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning 13. CIOMS requirements for ADR reporting 14. Writing case narratives of adverse events and their quality.
	Quality control and standardization of herbals	1. know WHO guidelines for quality control of herbal drugs 2. know Quality assurance in herbal drug industry 3. know the regulatory approval process and their registration in Indian and international markets 4. appreciate EU and ICH guidelines for quality control of herbal drugs
	Computer aided drug design	1. Design and discovery of lead molecules 2. The role of drug design in drug discovery process 3. The concept of QSAR and docking 4. Various strategies to develop new drug like molecules. 5. The design of new drug molecules using molecular modeling software
	Cell and molecular biology	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
	Pharmacological screening methods	1. Appreciate the applications of various commonly used laboratory animals. 2. Appreciate and demonstrate the various screening methods used in preclinical

		3. research 4. Appreciate and demonstrate the importance of biostatistics and research methodology 5. Design and execute a research hypothesis independently
	Advanced instrumentation techniques	1. understand the advanced instruments used and its applications in drug analysis 2. Understand the chromatographic separation and analysis of drugs. 3. understand the calibration of various analytical instruments 4. know analysis of drugs using various analytical instruments
	Dietary supplements and nutraceutical	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.

Programme: M. Pharm	
Programme Outcomes	To generate Pharmacy Post Graduates with profound knowledge in various branches of Pharmaceutical Sciences to meet with the rapidly increasing demands put forward by 1 Pharmaceutical Manufacturing 2 Pharmaceutical Research & Development 3 Pharmacological research including preclinical & clinical studies. 4 Herbal Drug Research 5 Pharmaceutical & Herbal Drug Analysis 6 Clinical Toxicology & Toxicological Analysis

Programme: M. Pharm. (Pharmaceutics) **Duration of the program**: The course of study for M.Pharm shall extend over a period of four semesters (Two academic years)		
Name of the Program and semester	**Name of the course**	**Course Outcome**
M Pharm Sem-I	Modern Pharmaceutical Analytical Techniques	1. Recall, apply and interpret theoretical principle, instrumentation and applications of Spectroscopic techniques like UV, IR, Fluorimetry, AAS and FES.
		2. Recall, apply and interpret theoretical principle, instrumentation and applications of Spectroscopic techniques like NMR, MS and X-ray crystallography.
		3. Recall, apply and interpret theoretical principle, instrumentation and applications of chromatographic techniques like paper, TLC, Ion exchange, column GC, HPLC and Affinity chromatograph.
		4. Recall, and understand theoretical principle, instrumentation and applications of electrophoresis and immunological techniques like RIA, ELISA and bioluminescence assay
	Drug Delivery System	1. Understand the Principles & Fundamentals in development on novel drug delivery systems
		2. Understand the various approaches for development of novel drug delivery systems
		3. Understand the criteria for selection of drugs and polymers for the development of delivering system
		4. understand the formulation and evaluation of Novel drug delivery systems
	Modern Pharmaceutics	1. Understand the elements of pre-formulation studies
		2. Understand the optimization techniques in pharmaceutical formulation and processing.

		3. Understand the Pharmaceutical Validation, policies of current good manufacturing practices and concept of Total Quality Management
		4. Understand the Physics of tablet compression, Dissolution parameters and Pharmacokinetic parameter and linearity Concept of significance
	Regulatory Affairs	1. To understand the concepts of innovator and generic drugs, drug development process, Regulatory guidance's and guidelines for filing and approval process and documentation in pharmaceutical industry.
		2. To understand, Preparation of dossiers and their submission to regulatory agencies in different countries.
		3. Know about the post approval regulatory requirements for actives and drug products and Submission of global documents in CTD/ eCTD formats.
		4. Know about the clinical trials requirements for approvals for conducting clinical trials Pharmacovigilance and process of monitoring in clinical trials.
	Pharmaceutics Practical I	1. Analysis of Pharmacopoeia compounds and their formulations by UV Vis spectrophotometer/ HPLC/ Gas Chromatography
		2. To carry out formulation and evaluation of sustained release matrix tablets
		3. To carry out the formulation and evaluation of Trans dermal patches
		4. Pre-formulation studies of tablets, effect of compressional force and to plot Heckle plot, Higuchi and peppa's factors
M.PharmSem-II	Molecular Pharmaceutics	1. Understand the basic concepts of Targeting and Targeted Drug Delivery Systems
		2. Understand the preparation and evaluation of Micro Capsules / Micro Spheres/ Niosomes, aquasomes
		3. Understand the preparation and evaluation of Pulmonary Drug Delivery Systems
		4. Understand the preparation and evaluation of Veterinary Drug Delivery Systems
	Advanced Biopharmaceutics And Pharmacokinetics	1. Understand the basic concepts in Biopharmaceutics and pharmacokinetics.
		2. Understand the use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination
		3. Understand the critical evaluation of Biopharmaceutical studies involving drug product Equivalency.

		4. Understand the design and evaluation of dosage regimens of the drugs using pharmacokinetic and Biopharmaceutical parameters and potential clinical Pharmacokinetic problems and application of basics of Pharmacokinetic
	Computer aided drug development	1. Understand history of Computers in Pharmaceutical Research and Development 2. To understand computational Modeling of Drug Disposition 3. To know importance of Computers in Preclinical Development 4. Optimization Techniques in Pharmaceutical Formulation 5. Importance of Computers in Market Analysis ,Clinical Development 6. Artificial Intelligence (AI) and Robotics 7. Computational fluid dynamics(CFD)
	Cosmetics and cosmeceuticals	1. To know the key ingredients used in cosmetics and cosmeceuticals. 2. To know key building blocks for various formulations. 3. To know Current technologies in the market 4. Understand various key ingredients and basic science to develop cosmetics and 5. cosmeceuticals 6. to get Scientific knowledge to develop cosmetics and cosmeceuticals with 7. desired Safety, stability, and efficacy.