Program Name: M.Pharm Program

Program Outcomes:

1. **Pharmacy knowledge:** Possess knowledge and comprehension of the core and basic knowledge associated with the profession of pharmacy, including biomedical sciences; pharmaceutical sciences; behavioral, social, and administrative pharmacy sciences; and manufacturing practices.
2. **Problem solving:** Demonstrate effective planning abilities and 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.
3. **Modern tool usage:** Learn, select, and apply appropriate methods and procedures, resources, and modern pharmacy-related computing tools with an understanding of the limitations.
4. **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.
5. **Professional Identity & ethics:** Understand, analyze and communicate the value of their professional roles in society while maintaining personal values and ethics.
6. **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.
7. **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.
8. **Life-long learning:** Ability to engage in independent and life-long learning in the broadest context of technological change and sustainability. Self-assess and use feedback effectively from others to identify learning needs and to satisfy these needs on an ongoing basis.

<u>Program Specific Outcomes (PSO's) for each specialization</u>

M.Pharm. Pharmaceutics:

PSO1: Demonstrate advanced knowledge of pharmaceutical formulation, drug delivery systems, and dosage form design.

PSO2: Develop skills in pharmaceutical product development, from concept to commercialization.

PSO3: Apply the knowledge of developing cosmeceuticals and computational skills in drug development.

M.Pharm. Pharmaceutical Technology:

PSO1: Design and optimize novel drug delivery systems and advanced therapeutic platforms, incorporating modern technologies and biomaterials to enhance product performance.

PSO2: Demonstrate the significance of nanotechnology and quality by design in pharmaceutical product development.

PSO3: Develop skills in the specialized areas of medical devices and pharmacokinetics.

M.Pharm. Industrial Pharmacy:

PSO1: Design pharmaceutical formulations and develop novel drug delivery systems by following advanced production techniques.

PSO2: Demonstrate the scale up and technology transfer skills.

PSO3: Apply the knowledge in protection of intellectual properties.

M.Pharm. Pharmaceutical Quality Assurance

PSO1: Understand regulatory guidelines like Good Practices (GxP) like, Good Manufacturing Practices (GMP), Good Laboratory Practices (GLP), and (ICH) standards and to ensure quality at every stage of drug formulation and process development, from raw materials to finished products.

PSO2: Ensure proficiency in validating analytical methods and process used in Pharmaceutical industry and implementing and managing quality management systems in pharmaceutical industries.

PSO3: Familiarize with pharmaceutical documentation and audit processes to meet regulatory requirements in pharmaceutical manufacturing environment and promote awareness of the societal impact of pharmaceutical quality assurance on public health.

M.Pharm. Regulatory Affairs:

PSO1: Demonstrate comprehensive understanding and practical application of national and international pharmaceutical regulatory frameworks, guidelines, and standards governing drug development, manufacturing, and marketing.

PSO2: Manage the regulatory aspects of clinical trials, maintain pharmaceutical quality management systems that ensure compliance and develop innovative solutions for complex regulatory challenges

PSO3: Evaluate and navigate regulatory requirements across different global markets, developing strategies for international product registration and managing harmonization initiatives.

M.Pharm. Pharmacology

PSO1: Apply advanced principles of drug action and receptor theory to analyze drug-target interactions, signal transduction pathways, and therapeutic mechanisms, integrating concepts of molecular pharmacology, biochemistry, and pathophysiology to understand drug effects at cellular and systemic levels.

PSO2: Design and execute preclinical pharmacological studies, including in vitro and in vivo experiments for target identification, lead optimization, and assessment of pharmacokinetic & pharmacodynamic drug effects; toxicity &safety profiles; and potential therapeutic applications while adhering to ethical research principles.

PSO3: Analyze and interpret clinical pharmacology data, including bioavailability studies, therapeutic drug monitoring, and population pharmacokinetics to optimize therapeutic outcomes, meet regulatory requirements, and apply pharmacogenomic principles to support precision medicine initiatives.

M. Pharm (Pharmaceutics)

Semester	Course Name	Course Outcomes	
I	Modern Pharmaceutical Analytical Techniques	CO-1	Explain the applications of various analytical techniques like UV, IR, NMR, Mass, X-Ray Diffraction, Chromatographic and electrophoretic analysis for various Pharmaceutical Products Analysis
		CO-2	Apply the various Analytical Techniques for various Drugs and Pharmaceutical Analytical Applications .
		CO-3	Summarize all the theoretical knowledge on various instrumental techniques available for analysis of various dosage and pharmaceutical forms
		CO-4	Apply the knowledge learnt in developing new procedures for analytical testing of various dosage forms.
	Drug Delivery Systems	CO-1	Design and develop various approaches for the development of novel drug delivery systems
		CO-2	Identify and analyze the key ingredients, polymers for the development of delivering system
		CO-3	Grasp the fundamental importance and significance of Drug Delivery Systems, as well as apply what they've learned to develop products for Novel use
		CO-4	Investigate the concepts of Gastro-Retentive, Ocular, Transdermal, Protein and Peptide, and Vaccine Delivery Systems and critically evaluate problems associated with various Drug Delivery Systems.
	Modern Pharmaceutics	CO-1	Design the elements of preformulation studies and Apply QbD concept to design and optimize pharmaceutical formulations.
		CO-2	Evaluate various Industrial Management aspects, Pharmaceutical Validation and GMP Considerations.
		CO-3	Analyze the concepts of Physics of tablet compression, compaction and consolidation.
		CO-4	Apply various Statistical techniques in pharmaceutical development.

Semester	Course Name	Course Outcomes	
	Pharmaceutics Practicals - I	CO-1	Evaluate drugs by various instrumental analytical techniques.
		CO-2	Perform preformulation studies for development of various dosage forms.
		CO-3	Design and optimize various types of controlled oral, transdermal and mucosal drug delivery systems.
		CO-4	Evaluate the compressional force, micromeritic properties, effect of particle size, binders on formulation of Tablets with the prediction of pharmaceutical factors affecting drug release kinetics
	Regulatory Affairs	CO-1	Understand the significance of documentation in Pharmaceutical industry.
		CO-2	Apply the concepts of filing and approval of IND, NDA and ANDA for drug development as per different regulatory agencies.
		CO-3	Implement knowledge of ICH Guidelines for registrations of drug substance and drug product according to CTD/ eCTD formats.
		CO-4	Assess clinical trials requirements and Pharmacovigilance.
II	Computer Aided Drug Development (723PH0C028)	CO-1	Explain the history and evolution of application of computer aided techniques in pharmaceutical research and industry.
		CO-2	Design experiments by using the concept of QBD and DoE in formulation development and analyze them using a computer software.
		CO-3	Summarize the use of computer aided techniques in drug discovery, pre-clinical and clinical development.
		CO-4	Discuss the recent trends and future directions in computer aided techniques for pharmaceutical automation and applications.
	Molecular Pharmaceutics (Nano Technology	CO-1	Develop strategies of targeted drug delivery systems for tumor and brain specific delivery.

Semester	Course Name	Course Outcomes	
	& Targeted DDS) (723PH0C027)	CO-2	Formulate various targeting carriers like nanoparticles, liposomes, monoclonal antibodies, niosomes, aquasomes, phytosomes, electrosomes, transfersomes, exosomes, biosensors, medical devices and theranostics.
		CO-3	Design aerosols, dry powder inhalers, other intra nasal route delivery systems and their packaging containers.
		CO-4	Apply the knowledge of gene therapy, antisense molecules and aptamers in the design of targeted drug delivery systems including liposomal gene delivery system.
	Cosmetics and Cosmeceuticals (723PH0C029)	CO-1	Design and develop cosmetics and cosmeceuticals while adhering to regulatory requirements.
		CO-2	Identify and evaluate the key ingredients and building blocks to develop Cosmetics and Cosmeceuticals
		CO-3	Grasp and apply the knowledge of skin and its biology to create Cosmetics and Cosmeceuticals to address the problems associated with skin and oral cavity
		CO-4	Apply the knowledge of ingredients and building blocks to formulate safe herbal Cosmetics and Cosmeceuticals
	Advanced Biopharmaceutics & Pharmacokinetics (723PH0C044)	CO-1	Understand the basic concepts in biopharmaceutics and drug absorption, distribution, metabolism and elimination.
		CO-2	Analyze the pharmacokinetic data and interpret the pharmacokinetic parameters of products.
		CO-3	Design and evaluate of bioavailability and bioequivalence Studies.
		CO-4	Apply and co-relate the concepts of pharmacodynamic, drug interactions, IVIVC for efficient design of dosage forms.
	Pharmaceutics Practicals - II	CO-1	Design and develop various delivery systems like microcapsules, microparticles, alginate beads, liposomes/niosomes, spherules and solid dispersions.
		CO-2	Formulate and evaluate various cosmetic products.

Semester	Course Name	Course Outcomes	
		CO-3	Apply QbD concept for optimization of pharmaceutical products.
		CO-4	Analyze and predict pharmacokinetic parameters using software, simulations and computational modeling of drug disposition.
III	Research Methodology & Biostatistics	CO-1	Design the concept of research methodologies
		CO-2	Compile various statistical tools in pharmaceutical research
		CO-3	Write medical research in research studies and healthcare
		CO-4	Plan the animal studies as per CPCSEA guidelines

CO-PO Mapping

Programme	Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3
M. Pharm (Pharmaceutics)	I	Modern Pharmaceutical Analytical Techniques	CO-1	H	H	M			L	L	M	M	M	
			CO-2	H	H	H			L	L	M	M	M	
			CO-3	H	M				L		M			
			CO-4	M	H	H				L	H	M	M	
		Drug Delivery Systems	CO-1	H	H	L	M	L	L	L	M	H	H	
			CO-2	H	H	L		L	L	L	M	H	H	
			CO-3	H	H		M	L	L	L	M	H	H	
			CO-4	H	H		M	L	L	L	M	H	H	
		Modern Pharmaceutics	CO-1	H	H	H	L	M		H	M	M	M	L
			CO-2	H	H	H	L	M		H	M	M	M	
			CO-3	H	H	H	L	M		H	M	H	M	
			CO-4	H	H	H	L	M		H	M	H	M	M
		Pharmaceutics Practicals - I	CO-1	H	H	H	M	L	M	H	M	M	H	L
			CO-2	H	H	M	H	L	M	H	M	M	H	L
			CO-3	H	H	H	M	H	M	L	M	M	H	L
			CO-4	H	H	M	M	M	M	L	M	M	H	L
		Regulatory Affairs	CO-1	H			M	M	M	L	H	M	M	M
			CO-2	H			M	M	M	L	H	M	M	M
			CO-3	H		M	M	M	M	L	H	M	H	M
			CO-4	H			M	H	M	L	H	M	H	M
	II	Computer Aided Drug Development	CO-1	M								H		
			CO-2	H	H	H					L	H	H	H
			CO-3	H	M	H					L		H	H
			CO-4		H	L					H		H	H
		Molecular Pharmaceutics (Nano Technology & Targeted DDS)	CO-1	H	H	H				M	H	H	H	
			CO-2	H	H	H				M	H	H	H	
			CO-3	H	H	H				M	H	H	H	
			CO-4	H	H	L				M	H	H	H	
		Cosmetics and Cosmeceuticals	CO-1	H	M	M	L	H	L	M	L	M	H	M
			CO-2	H	M	M	L	H	L	M	L	M	H	M
			CO-3	H	M	M	L	H	L	M	L	M	H	M
			CO-4	H	M	M	L	H	L	M	H	M	H	M
		Advanced Biopharmaceutics & Pharmacokinetics	CO-1	M	M	L		M		M	M	M	M	L
			CO-2	H	H	H		M		M	M	M	M	L
			CO-3	H	H	H		M		M	M	M	M	L
			CO-4	H	H	H		M		M	M	M	M	L
		Pharmaceutics Practicals - II	CO-1	H	M	M	H	H		H	M	M	M	L

Programme	Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3
			CO-2	H	L	M	M	M		H	M	M	M	L
			CO-3	M	H	M	H	M		H	M	M	M	L
			CO-4	H	L	M	M	L		M	H	M		L
	III	Research Methodology & Biostatistics	CO-1	H	M	M	M	H	M	H	H	H	H	M
			CO-2	H	H	H	L	M	L	L	M	M	M	M
			CO-3	H	M	M	M	H	M	M	H	H	H	H
			CO-4	H	H	L	H	M	M	L	H	H	M	M

M. Pharm (Pharmaceutical Technology)

Semester	Course Name	Course Outcomes	
I	Modern Pharmaceutical Analytical Techniques	CO-1	Explain the applications of various analytical techniques like UV, IR, NMR, Mass, X-Ray Diffraction, Chromatographic and electrophoretic analysis for various Pharmaceutical Products Analysis
		CO-2	Apply the various Analytical Techniques for various Drugs and Pharmaceutical Analytical Applications .
		CO-3	Summarize all the theoretical knowledge on various instrumental techniques available for analysis of various dosage and pharmaceutical forms
		CO-4	Apply the knowledge learnt in developing new procedures for analytical testing of various dosage forms.
	Pharmaceutical Product Development	CO-1	Understand product life cycle and drug development strategies.
		CO-2	Design formulation and manufacturing processes.
		CO-3	Plan scale up and technology transfer activities.
		CO-4	Explain regulatory aspects and prepare dossiers for pharmaceutical products.
	Advances in Drug Delivery	CO-1	Design and analyse the various concepts and models of drug delivery systems, their recommend the carriers involved in drug delivery.
		CO-2	Formulate and evaluate various novel drug delivery systems like oral, mucoadhesive, ransdermal systems, targeted systems, protein/peptide systems.
		CO-3	Explain the biotechnology in drug delivery systems.
		CO-4	Summarize the new trends for personalized medicine.
	Pharmaceutical Technology Practical - I	CO-1	Demonstrate the scheduled activities in a pharmaceutical firm.
		CO-2	Interpret and apply the knowledge in routine F & D.
		CO-3	Design and analysis of various dosage form.
		CO-4	Understand and analyse the requirements for formulation work from start to end.
		CO-1	Assess and prepare documents as per different Regulatory Agencies worldwide.

Semester	Course Name	Course Outcomes	
	Drug Regulatory Affairs & Compliance	CO-2	Establish procedures and requirements to get marketing authorization for bulk and formulation as per USA and EU
		CO-3	Analyze various ICH guidelines and WHO Prequalification of Medicines
		CO-4	Assess various Intellectual property rights, various routes of filing patents and patents act.
II	Pharmaceutical Nanotechnology	CO-1	Understand the concepts of nanoscience, regulatory aspects and their advances.
		CO-2	Design and optimize different nanoformulations.
		CO-3	Outline characterization parameters and packaging of nanoformulations.
	Advances in Medical Devices	CO-1	Compile the National, International status for medical device market and discuss the MDR Act 2017 India.
		CO-2	Conceptualise the design, evaluation of medical device and the WHO requirement of regulated market in various countries like US, Canada, India.
		CO-3	Explain the applications and functioning of the various implantable active medical devices, prosthetics, support devices, wound dressings, orthopedic, dental and other medical devices.
		CO-4	Differentiate various polymeric and other materials used in construction of medical devices, packaging materials and the selection of sterilization process.
	Quality By Design in Pharmaceuticals	CO-1	Analyze the various statistical tools applied in pharmaceutical industry.
		CO-2	Apply the knowledge of QbD for formulation development.
	Pharmaceutical Technology Practicals - II	CO-1	Formulate, characterize and evaluate various novel drug delivery systems, herbal and cosmetic formulations.
		CO-2	Apply DOE and QbD software for product development.
		CO-3	Demonstrate few medical devices and newer technology involved in advanced drug delivery systems, Differentiate the marketed formulation brands using In – vitro studies.
		CO-4	Analyse and interpret results obtained with various analytical techniques.

Semester	Course Name	Course Outcomes	
	Pharmacoeconomics	CO-1	Compares the value of one pharmaceutical drug or drug therapy to another systems.
		CO-2	Distinguish the Principles, Methods, and Applications.
		CO-3	Design the pharmacoeconomic literature evaluation.
		CO-4	Prepare the cost-effectiveness and incremental analysis, Sensitivity analysis of therapy.
	Advanced Biopharmaceutics & Pharmacokinetics	CO-1	Understand the basic concepts in biopharmaceutics and drug absorption, distribution, metabolism and elimination.
		CO-2	Analyze the pharmacokinetic data and interpret the pharmacokinetic parameters of products.
		CO-3	Design and evaluate of bioavailability and bioequivalence Studies.
		CO-4	Apply and co-relate the concepts of pharmacodynamic, drug interactions, IVIVC for efficient design of dosage forms.
III	Research Methodology & Biostatistics	CO-1	Design the concept of research methodologies
		CO-2	Compile various statistical tools in pharmaceutical research
		CO-3	Write medical research in research studies and healthcare
		CO-4	Plan the animal studies as per CPCSEA guidelines

CO-PO Mapping

Programme	Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3
M. Pharm (Pharma Tech)	I	Pharmaceutical Product Development	CO-1	H	H	H	M	L	L	L	L	L	M	L
			CO-2	H	H	H	H	L	L	L	L	L	M	L
			CO-3	H	H	H	H	L	L	L	L	L	M	L
			CO-4	H	H	H	M	L	L	L	L	L	M	L
		Modern Pharmaceutical Analytical Techniques	CO-1	H	H	M			L	L	M	M	M	
			CO-2	H	H	H			L	L	M	M	M	
			CO-3	H	M				L		M			
			CO-4	M	H	H				L	H	M	M	
		Advances in Drug Delivery	CO-1	H	M	M	L	H	L	M	L	M	H	M
			CO-2	H	M	M	L	H	L	M	L	M	H	M
			CO-3	H	M	M	L	H	L	M	L	M	H	M
			CO-4	H	M	M	L	H	L	M	H	M	H	M
		Pharmaceutical Technology Practical - I	CO-1	M	M	L	H	H	L	H	M	M	L	M
			CO-2	M	M	L	H	H	L	H	M	M	L	M
			CO-3	M	M	L	H	H	L	H	M	M	L	M
			CO-4	M	M	L	H	H	L	H	M	M	L	M
		Drug Regulatory Affairs & Compliance	CO-1	H			M	M	M	L	H	M	M	M
			CO-2	H			M	M	M	L	H	M	M	M
			CO-3	H			M	M	M	L	H	M	M	M
			CO-4	H			M	M	M	L	H	M	M	M
	II	Pharmaceutical Nanotechnology	CO-1	H	M	M	L	H	L	M	L	M	H	M
			CO-2	H	M	M	L	H	L	M	L	M	H	M
			CO-3	H	M	M	L	H	L	M	L	M	H	M
			CO-4	H	M	M	L	H	L	M	H	M	H	M
		Advances in Medical Devices	CO-1	H			M	M	L	L	H	L	L	H
			CO-2	H			M	M	L	M	H	M	L	H
			CO-3	H			M	M	L	M	H	L	L	H
			CO-4	H			M	L	L	L	H	L	L	H
		Advanced Biopharmaceutics & Pharmacokinetics	CO-1	M	M	L		M		M	M	M	M	L
			CO-2	H	H	H		M		M	M	M	M	L
			CO-3	H	H	H		M		M	M	M	M	L
			CO-4	H	H	H		M		M	M	M	M	L
		Quality By Design in Pharmaceuticals	CO-1	H	H	M	L	L	L	M	H	M	M	L
			CO-2	H	H	M	L	L	L	M	H	M	M	
		Pharmaceutical Technology Practicals - II	CO-1	H	H	H	L	L	H	L	L	L	M	L
			CO-2	H	H	H	L	L	L	L	L	H	H	H
			CO-3	H	H	H	L	L	M	L	L	H	H	H

Programme	Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3
			CO-4	H	H	H	H	L	H	L	L	M	H	M
		Pharmacoeconomics	CO-1	H	H	M	M	M	M	M	M	M	L	L
			CO-2	H	H	M	M	M	M	M	M	M	L	L
			CO-3	H	H	M	M	M	M	M	M	M	L	L
			CO-4	H	H	M	M	M	M	M	M	M	L	L
	III	Research Methodology & Biostatistics	CO-1	H	M	M	M	H	M	H	H	H	H	M
			CO-2	H	H	H	L	M	L	L	M	M	M	M
			CO-3	H	M	M	M	H	M	M	H	H	H	H
			CO-4	H	H	L	H	M	M	L	H	H	M	M

M. Pharm (Industrial Pharmacy)

Semester	Course Name	Course Outcomes	
I	Modern Pharmaceutical Analytical Techniques	CO-1	Explain the applications of various analytical techniques like UV, IR, NMR, Mass, X-Ray Diffraction, Chromatographic and electrophoretic analysis for various Pharmaceutical Products Analysis
		CO-2	Apply the various Analytical Techniques for various Drugs and Pharmaceutical Analytical Applications .
		CO-3	Summarize all the theoretical knowledge on various instrumental techniques available for analysis of various dosage and pharmaceutical forms
		CO-4	Apply the knowledge learnt in developing new procedures for analytical testing of various dosage forms.
	Pharmaceutical Formulation Development	CO-1	Plan preformulation studies
		CO-2	Design dosage form based on knowledge of formulation additives, design of experiments and solubility studies
		CO-3	Construct the dissolution and stability studies
	Novel Drug Delivery Systems	CO-1	Design and analyse the various concepts and models of drug delivery systems, their recommend the carriers involved in drug delivery.
		CO-2	Formulate and evaluate various novel drug delivery systems like oral, mucoadhesive, transdermal systems, targeted systems, protein/peptide systems.
		CO-3	Explain the biotechnology in drug delivery systems.
		CO-4	Summarize the new trends for personalized medicine.
	Industrial Pharmacy Practicals - I	CO-1	Demonstrate and analyse the scheduled activities in a pharmaceutical firm using various sophisticated analytical instruments
		CO-2	Interpret and apply the knowledge in routine Formulation R & D and Analytical R&D activities

Semester	Course Name	Course Outcomes	
		CO-3	Designing and analysing the preformulation studies for various pharmaceutical dosage forms and cosmetic formulations
	Intellectual Property Rights	CO-1	Assess and prepare documents as per different Regulatory Agencies worldwide.
		CO-2	Understand the scope for protecting novel creations and critically analyze the inventiveness of work.
		CO-3	Assess various Intellectual property rights, various routes of filing patents, prior art and patents act.
II	Scale up and Technology Transfer (723PH0C022)	CO-1	Manage the scale up process in pharmaceutical industry and assist in technology transfer with understanding of QbD, PAT.
		CO-2	Plan the various equipment and instruments qualification
		CO-3	Apply the validation concepts to analytical methods, cleaning of equipment, raw material, different processes of manufacturing, aseptic room, environmental control
		CO-4	Establish safety guidelines, which prevent industrial hazards.
	Advanced Biopharmaceutics & Pharmacokinetics (723PH0C044)	CO-1	Understand the basic concepts in biopharmaceutics and drug absorption, distribution, metabolism and elimination.
		CO-2	Analyze the pharmacokinetic data and interpret the pharmacokinetic parameters of products.
		CO-3	Design and evaluate of bioavailability and bioequivalence Studies.
		CO-4	Apply and co-relate the concepts of pharmacodynamic, drug interactions, IVIVC for efficient design of dosage forms.

Semester	Course Name	Course Outcomes	
	Pharmaceutical Production Technology (723PH0C023)	CO-1	Understand the manufacturing processes of dosage forms like tablets, capsules, dispersion systems and plan their production activities.
		CO-2	Design the manufacturing layout parenteral products with advanced technologies.
		CO-3	Suggest the best packaging material for different pharmaceutical products.
		CO-4	Apply concepts of water treatment process at industrial scale.
	Entrepreneurship Management (723PH0C024)	CO-1	Understand the role of enterprise in national and global economy.
		CO-2	Understand dynamics of motivation and concepts of entrepreneurship.
		CO-3	Understand demands and challenges of Growth Strategies and Networking.
	Industrial Pharmacy Practicals - II	CO-1	Demonstrate the preparation and characterization of various formulations.
		CO-2	Understand mathematical modelling and pharmacokinetic parameters.
		CO-3	Design the scale-up of pharmaceutical formulations.
		CO-4	Decide/perform drying processes.
III	Research Methodology & Biostatistics	CO-1	Design the concept of research methodologies
		CO-2	Compile various statistical tools in pharmaceutical research
		CO-3	Write medical research in research studies and healthcare
		CO-4	Plan the animal studies as per CPCSEA guidelines

CO-PO Mapping

Programme	Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3
M. Pharm (Industrial Pharmacy)	I	Pharmaceutical Formulation Development	CO-1	H	M	H	L	M	L	L	M	M	L	H
			CO-2	H	H	H	L	M	L	M	M	H	H	H
			CO-3	H	H	M	L	M	L	L	M	M	L	M
		Modern Pharmaceutical Analytical Techniques	CO-1	H	H	M			L	L	M	M	M	
			CO-2	H	H	H			L	L	M	M	M	
			CO-3	H	M				L		M			
			CO-4	M	H	H				L	H	M	M	
		Novel Drug Delivery Systems	CO-1	H	H	H	L	L	L	M	M	H	H	L
			CO-2	H	H	H	L	L	L	M	M	H	H	M
			CO-3	H	H	H	L	L	L	M	M	H	H	L
			CO-4	H	H	H	L	L	L	M	M	H	H	L
		Industrial Pharmacy Practicals - I	CO-1	H	H	H	L	L	L	M	M	H	H	L
			CO-2	H	H	H	L	L	L	M	M	H	H	M
			CO-3	H	H	H	L	L	L	M	M	H	H	L
		Intellectual Property Rights	CO-1	H	M	M	M	L	M	M	L	M	M	H
			CO-2	H	M	M	M	L	M	M	L	M	M	H
			CO-3	H	M	M	M	L	M	M	L	M	M	H
			CO-4	H	M	M	M	L	M	M	L	M	M	H
	II	Scale up and Technology Transfer	CO-1	H	H	M	H	L	L	L	M	L	H	L
			CO-2	H	M	M	M	L	L	L	M	M	H	L
			CO-3	H	H	M	M	L	L	L	M	L	M	L
			CO-4	H	L	M	M	L	L	M	M	L	L	L
		Pharmaceutical Production Technology	CO-1	H	M	M	M	L		H	M	M	M	L
			CO-2	H	M	M	M	L		H	M	M	M	M
			CO-3	H	M	M	M	L		H	M	M	M	M
			CO-4	H	M	M	M	L		H	M	M	M	M
		Advanced Biopharmaceutics & Pharmacokinetics	CO-1	M	M	L		M		M	M	M	M	L
			CO-2	H	H	H		M		M	M	M	M	L
			CO-3	H	H	H		M		M	M	M	M	L
			CO-4	H	H	H		M		M	M	M	M	L
		Entrepreneurship Management	CO-1		H									
			CO-2						H		M			
			CO-3		M		H							
		Industrial Pharmacy Practicals - II	CO-1	H	M	M	L	H	L	M	L	M	H	M
			CO-2	H	M	M	L	H	L	M	L	M	H	M
			CO-3	H	M	M	L	H	L	M	L	M	H	M
			CO-4	H	M	M	L	H	L	M	H	M	H	M
	III	Research Methodology & Biostatistics	CO-1	H	M	M	M	H	M	H	H	H	H	M
			CO-2	H	H	H	L	M	L	L	M	M	M	M

Programme	Semest	Subject Name

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3
CO-3	H	M	M	M	H	M	M	H	H	H	H
CO-4	H	H	L	H	M	M	L	H	H	M	M

M. Pharm (Pharmaceutical Quality Assurance)

Semester	Course Name	Course Outcomes	
I	Modern Pharmaceutical Analytical Techniques	CO-1	Explain the applications of various analytical techniques like UV, IR, NMR, Mass, X-Ray Diffraction, Chromatographic and electrophoretic analysis for various Pharmaceutical Products Analysis
		CO-2	Apply the various Analytical Techniques for various Drugs and Pharmaceutical Analytical Applications .
		CO-3	Summarize all the theoretical knowledge on various instrumental techniques available for analysis of various dosage and pharmaceutical forms
		CO-4	Apply the knowledge learnt in developing new procedures for analytical testing of various dosage forms.
	Product Development and Technology Transfer	CO-1	Explain the new product development process
		CO-2	Apply the technology transfer models to the transfer of technology from R&D to actual manufacturing, and between various manufacturing places.
		CO-3	Analyse scale up related issues and provide solutions.
		CO-4	Evaluate and select the pharmaceutical packaging for specific dosage forms.
	Quality Control and Quality Assurance	CO-1	Understand the aspects of cGMP and the responsibilities of QA & QC departments in the pharmaceutical industry.
		CO-2	Analyse the significance of documentation.
		CO-3	Apply the quality certifications and regulatory requirements, applicable to pharmaceutical industries.
		CO-4	Evaluate in process quality control and finished products quality control test for dosage forms in Pharma industry.
	Quality Management Systems	CO-1	Demonstrate quality as a strategic decision, requirements of the quality management system and regulatory compliance.

Semester	Course Name	Course Outcomes	
		CO-2	Understand the components of quality system and identify possible deficiencies according to inspection model.
		CO-3	Interpret and apply ICH Guidelines Q1, Q8, Q9 and Q10.
		CO-4	Integrate statistical approaches to process control.
	Pharmaceutical Quality Assurance Practical - I	CO-1	Analyse bulk drugs and in their formulations using different analytical instruments like UV Vis spectrophotometer, HPLC, gas chromatography.
		CO-2	Perform in-process and finished product quality control tests for tablets, capsules, parenteral and semisolid dosage forms.
		CO-3	Carry out preformulation, solubility studies and design stability protocols.
		CO-4	Understand different quality concept like TQM, six sigma, OOS, OOT, change control, CAPA, deviation
II	Audits and Regulatory Compliance	CO-1	Understand the auditing process.
		CO-2	Evaluate the role of quality systems and audit in pharmaceutical manufacturing environment as per cGMP requirements.
		CO-3	Plan the audit of production process, equipment and utility systems.
		CO-4	Apply knowledge in auditing of microbiology testing laboratory.
	Pharmaceutical Validation	CO-1	Understand the concepts of calibration, qualification and validation
		CO-2	Plan the various equipment and instruments qualification
		CO-3	Apply the validation concepts to analytical methods, cleaning of equipment, sterilization process and processing of different dosage forms.
		CO-4	Adapt the practices and procedures of filing IPR.
	Pharmaceutical Manufacturing Technology	CO-1	Acquaint with the legal requirements, common practices and production activities in a pharmaceutical plant.
		CO-2	Design the manufacturing layout requirements, recommend the manufacturing plant location

Semester	Course Name	Course Outcomes	
		CO-3	Understand the production process, Quality by design approach and advanced manufacturing technology for dosage forms like tablet, parenteral products.
		CO-4	Utilize the best packaging material for different dosage form with automated machinery.
	Hazards and Safety Management	CO-1	Categorize various natural resources; understand the concept, structure and function of an ecosystem.
		CO-2	Demonstrate the knowledge of, and need for sustainable development.
		CO-3	Design a clear mechanism for the identification and management of different kinds of hazards/risks at a workplace.
		CO-4	Assess the safety standards in pharmaceutical industry and plan the method of risk assessment to provide safe industrial atmosphere.
	Pharmaceutical Quality Assurance Practical - II	CO-1	Demonstrate And characterize the material and Product by using different analytical techniques and analyse causes for batch variation.
		CO-2	Interpret and apply the requirements during quality control and formulation development
		CO-3	Understand the requirements for validation, and qualification.
		CO-4	Understand the quality by design concept and PAT.
III	Research Methodology & Biostatistics	CO-1	Design the concept of research methodologies
		CO-2	Compile various statistical tools in pharmaceutical research
		CO-3	Write medical research in research studies and healthcare
		CO-4	Plan the animal studies as per CPCSEA guidelines

CO-PO Mapping

Programme	Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3
M. Pharm (Pharmaceutical Quality Assurance)	I	Product Development and Technology Transfer	CO-1	H	H	H	M	L	M	L	M	H	H	H
			CO-2	H	H	H	H	L	M	L	L	M	M	M
			CO-3	H	H	H	M	L	M	L	M	M	L	M
			CO-4	H	H	H	L	L	M	L	L	L	M	L
		Modern Pharmaceutical Analytical Techniques	CO-1	H	H	M			L	L	M	M	M	
			CO-2	H	H	H			L	L	M	M	M	
			CO-3	H	M				L		M			
			CO-4	M	H	H				L	H	M	M	
		Quality Control and Quality Assurance	CO-1	H	M		H	H	H	H	H	H	L	H
			CO-2	H	M	M	M	M	M	M	H	H		H
			CO-3	H	L	M	H	M	M	M	H	H	L	H
			CO-4	M	H	M	M	L	L	M	H	H	L	M
		Quality Management Systems	CO-1	M	H	M		M	M	M	H	H	L	L
			CO-2	H	M	M		H	L	H	H	H	M	L
			CO-3	H	M	M		H	L	M	M	H	L	M
			CO-4	H	H	M		H	M	H	H	M	L	L
		Pharmaceutical Quality Assurance Practical - I	CO-1	M	H	H	L	L	M	M	H	H	M	
			CO-2	M	H	M	M	M	M	L	H	H	M	
			CO-3	H	M	H	M	L	L	M	M	H	M	M
			CO-4	M	M	H	H	H	M	M	H	M	M	H
	II	Audits and Regulatory Compliance	CO-1	M	H		H	M	L	M	M	H	M	H
			CO-2	H	H		H	M	L	M	H	M	M	H
			CO-3	H	M	M	H	M	M	M	M	M	M	H
			CO-4	H	M	M	M	M	M	H	H	M	M	H
		Pharmaceutical Validation	CO-1	H	M		M	M	L	M	H	M	M	L
			CO-2	M	H	M	M	M	M	M	H	H		L
			CO-3	H	H	H	M	M	H	H	H	M	H	L
			CO-4	H	L		H	M	M	M	H	L	H	M
		Pharmaceutical Manufacturing Technology	CO-1	H	H	M	L	M	M	M	L	M	M	H
			CO-2	H	H	M	L	M	M	M	L	M	M	H
			CO-3	H	H	H	L	M	M	M	L	M	M	H
			CO-4	H	H	M	L	M	M	M	L	M	M	H
		Hazards and Safety Management	CO-1	H	H	H	M	M	M	M	M	M	L	M
			CO-2	H	H	H	M	M	M	M	M	M	L	M
			CO-3	H	H	H	M	M	M	M	M	H	M	M
			CO-4	H	H	H	M	M	M	M	M	H	M	M
		Pharmaceutical Quality Assurance Practical - II	CO-1	H	M	H	L	M	M	M	H	H	L	M
			CO-2	H	H	M	L	M	M	M	H	M	M	L
			CO-3	H	H		M	M	M	M	H	H	H	L

CO-PO Mapping

Programme	Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3
			CO-4	H	M		M	L	L	M	H	H	M	
	III	Research Methodology & Biostatistics	CO-1	H	M	M	M	H	M	H	H	H	H	M
			CO-2	H	H	H	L	M	L	L	M	M	M	M
			CO-3	H	M	M	M	H	M	M	H	H	H	H
			CO-4	H	H	L	H	M	M	L	H	H	M	M

M. Pharm (Regulatory Affairs)

Semester	Course Name	Course Outcomes	
I	Modern Pharmaceutical Analytical Techniques	CO-1	Explain the applications of various analytical techniques like UV, IR, NMR, Mass, X-Ray Diffraction, Chromatographic and electrophoretic analysis for various Pharmaceutical Products Analysis
		CO-2	Apply the various Analytical Techniques for various Drugs and Pharmaceutical Analytical Applications .
		CO-3	Summarize all the theoretical knowledge on various instrumental techniques available for analysis of various dosage and pharmaceutical forms
		CO-4	Apply the knowledge learnt in developing new procedures for analytical testing of various dosage forms.
	Good Regulatory Practices	CO-1	Apply the key regulatory and compliance elements to good manufacturing practices, good laboratory practices, good automated laboratory practices and good documentation practices
		CO-2	Design and implement the check lists and SOPs required for maintaining good regulatory practices
		CO-3	Implement good quality practices and validation in healthcare and related industries
	Documentation and Regulatory Writing	CO-1	Design various documents pertaining to drugs in pharmaceutical industry with special emphasis to regulatory submission strategy
		CO-2	Create and assemble the regulatory submissions as per the requirements of various agencies and to Evaluate the readiness and conduct of audits and inspections
		CO-3	Plan the follow up for the submissions and post approval document requirements
	Clinical Research Regulations	CO-1	Compare the history, origin and ethics of clinical and biomedical research with evaluation

Semester	Course Name	Course Outcomes	
		CO-2	Analyze the clinical trials, medical device development processes and different types and phases of clinical trials
		CO-3	Prepare the regulatory requirements and guidance for conduct of clinical trials and research
		CO-4	Write the drafts of clinical trial protocols for clinical trials based on regulatory requirements
	Regulations and Legislation for Drugs & Cosmetics, Medical Devices, Biologicals & Herbals, and Food & Nutraceuticals In India and Intellectual Property Rights	CO-1	Categorize different acts and guidelines that regulate Drugs & Cosmetics, Medical Devices, Biologicals & Herbals, and Food & Nutraceutical industries.
		CO-2	Design regulatory submission strategy for dossier submissions based on regulatory requirements in different countries
		CO-3	Develop stability protocols for drugs & cosmetics, biologicals based on regulatory requirements
		CO-4	Plan IP and product strategy for products (drugs & cosmetics, biologicals and herbals, medical devices) based on IP and regulatory laws of different countries
		CO-5	Evaluate the applications of IPR and BABE for regulatory approval and marketing
	Regulatory Affairs Practical - I	CO-1	Create the various documents pertaining to drugs and their formulations in pharmaceutical industry
		CO-2	Evaluate the practical knowledge of regulatory compilation.
		CO-3	Design the regulation submission and develop submission strategy as per the requirements of agencies.
		CO-4	Organize the checklists for regulatory submissions.
II	Regulatory Aspects of Food & Nutraceuticals	CO-1	Compare the regulatory requirements for nutraceuticals
		CO-2	Integrate the standards and certifications of nutraceuticals nationally and internationally

Semester	Course Name	Course Outcomes	
		CO-3	Correlate the regulations for registration and labeling of nutraceuticals and food supplements in India, USA and Europe.
	Regulatory Aspects of Drugs & Cosmetics	CO-1	Analyze the process of drug discovery and development and generic product development
		CO-2	Design the regulatory approval process and registration procedures for API and drug products in US, EU
		CO-3	Integrate the cosmetics regulations in regulated and semi-regulated countries
		CO-4	Correlate India with other global regulated markets
	Regulatory Aspects of Herbal and Biologicals	CO-1	Organize the regulatory requirements for Biologics and Vaccines, newly developed biologics and biosimilars
		CO-2	Assess the knowledge of pre-clinical and clinical development considerations of biologics and herbal formulations
		CO-3	Evaluate the regulatory requirements of blood and/or its components including blood products and label requirements
	Regulatory Affairs Practical - II	CO-1	Plan and identify the various documents for submission to regulatory agencies.
		CO-2	Develop the practical knowledge of eCTD.
		CO-3	Create and assemble the regulation submission to various regulatory agencies.
		CO-4	Organize audit checklist for market authorization of various agencies.
		CO-5	Track submissions and post approval document requirements.
	Regulatory Aspects of Medical Devices	CO-1	Demonstrate the basics of medical devices and IVDs, process of development, ethical and quality considerations
		CO-2	Plan harmonization initiatives for approval and marketing of medical devices and IVDs

Semester	Course Name	Course Outcomes	
		CO-3	Compile regulatory approval process for medical devices and IVDs in India, US, Canada, EU, Japan and ASEAN
		CO-4	Develop regulatory submission strategy for medical devices based on regulatory requirement of different geographies
III	Research Methodology & Biostatistics	CO-1	Design the concept of research methodologies
		CO-2	Compile various statistical tools in pharmaceutical research
		CO-3	Write medical research in research studies and healthcare
		CO-4	Plan the animal studies as per CPCSEA guidelines

CO-PO Mapping

Programme	Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3
M. Pharm (Regulatory Affairs)	I	Good Regulatory Practices	CO-1	H	M	H	M	M	L	L	M	H	H	H
			CO-2	H	H	H	M	L	L	L	M	H	H	H
			CO-3	H	H	H	M	L	L	L	M	H	H	M
		Documentation and Regulatory Writing	CO-1	H	H	H	M	M	L	L	M	H	H	H
			CO-2	H	H	H	M	M	L	L	M	H	H	H
			CO-3	M	M	M	M	M	L	L	M	H	H	H
		Clinical Research Regulations	CO-1	H	H	H	M	M	L	L	M	H	H	H
			CO-2	H	H	H	M	M	L	L	M	H	H	H
			CO-3	M	M	M	M	M	L	L	M	H	H	H
			CO-4	M	M	M	M	M	L	L	L	H	H	H
		Regulations and Legislation for Drugs & Cosmetics Medical Devices Biologicals & Herbals and Food & Nutraceuticals In India and Intellectual Property Rights	CO-1	H	L	M	L	L	L	L	H	H	M	H
			CO-2	M	L	M	M	L	L	L	M	M	H	H
			CO-3	M	L	H	L	L	L	L	H	M	M	H
			CO-4	H	H	H	M	L	L	L	H	M	M	H
			CO-5	H	H	H	L	L	L	L	H	M	M	H
		Regulatory Affairs Practical - I	CO-1	H	H	H	M	L	L	L	M	H	H	H
			CO-2	H	M	H	M	L	L	L	M	H	M	M
			CO-3	M	H	M	M	L	L	L	L	H	H	H
			CO-4	H	M	M	M	L	L	L	L	H	M	H
	II	Regulatory Aspects of Food & Nutraceuticals	CO-1	H	L	M	L	L	L	M	L	H	H	H
			CO-2	H	L	M	L	L	L	M	L	H	M	H
			CO-3	H	L	M	L	L	L	M	L	H	M	H
		Regulatory Aspects of Drugs & Cosmetics	CO-1	H	H	H	M	H	M	H	H	H	H	H
			CO-2	H	H	M	H	M	M	M	H	H	H	H
			CO-3	H	H	M	L	H	M	M	M	H	H	H
			CO-4	H	H	M	L	M	M	H	H	H	H	H
		Regulatory Aspects of Herbal and Biologicals	CO-1	H	H	H	M	H	M	H	H	H	H	M
			CO-2	H	H	M	L	M	M	M	H	H	M	H
			CO-3	H	H	M	M	H	M	M	M	H	M	H
		Regulatory Affairs Practical - II	CO-1	H	H	H	H	H	L	H	H	H	H	M
			CO-2	H	H	M	M	H	H	M	M	H	M	H
			CO-3	H	H	L	M	M	H	L	M	H	M	H
			CO-4	H	H	M	M	M	H	M	M	H	M	M
		Regulatory Aspects of Medical Devices	CO-1	H	H	H	M	H	M	H	H	H	M	H
			CO-2	H	H	H	M	M	M	M	H	H	M	H
			CO-3	H	H	H	M	H	M	M	M	H	M	H
			CO-4	H	H	H	M	M	M	H	H	H	M	M
	III	Research Methodology & Biostatistics	CO-1	H	M	M	M	H	M	H	H	H	H	M
			CO-2	H	H	H	L	M	L	L	M	M	M	M

Programme	Semest	Subject Name

CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3
CO-3	H	M	M	M	H	M	M	H	H	H	H
CO-4	H	H	L	H	M	M	L	H	H	M	M

M. Pharm (Pharmacology)

Semester	Course Name	Course Outcomes	
I	Modern Pharmaceutical Analytical Techniques	CO-1	Explain the applications of various analytical techniques like UV, IR, NMR, Mass, X-Ray Diffraction, Chromatographic and electrophoretic analysis for various Pharmaceutical Products Analysis
		CO-2	Apply the various Analytical Techniques for various Drugs and Pharmaceutical Analytical Applications .
		CO-3	Summarize all the theoretical knowledge on various instrumental techniques available for analysis of various dosage and pharmaceutical forms
		CO-4	Apply the knowledge learnt in developing new procedures for analytical testing of various dosage forms.
	Advanced Pharmacology I	CO-1	Analyze the pharmacokinetic and pharmacodynamic properties of drugs and to predict potential adverse effects and drug-drug interactions.
		CO-2	Compare and contrast the pharmacological properties of drugs within the same class, as well as between different classes of drugs.
		CO-3	Assess the effectiveness of drug therapies in meeting patient needs and improving quality of life.
		CO-4	Explore options to develop new drug compounds with specific pharmacological properties, such as increased efficacy, safety, and selectivity.
	Pharmacological and Toxicological Screening Methods - I	CO-1	Understand the fundamental concepts related to the laboratory animals, bioassays, and principles of screening methods for CNS, respiratory, CVS, immunomodulatory systems.
		CO-2	Interpret and explain screening methods for different systems, identify and describe the different types of laboratory animals used for drug testing.

Semester	Course Name	Course Outcomes	
		CO-3	Apply the knowledge to design and perform pharmacological and toxicological experiments using different animal models and bioassays. Analyze and interpret the results of these experiments.
		CO-4	Evaluate the validity and reliability of the different screening methods used in pharmacology and toxicology. Analyze the ethical issues associated with animal testing and propose alternative methods for drug evaluation.
	Pharmacology Practical -I	CO-1	Apply analytical techniques such as UV spectrophotometry, HPLC, and Gas Chromatography to analyze pharmacopoeial compounds and multi-component formulations.
		CO-2	Demonstrate knowledge and skills related to handling laboratory animals, including various routes of drug administration, blood sampling techniques, and functional observation tests.
		CO-3	Evaluate the pharmacological activities of drugs through various experiments including evaluation of CNS activity, analgesic, anti-inflammatory, and diuretic activity.
		CO-4	Apply molecular biology techniques such as DNA and RNA isolation, gene amplification, and protein quantification to study drug activity and pharmacokinetics in biological samples
	Cellular and Molecular Pharmacology	CO-1	Describe the structure and functions of different organelles within a cell, and explain how these organelles work together to maintain cellular homeostasis.
		CO-2	Apply knowledge of cell signaling pathways to understand how drugs can modulate and predict the effects of different drugs on cellular signaling.
		CO-3	Analyze genomic and proteomic data to identify potential targets for drug development, and evaluate the effectiveness of different drugs based on their molecular mechanisms of action.

Semester	Course Name	Course Outcomes	
		CO-4	Design experiments using cell culture techniques to test the efficacy of different drugs and therapeutics, and propose new strategies for developing biosimilars and gene therapies
II	Advanced Pharmacology (723PH0C069)	CO-1	Analyze the molecular and cellular mechanisms of action of hormones, such as growth hormone, prolactin, thyroid, insulin, and sex hormones.
		CO-2	Evaluate the advances in the management of endocrine disorders, including diabetes mellitus, adrenal insufficiency, hypothyroidism, hyperthyroidism, and the study of oral contraceptives and corticosteroids.
		CO-3	Evaluate the effectiveness and rationality of drug combinations for chemotherapy and drugs affecting calcium regulation.
		CO-4	Synthesize the approaches for preventing resistance to antimicrobial agents, advances in drugs used for protozoal infections, helminthiasis and recent advances in the treatment of cancer and diabetes mellitus.
	Clinical Research and Pharmacovigilance (723PH0C070)	CO-1	Demonstrate the ability to critically evaluate the origin, principles, and applications of Clinical Practice Guidelines in clinical trials, and analyze their impact on patient care.
		CO-2	Evaluate the ethical considerations and guidelines for biomedical research and human participants.
		CO-3	Analyze and evaluate the different types and designs of clinical trials, including the roles and responsibilities of the clinical trial study team, and the guidelines for clinical trial documentation and monitoring.
		CO-4	Synthesize and evaluate the significance of pharmacovigilance in ensuring medication safety.
	Pharmacological and Toxicological	CO-1	Analyze the regulatory guidelines and principles for toxicity studies, including GLP and OECD, and their application in toxicology.

Semester	Course Name	Course Outcomes	
	Screening Methods-II (723PH0C071)	CO-2	Evaluate the different types of toxicity studies, such as acute, sub-acute, chronic, reproductive, genotoxicity, carcinogenicity, and safety pharmacology studies, and their role in drug development.
		CO-3	Synthesize the concept and significance of IND enabling studies, including the requisite studies for IND submission, and their impact on drug development.
		CO-4	Create a critical analysis of toxicokinetics and dose-response relationship in drug toxicity, as well as alternative methods to animal toxicity testing.
	Pharmacology Practical - II	CO-1	Develop advanced proficiency in designing and conducting in vitro bioassays to evaluate the pharmacological effects of drugs and other compounds
		CO-2	Analyze and evaluate the mechanism of action of drugs and their interactions with receptors, enzymes, and other cellular components.
		CO-3	Apply advanced skills in conducting toxicity studies, and in evaluating the potential adverse effects of drugs and other compounds, by using in vitro, in vivo and in silico techniques.
		CO-4	Demonstrate expertise in designing and implementing clinical trials, including protocol design, adverse event monitoring and critically evaluate the results.
	Principles of Drug Discovery (723PH0C072)	CO-1	Evaluate the drug discovery process by analyzing the different stages
		CO-2	Analyze the role of genomics, proteomics, bioinformatics, and other technologies in target discovery and validation, and evaluate the use of transgenic animals in drug discovery.
		CO-3	Create a synthesis of rational drug design methods by evaluating structure and pharmacophore-based approaches, virtual screening techniques, molecular docking, de novo drug design and analyze their limitations and advantages.
		CO-4	Evaluate the quantitative analysis of structure-activity relationships and its various statistical methods, as well as prodrug design and its practical

Semester	Course Name	Course Outcomes	
			considerations, and synthesize recommendations for improving drug design processes.
III	Research Methodology & Biostatistics	CO-1	Design the concept of research methodologies
		CO-2	Compile various statistical tools in pharmaceutical research
		CO-3	Write medical research in research studies and healthcare
		CO-4	Plan the animal studies as per CPCSEA guidelines

CO-PO Mapping

Programme	Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3
M. Pharm (Pharmacology)	I	Advanced Pharmacology I	CO-1	H	H	M	L	L	M	M	H	L	M	M
			CO-2	H	M	M	L	L	M	L	H	M	M	M
			CO-3	H	H	M	M	H	H	H	M	H	H	H
			CO-4	H	H	M	M	L	H	H	M	H	H	H
		Modern Pharmaceutical Analytical Techniques	CO-1	H	H	M			L	L	M	M	M	
			CO-2	H	H	H			L	L	M	M	M	
			CO-3	H	M				L		M			
			CO-4	M	H	H				L	H	M	M	
		Pharmacological and Toxicological Screening Methods - I	CO-1	M	H	M	L	L	H	L	H			
			CO-2	H	H	M	L	M	H	L	H			
			CO-3	H	H	M	M	H	H	M	M			
			CO-4	H	H	M	M	M	H	H	M			
		Pharmacology Practical -I	CO-1	H	H	L			M	L	M	L		H
			CO-2	H	H				L			M	H	
			CO-3	H	H	L			L		L	H	H	
			CO-4	H	H	M			L	L	M	H	H	H
		Cellular and Molecular Pharmacology	CO-1	H	L						M			
			CO-2	H	M			L			M	M		
			CO-3	H	M	L				M	M	M		M
			CO-4	H	H	H	L			L	M	L		M
	II	Advanced Pharmacology	CO-1	H	M	L	L	L	L	L	H	H	M	H
			CO-2	H	M	H	L	M	M	M	H	H	M	M
			CO-3	H	M	L	M	H	H	M	H	H	H	H
			CO-4	H	L	L	L	M	M	L	H	M	M	H
		Clinical Research and Pharmacovigilance	CO-1	H	H	M	H	M	H	H	H	M	H	M
			CO-2	H	H	M	M	H	H	H	H	M	H	H
			CO-3	H	H	H	H	M	H	H	M	M	M	H
			CO-4	H	H	H	H	H	H	H	M	M	M	H
		Pharmacological and Toxicological Screening Methods-II	CO-1	H	M	L		H	L		L		H	
			CO-2	H	M	H		L	M	M	M		H	
			CO-3	H	L	L		L	M	M	L		H	
			CO-4	H	M	H		M		L	M		H	
		Pharmacology Practical - II	CO-1	H	H	H	M	M	M	H	M	M	H	M
			CO-2	H	H	M	L	M	M	H	M	M	M	H
			CO-3	M	M	M	L	M	M	M	M	M	H	H
			CO-4	H	H	M	L	M	L	M	M	M	H	H
		Principles of Drug Discovery	CO-1	H	H	H	H				L	H		
			CO-2	H	H	H	H				L	H		
			CO-3	H	H	H	H				L	H		

Programme	Semest	Subject Name	CO No.	PO-1	PO-2	PO-3	PO-4	PO-5	PO-6	PO-7	PO-8	PSO-1	PSO-2	PSO-3
			CO-4	H	H	H	H				L	H		
	III	Research Methodology & Biostatistics	CO-1	H	M	M	M	H	M	H	H	H	H	M
			CO-2	H	H	H	L	M	L	L	M	M	M	M
			CO-3	H	M	M	M	H	M	M	H	H	H	H
			CO-4	H	H	L	H	M	M	L	H	H	M	M