Course outcomes of the Programme offered by the institution
M. Pharmacy Course Outcomes (New PCI Pattern)

Semester-I
Branch:Pharmaceutics
Subject: Modern Pharmaceutical Analytical Techniques– Theory
Subject Code:MPH101T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Understand and apply the concepts of various analytical techniques and its applications in qualitative and quantitative analysis of drugs in single and combination dosage forms
CO 2	Understand the principle and applications of IR spectroscopy
CO 3	Understand and apply the principle and applications of NMR spectroscopy
CO 4	Understand and apply the principle and applications of MASS spectrometry
CO 5	Understand and apply the principle and applications of various chromatographic techniques
CO 6	Understand and apply theoretical and practical skills of instruments

Subject: Drug Delivery System Theory
Subject Code: MPH102T

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Students should understand concept of controlled and sustained release drug delivery system and role of various polymers in the design and development of various novel drug delivery systems. 3D printing tech., telepharmacy, personalized and customized medicine,pharmacogenetics
CO2	Students should understand and design and development of various activation modulated drug delivery systems, feedback regulated DDS and fabrication of GRDDS
CO3	Students should understand and learn the various approaches for development of ocular drug delivery systems
CO4	Students should understand and learn formulation and evaluation of trans-dermal delivery systems
CO5	Students should understand concept of proteins and peptides and learn to develop and evaluate their drug delivery systems
CO6	Students should understand concept of vaccines and able to design the various formulations of vaccines

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Subject: Modern Pharmaceutics - Theory
Subject Code: MPH103T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Student shall be able to understand the concepts of preformulation and it's various parameters, like compatibility study and stability study associated with dispersion system, parenterals and other dosage form.
CO 2	Student should express the concept of optimization and its significance in manufacturing of pharmaceutical formulations.
CO 3	Students shall be able to find out the scope, and significance of validation processes, various ICH & WHO guidelines and regulation associated with validations.
CO 4	Students should understand and apply the objectives and policies of cGMP in industry and shall be able to understand the various parameters of industry management.
CO 5	Students should evaluate various tablet dosage form, its compression and compaction and physics of tablet and there by understand the various methods of enhancement of solubility of drug.
CO6	After studying consolidation parameters like diffusion parameters, dissolution parameters and pharmacokinetic parameters, students shall be able to understand the various model of dissolution and concept of standard deviation.

Subject: Regulatory Affairs
Subject Code: MPH104T

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Students should be able to understand documentation in pharmaceutical industry
CO2	Students should be able familiar with regulatory requirements for product approval
CO3	Students should be able to explain the concept post approval regulatory affairs
CO4	Students should be able to describe various aspects of non clinical drug development
CO5	Students should be able to comprehend clinical trials requirements
CO6	Students should be able to illustrate ICH guidelines

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Subject:Pharmaceutics Practical I
Subject Code: MPH105P

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Understand the elements of Preformulation studies
CO2	Conceptual understanding of Modern analytical Methods of drug analysis
CO3	Advance knowledge in formulation, quality control, and key process parameter on oral dosage forms
CO4	Knowledge of evaluation of various dosage forms

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Branch: Pharmaceutical Quality Assurance
Subject: Quality Management System
Subject Code: MQA102T

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Students should be able toillustrate various aspects of quality and customer focus
CO2	Students should be able toexplain basics of Pharmaceutical Quality Management
CO3	Students should be able todescribe management of drug stability
CO4	Students should be able tounderstand Statistical Process Control
CO5	Students should be able tocomprehend Regulatory Compliance through Quality Management
CO6	Students should be able toexplain Out of specifications and CAPA

Subject: Quality Control and Quality Assurance
Subject Code:MQA103T

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Students should understands the concept of quality control and quality assurance
CO2	Students should learn pharmacopoeial guidelines about in process quality control testing
CO3	Students should appreciate the need of documentation in pharmaceutical industry.
CO4	Students should understand the quality assurance aspects of manufacturing andprocess control, Discuss about intellectual property rights and their scope inpharmaceutical industry

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Subject: Product Development & Technology Transfer
Subject Code: MQA104T

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Student should be able to understand the new product development process
CO2	Student should be able to identify preformulation characteristic to develop a product.
CO3	Student should be able to explain the necessary information to transfer technology from R&D to actual manufacturing site.
CO4	Student should be able to describe Pharmaceutical packaging parameters and Quality control test
CO5	Student should be able to explain tech transfer techniques and documentation parameters

Subject: Pharmaceutical QualityAssurance Practical I
Subject Code: MQA105P

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Student able to perform quantitative estimation of drugs from formulations
CO2	Student understand hands on training to students using different instruments like used for qualitative and quantitative analysis
CO3	Student understand concept TQM, Six Sigma, change management, change control, Deviations out of specifications, out of trend, CAPA
CO4	Student able to describe pharmacopoeia requirements for pharmaceuticals

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Department: Pharmacology

Subject: Advanced Pharmacology-I
Subject Code: MPL102T

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Student able to discuss the pathophysiology and pharmacotherapy of certain diseases
CO2	Student able to explain the mechanism of drug actions at cellular and molecular level
CO3	Student able to understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases

Subject: Pharmacological and Toxicological Screening Methods – I
Subject Code: MPL103T

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO 1	Students should be able to understand the regulations and ethical requirement for the usage of experimental animals their use in the drug discovery process and good laboratory practices in maintenance and handling of experimental animals.
CO 2	Students should be able to describe the general principles of preclinical screening and various newer screening methods for study of drugs acting on CNS, ANS and drugs for neurodegenerative diseases.
CO 3	Students should be able to explain the various screening methods for study of drugs acting on respiratory system, reproductive system, GIT and analgesics, antipyretics, anti-inflammatory drugs.
CO 4	Students should be able to discuss the various screening methods for study of drugs acting on CVS, drugs for metabolic disorders, anti cancer agents, hepatoprotective agents.
CO 5	Students should be able to understand the general principles of immunoassay, various screening methods for study of Iimmunomodulators, Immunosuppressants and immunostimulants. Appreciate and correlate the preclinical data to humans.

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Subject: Cellular and Molecular Pharmacology
Subject Code: MPL104T

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Student able to explain the receptor signal transduction processes
CO2	Student able to understand the molecular pathways affected by drugs
CO3	Student able to appreciate the applicability of molecular pharmacology and biomarkers in drug discovery process
CO4	Student able to demonstrate molecular biology techniques as applicable for pharmacology

Subject: Pharmacological Practical - I
Subject Code: MPL105P

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Student able to acquire the knowledge about advanced analytical instruments used preclinical research
CO2	Student able to impart basic practical skills and knowledge of dose calculation, routes of drug administration, blood collection method along with anesthesia and euthanasia in experimental animals
CO3	Student able to understand the basic concepts used in behavioral pharmacology for screening of drugs
CO4	Student able to observe, understand , analyze and evaluate the effect of drugs in animals by in vivo-pharmacology

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Semester -II
Branch: Pharmaceutics
Subject: Molecular Pharmaceutics
Subject Code: MPH201T

Course Outcome	Description/Statement
CO1	Students should understand the concept of microencapsulation and able to learn various methods for the development of microcapsules and its evaluation, applications
CO2	Students should learn and understand the concept of pulmonary drug delivery systems and also to design the intranasal fromulatons
CO3	Students should able to understand the nucleic acid based drug delivery systems. Also able to remember its application in targeting the various diseases like gene therapy
CO4	students should understand and learn the various concepts of targeted drug delivery systems and biological processes involved in tumor targeting with the help of nanoparticles, liposomes

Subject: Advanced Biopharmaceutics& Pharmacokinetics
Subject Code: MPH202T

Course Outcome	Description/Statement
CO1	Understanding of the basic concepts in biopharmaceutics and pharmacokinetics
CO2	The use and application of raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination.
CO3	The critical evaluation of biopharmaceutic studies involving drug product equivalency.
CO4	The design and evaluation of dosage regimen of the drugs using pharmacokinetic and biopharmaceutic parameters.
CO5	The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic

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Subject: Computer Aided Drug Development System- Theory
Subject Code: MPH203T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Students will be able to understand, the history of computers in product development. also shall be able to understand about the various models/software, QbD as per ICH guidelines and regulatory and industry views on QbD.
CO 2	Students shall be able to understand the, computers in Drug absorption, distribution, excretion, intestinal permeation and Solubility. Also how active transporter helps to move the drug molecules.
CO 3	Students should know the concept of optimization, parameters and role of computers in development of pharmaceutical emulsions and microemulsion. The rights, ethics and drug on computer use is also understand by students.
CO 4	Students shall be able to understand the biopharmaceutical characterization with the help of computers including in-vitro and in-vivo correlation. Compuetrs in clinical data collection and simulation is also another concept will understand the students.
CO 5	Pharmaceutical Automation, applications, Advantages and Disadvantages of Artificial intelligence shall be understand by the students.

Subject: Cosmetics and Cosmeceuticals- Theory
Subject Code: MPH204T

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Students should be able to understand Indian regulatory requirements for cosmetics
CO2	Students should be able to explain biological aspects of cosmetics
CO3	Students should be able to describe formulation aspects of cosmetics
CO4	Students should be able to illustrate design of cosmeceutical products
CO5	Students should be able to comprehend basics of herbal cosmetics
CO6	Students should be able to explain perfumes and controversial ingredients

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Subject: Pharmaceutics Practical II
Subject Code: MPH205P

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Understanding of the formulation aspects of Pharmaceuticals
CO2	Knowledge of novel drugdesignanddevelopment
CO3	Evaluation studies for dosage form
CO4	Use of modern tools for the development for dosage forms

Department: Pharmaceutical Quality Assurance

Subject: Hazards and Safety Management
Subject Code: MQA201T

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Student able to understand about the multidisciplinary nature of environmental studies, various natural resources and its allied problems
CO2	Student able to understand the concept, structure and function of an ecosystem
CO3	Student able to learn about sources and type's industrial hazards and method of Hazard assessment, procedure, and methodology for provide safe industrial atmosphere.
CO4	Student able to understand the prevention of air, chemical and fire hazards and critical hazard management systems
CO5	Student able to describe the hazard and risk management in workplace, and the rules and guidelines on risk assessment and management

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Subject: Pharmaceutical Validation– Theory
Subject Code: MQA202T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Understand and apply the concepts of qualification and validation including their types and significance.
CO 2	Understand and apply the process of qualification of manufacturing equipment and analytical instruments
CO 3	Understand and apply the process of qualification of laboratory equipments and validation of utility system.
CO 4	Understand and apply the process of "process validation of various formulations", "analytical method validation", "guidelines on process validation" and" documentation of process validation".
CO 5	Understand and apply the cleaning method development and cleaning validation of various equipment and facilities including sterile and non-sterile plant.
CO 6	Understand and apply the concept of intellectual property, its importance, mechanism, process of filing patent applications, its rights and responsibilities there under.

Subject: Audit & Regulatory Compliance
Subject Code:MQA203T

Course Outcome	Description/Statement
CO1	Students should understand the importance of auditing
CO2	Students should understand the methodology of auditing
CO3	Students should understands execution of audit process
CO4	To prepare the audit report.

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Subject: Pharmaceutical Manufacturer Technique
Subject Code: MQA204T

Course Outcome	Description/Statement
CO1	Student shall be able to understand the common practice in the pharmaceutical industry developments.
CO2	Student shall be able to describe the practices of aseptic process technology
CO3	Student shall be able to identify the practices of non sterile manufacturing technology
CO4	Student shall be able to explain the practices of packaging technology
CO5	Student shall be able to describe the principles and implementation of Quality by design (QbD)
CO6	Student shall be able to understand understanding of principles and implementation of process analytical technology (PAT) in pharmaceutical manufacturing

Subject: Pharmaceutical Quality Assurance Practical II
Subject Code:MQA205P

COURSE OUTCOME	DESCRIPTION/STATEMENT
CO1	Student able to understand Identification & estimation of drug in pharmaceuticals by various techniques
CO2	Student able to describe the basic principles and methods of validation of an analytical methodfor pharmaceuticals
CO3	Student able to understand and perform Qualification of Pharmaceutical Testing Equipment
CO4	Student able to describe the principles and applications of QbD, Design of plant layout: Sterile and non-sterile

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Department: Pharmacology

Subject: Advanced Pharmacology II– Theory
Subject Code: MPL201T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Explain the mechanism of drug actions at cellular and molecular level
CO 2	Discuss the pathophysiology and pharmacotherapy of certain diseases
CO 3	Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases.
CO 4	Learn, acquire and update knowledge about recent advancement in diagnosis and drug therapy of various diseases

Subject: Pharmacological and Toxicological Screening Methods-II
Subject Code: MPL202T

COURSE OUTCOMES	DESCRIPTION/STATEMENT
CO 1	Students should be able to understand the definition and types of toxicology, regulatory guidelines for conducting toxicity studies, OECD principles of good laboratory practice (GLP) - history, concept and its importance in drug development.
CO 2	Students should be able to describe the acute, sub-acute and chronic- oral, dermal and inhalational studies as per OECD guidelines. Acute eye irritation, skin sensitization, dermal irritation & dermal toxicity studies. Test item characterization- importance and methods in regulatory toxicology studies
CO 3	Students should be able to explain the reproductive toxicology studies, teratogenecity studies, genotoxicity studies, In vivo carcinogenicity studies.
CO 4	Students should be able to discuss the IND enabling studies, Safety pharmacology studies- Tier1- CVS, CNS and respiratory safety pharmacology, HERG assay. Tier2- GI, renal and other studies
CO 5	Students should be able to understand the toxicokinetics& Alternative methods to animal toxicity testing.

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Subject: Principles of Drug Discovery
Subject Code: MPL203T

Course Outcome	Description/Statement
CO1	Student able to explain the various stages of drug discovery.
CO2	Student able to describe the importance of the role of genomics, proteomics and bioinformatics in drug discovery
CO3	Student able to explain various targets for drug discovery
CO4	Student able to explain various lead seeking method and lead optimization
CO5	Student able to understand the importance of the role of computer aided drug design in drug discovery

Subject: Pharmacological Practical II– Practical
Subject Code:MPL205P

Course Outcome	Description/Statement
CO1	Student able to gain the knowledge about basics of experimental pharmacology i.e. in-vivo and in-vitro methods
CO2	Student able to impart practical knowledge of preparation of different Physiological salt solution and its application in experimental pharmacology
CO3	Student able to study the effect of drug and drug receptor interaction on isolated organs/tissues of animals by using different bioassay methods
CO4	Student able to learn and understand the guidelines used in preclinical research for toxicity studies
CO5	Student able to gain the knowledge about non-invasive techniques used in preclinical research
CO6	Student able to understand the basic knowledge of different protocol design

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