



**Panchakshri Shivacharya Trust's**  
**CHANNABASWESHWAR PHARMACY COLLEGE (DEGREE)**

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### Course Outcomes

#### PROGRAMME: M. Pharm

Name of Subject with Code	CO Code	Course Outcomes	Bloom's Level
<b>M. Pharm I (Semester-I) in Pharmaceutics</b>			
<b>MPH101T Modern Pharmaceutical Analytical Technique - Theory</b>	<b>MPH101T_CO1</b>	<b>Acquire</b> basic knowledge of the assay of single and multiple component analysis.	<b>L1, L3</b>
	<b>MPH101T_CO2</b>	<b>Develop</b> fundamental practical skills using instrumentation techniques.	<b>L3, L6</b>
	<b>MPH101T_CO3</b>	<b>Gain</b> skills in selecting suitable techniques for the analysis of drugs and pharmaceuticals.	<b>L1</b>
	<b>MPH101T_CO4</b>	<b>Apply</b> theoretical knowledge to various instrumental techniques effectively.	<b>L3</b>
	<b>MPH101T_CO5</b>	<b>Apply</b> learned knowledge to develop new procedures of their own design.	<b>L3</b>
	<b>MPH101T_CO6</b>	<b>Demonstrate</b> the ability to compare various methods of analysis and their outcomes for specific applications.	<b>L2</b>
<b>MPH102T Drug Delivery System - Theory</b>	<b>MPH102T_CO1</b>	<b>Understand</b> concepts of dosages like Sustained Release (SR), Controlled Release (CR) Formulations, bioelectric, personalized medicine, 3D printing, and their factors.	<b>L2, L5</b>
	<b>MPH102T_CO2</b>	<b>Acquire</b> knowledge on principles and fundamentals of Rate Controlled Drug Delivery Systems.	<b>L1, L3</b>
	<b>MPH102T_CO3</b>	<b>Understand</b> concepts of Gastro-Retentive and Ocular Drug Delivery Systems.	<b>L2, L5</b>
	<b>MPH102T_CO4</b>	<b>Acquire</b> knowledge on Transdermal Drug Delivery Systems and its barriers.	<b>L1, L3</b>
	<b>MPH102T_CO5</b>	<b>Understand</b> fundamentals of Protein and Peptide & Vaccine delivery systems.	<b>L2, L5</b>
<b>MPH103T Modern Pharmaceutics - Theory</b>	<b>MPH103T_CO1</b>	<b>Understand</b> the basic concepts of Pre-formulation.	<b>L2, L5</b>
	<b>MPH103T_CO2</b>	<b>Acquire</b> knowledge on Optimization techniques in Pharmaceutical Formulation.	<b>L1, L3</b>
	<b>MPH103T_CO3</b>	<b>Understand</b> Validation, cGMP, and Industrial Management.	<b>L2, L5</b>
	<b>MPH103T_CO4</b>	<b>Acquire</b> knowledge on Compression and compaction.	<b>L1, L3</b>
	<b>MPH103T_CO5</b>	<b>Study</b> consolidation parameters.	<b>L3, L4</b>
<b>MPH104T Regulatory Affairs - Theory</b>	<b>MPH104T_CO1</b>	<b>Understand</b> the concepts of innovator and generic drugs, drug development process.	<b>L2, L5</b>
	<b>MPH104T_CO2</b>	<b>Study</b> regulatory guidance and guidelines for filing and approval processes.	<b>L3, L4</b>
	<b>MPH104T_CO3</b>	<b>Prepare</b> Dossiers and submit them to regulatory	<b>L3</b>

		agencies in different countries.	
	MPH104T_CO4	<b>Study</b> documentation of post-approval regulatory requirements for drug substance and drug products.	L3, L4
	MPH104T_CO5	<b>Learn</b> the submission of global documents in CTD/e CTD formats.	L3
	MPH104T_CO6	<b>Study</b> different clinical trials requirements for approvals and for conducting clinical trials.	L3, L4
	MPH104T_CO7	<b>Gain</b> brief knowledge about pharmacovigilance and the process of monitoring in clinical trials.	L1
	MPH104T_CO8	<b>Study</b> various documentation in the pharmaceutical industry.	L3, L4
<b>MPH105P Pharmaceutics Practical I - Practical</b>	MPH105P_CO1	<b>Analyze</b> drugs and their formulations by UV Vis spectrophotometer, HPLC, Gas Chromatography, fluorimetry, and photometry.	L4
	MPH105P_CO2	<b>Formulate</b> and evaluate sustained-release matrix tablets and study the in-vitro dissolution profile of CR/SR marketed formulations.	L6
	MPH105P_CO3	<b>Formulate</b> and evaluate novel Drug Delivery Systems (DDS) such as Transdermal DDS, Mucoadhesive DDS, osmotically controlled DDS, Floating DDS, etc.	L6
	MPH105P_CO4	<b>Conduct</b> Pre-formulation studies of tablets, assess the effect of compressional force, and plot Heckle plot, Higuchi, and Peppas's factors.	L3
<b>M. Pharm I (Semester-II) in Pharmaceutics</b>			
<b>MPH201T Molecular Pharmaceutics (Nano Tech and Targeted DDS) - Theory</b>	MPH201T_CO1	<b>Understand</b> the basic concepts of Targeted Drug Delivery Systems.	L2, L5
	MPH201T_CO2	<b>Study</b> various Targeting Methods.	L3, L4
	MPH201T_CO3	<b>Learn</b> about Micro Capsules/Micro Spheres.	L3
	MPH201T_CO4	<b>Discuss</b> Pulmonary Drug Delivery Systems.	L6
	MPH201T_CO5	<b>Gain</b> knowledge of Nucleic acid-based therapeutic delivery systems.	L1
<b>MPH202T Advanced Biopharmaceutics &amp; Pharmacokinetics - Theory</b>	MPH202T_CO1	<b>Understand</b> advanced concepts in biopharmaceutics and pharmacokinetics.	L2, L5
	MPH202T_CO2	<b>Analyze</b> and interpret various drug absorption, distribution, metabolism, and excretion processes.	L4
	MPH202T_CO3	<b>Apply</b> mathematical models to describe drug concentration-time profiles and pharmacokinetic parameters.	L3
	MPH202T_CO4	<b>Evaluate</b> factors influencing drug bioavailability and bioequivalence.	L5
	MPH202T_CO5	<b>Demonstrate</b> knowledge of advanced drug delivery systems and their impact on biopharmaceutical aspects.	L2
	MPH202T_CO6	<b>Critically</b> assess and predict drug-drug interactions and their consequences on pharmacokinetics.	L5
	MPH202T_CO7	<b>Understand</b> the principles of population pharmacokinetics and their application in dosage individualization.	L2, L5
	MPH202T_CO8	<b>Analyze</b> and interpret clinical data related to drug efficacy and safety.	L4
<b>MPH203T</b>	<b>MPH203T_CO1</b>	<b>Understand</b> computer applications in drug	L2, L5

<b>Computer Aided Drug Delivery System - Theory</b>		discovery and development, in pharmaceutical research and development.	
	<b>MPH203T_CO2</b>	<b>Study</b> computational modeling of drug dispositions, including modeling techniques of drug absorption, distribution, excretion, and permeation.	<b>L3, L4</b>
	<b>MPH203T_CO3</b>	<b>Study</b> optimization techniques in pharmaceutical formulations.	<b>L3, L4</b>
	<b>MPH203T_CO4</b>	<b>Understand</b> the use of computers in pre-clinical and clinical development.	<b>L2, L5</b>
	<b>MPH203T_CO5</b>	<b>Study</b> Artificial Intelligence (AI), Robotics, and Computational fluid dynamics.	<b>L3, L4</b>
<b>MPH204T Cosmetic and Cosmeceuticals - Theory</b>	<b>MPH204T_CO1</b>	<b>Understand</b> basic concepts of Cosmetics - Regulatory.	<b>L2, L5</b>
	<b>MPH204T_CO2</b>	<b>Understand</b> the concepts of Cosmetics - Biological aspects.	<b>L2, L5</b>
	<b>MPH204T_CO3</b>	<b>Learn</b> Formulation Building blocks and Perfumes.	<b>L3</b>
	<b>MPH204T_CO4</b>	<b>Study</b> the Design of cosmeceutical products.	<b>L3, L4</b>
	<b>MPH204T_CO5</b>	<b>Acquire</b> knowledge of Herbal Cosmetics.	<b>L1, L3</b>
<b>MPH205P Pharmaceutics Practical II - Practical</b>	<b>MPH205P_CO1</b>	<b>Formulate</b> and evaluate novel drug delivery systems such as Alginate beads, liposomes, and nanosomes.	<b>L6</b>
	<b>MPH205P_CO2</b>	<b>Conduct</b> solubility studies and bioavailability studies of drugs.	<b>L3</b>
	<b>MPH205P_CO3</b>	<b>Perform</b> formulation data analysis using Design Expert.	<b>L3</b>
	<b>MPH205P_CO4</b>	<b>Develop</b> and evaluate cosmetic formulations such as creams, shampoo, and toothpaste, etc.	<b>L3, L6</b>
<b>M. Pharm II (Semester-III) in Pharmaceutics</b>			
<b>MRM301T Research Methodology and Biostatistics - Theory</b>	<b>MRM301T_CO1</b>	<b>Develop</b> the ability to apply appropriate research methods, choose a suitable research design, and establish a framework for conducting research projects.	<b>L3, L6</b>
	<b>MRM301T_CO2</b>	<b>Describe</b> the relevant statistical methods necessary for a specific research design and formulate appropriate research hypotheses for a research project.	<b>L2</b>
	<b>MRM301T_CO3</b>	<b>Develop</b> the ability to articulate and implement medical ethics, control regulations, cultural considerations, confidentiality, and conflict of interest in research studies.	<b>L3, L6</b>
	<b>MRM301T_CO4</b>	<b>Explain</b> CPCSEA guidelines, SOPs for laboratory animal facilities, environmental protection, and personnel training in compliance with ethical standards.	<b>L2, L5</b>
	<b>_CO5</b>	<b>Implement</b> basic principles of medical research while ensuring medical care in accordance with the Declaration of Helsinki.	<b>L3</b>
<b>MPH Journal Club [Theory   Regular]</b>	<b>MPH Journal Club_CO1</b>	<b>Develop</b> the ability to formulate research questions in an answerable form.	<b>L3, L6</b>
	<b>MPH Journal Club_CO2</b>	<b>Discuss</b> critical appraisal methods for evaluating the validity, significance of results, and clinical applicability of research articles.	<b>L6</b>

	<b>MPH Journal Club_CO3</b>	<b>Conduct</b> a systematic search in pharmaceutical bibliographic databases to identify relevant articles and compile scientific data using computer software.	<b>L3</b>
<b>M. Pharm I (Semester-I) in Pharmaceutical Quality Assurance</b>			
<b>MQA101T Modern Pharmaceutical Analytical Techniques - Theory</b>	<b>MQA101T_CO1</b>	<b>Acquire</b> foundational knowledge in the assay of single and multiple components in pharmaceutical analysis.	<b>L1, L3</b>
	<b>MQA101T_CO2</b>	<b>Develop</b> basic practical skills using instrumentation techniques for pharmaceutical analysis.	<b>L3, L6</b>
	<b>MQA101T_CO3</b>	<b>Gain</b> skills in selecting suitable techniques for the analysis of drugs and pharmaceuticals.	<b>L1</b>
	<b>MQA101T_CO4</b>	<b>Apply</b> theoretical knowledge on various instrumental techniques effectively.	<b>L3</b>
	<b>MQA101T_CO5</b>	<b>Apply</b> learned knowledge in developing new procedures of their own design in pharmaceutical analysis.	<b>L3</b>
	<b>MQA101T_CO6</b>	<b>Compare</b> various methods of analysis and evaluate their outcomes for specific applications.	<b>L2, L4, L5</b>
<b>MQA102T Quality Management System - Theory</b>	<b>MQA102T_CO1</b>	<b>Understand</b> quality parameters and attributes in the pharmaceutical industry.	<b>L2, L5</b>
	<b>MQA102T_CO2</b>	<b>Gain</b> knowledge of ISO, NABL, and other regulatory agencies, along with their industrial requirements.	<b>L1</b>
	<b>MQA102T_CO3</b>	<b>Understand</b> customer expectations for quality pharmaceutical products.	<b>L2, L5</b>
	<b>MQA102T_CO4</b>	<b>Acquire</b> knowledge of quality evaluation of pharmaceuticals.	<b>L1, L3</b>
	<b>MQA102T_CO5</b>	<b>Understand</b> stability testing of drugs and drug substances.	<b>L2, L5</b>
	<b>MQA102T_CO6</b>	<b>Comprehend</b> statistical approaches for quality in the pharmaceutical industry.	<b>L2, L5</b>
<b>MQA103T Quality Control and Quality Assurance - Theory</b>	<b>MQA103T_CO1</b>	<b>Understand</b> cGMP aspects in the pharmaceutical industry.	<b>L2, L5</b>
	<b>MQA103T_CO2</b>	<b>Recognize</b> the importance of documentation in quality control and assurance.	<b>L1</b>
	<b>MQA103T_CO3</b>	<b>Evaluate</b> the scope of quality certifications applicable to pharmaceutical industries, demonstrating a comprehensive understanding and critical assessment of quality management principles	<b>L5</b>
	<b>MQA103T_CO4</b>	<b>Understand</b> the responsibilities of QA & QC departments in maintaining quality standards.	<b>L2, L5</b>
	<b>MQA103T_CO5</b>	<b>Learn</b> about Good Laboratory Practices (GLP) and regulatory affairs.	<b>L3</b>
<b>MQA104T Product Development and Technology Transfer - Theory</b>	<b>MQA104T_CO1</b>	<b>Apply</b> knowledge to develop new procedures in pilot layouts.	<b>L3</b>
	<b>MQA104T_CO2</b>	<b>Understand</b> concepts and procedures in preformulation studies.	<b>L2, L5</b>
	<b>MQA104T_CO3</b>	<b>Understand</b> practices and standards in packaging technology.	<b>L2, L5</b>
	<b>MQA104T_CO4</b>	<b>Understand</b> regulatory requirements in drug	<b>L2, L5</b>

		development stages.	
	MQA104T_CO5	<b>Gain</b> knowledge about the phases and regulations in technology transfer.	L1
<b>MQA105P Pharmaceutical Quality Assurance Practical I - Practical</b>	MQA105P_CO1	<b>Understand</b> the analysis of various drugs in single and combination dosage forms.	L2, L5
	MQA105P_CO2	<b>Learn</b> stability testing of drugs and drug substances.	L3
	MQA105P_CO3	<b>Understand</b> quality control tests for various drugs, dosage forms, and packaging materials.	L2, L5
	MQA105P_CO4	<b>Analyze</b> and interpret various instruments and case studies in the quality control area, demonstrating comprehension and application of quality control principles	L4
<b>M. Pharm I (Semester-II) in Pharmaceutical Quality Assurance</b>			
<b>MQA201T Hazards and Safety Management - Theory</b>	MQA201T_CO1	<b>Understand</b> the utilization of energy resources to create an eco-friendly industry environment.	L2, L5
	MQA201T_CO2	<b>Develop</b> the ability to determine, understand, and implement control measures to eliminate or minimize risks.	L3, L6
	MQA201T_CO3	<b>Acquire</b> knowledge to identify hazards in the work atmosphere.	L1, L3
	MQA201T_CO4	<b>Recognize</b> and apply control measures to eliminate or minimize risks.	L1
	MQA201T_CO5	<b>Gain</b> proficiency in the formal process of hazard identification, risk assessment, and control for effective workplace and safety hazard management.	L1
	MQA201T_CO6	<b>Develop</b> a thorough understanding of the stages of risk assessment.	L3, L6
<b>MQA202T Pharmaceutical Validation - Theory</b>	MQA202T_CO1	<b>Study</b> the scope and government regulations related to validation.	L3, L4
	MQA202T_CO2	<b>Understand</b> the importance of validation in pharmaceutical processes.	L2, L5
	MQA202T_CO3	<b>Gain</b> knowledge about the importance of patent and intellectual property rights.	L1
	MQA202T_CO4	<b>Acquire</b> training in the qualification aspects of analytical instruments	L1, L3
	MQA202T_CO5	<b>Understand</b> the importance of calibration for various instruments.	L2, L5
	MQA202T_CO6	<b>Comprehend</b> various validation aspects in the pharmaceutical industry.	L2, L5
	MQA202T_CO7	<b>Gain</b> knowledge on how validation is conducted for various components, including instrument validation, cleaning validation, and process validation.	L1
<b>MQA203T Audits and Regulatory Compliance - Theory</b>	MQA203T_CO1	<b>Describe</b> the importance of auditing in ensuring regulatory compliance.	L2
	MQA203T_CO2	<b>Understand</b> the methodology of auditing in the pharmaceutical industry.	L2, L5
	MQA203T_CO3	<b>Prepare</b> various audit checklists for conducting audits.	L3
	MQA203T_CO4	<b>Explore</b> various forms of auditing and understand the audit process.	L2, L5



	MQA203T_CO5	<b>Practice</b> the auditing process and reporting procedures.	L3
MQA204T Pharmaceutical Manufacturing Technology - Theory	MQA204T_CO1	<b>Understand</b> common practices in pharmaceutical industry development.	L2, L5
	MQA204T_CO2	<b>Comprehend</b> the practices of aseptic process technology.	L2, L5
	MQA204T_CO3	<b>Understand</b> the practices of non-sterile manufacturing technology.	L2, L5
	MQA204T_CO4	<b>Understand</b> the principles and practices of packaging technology, demonstrating comprehension and application in various contexts	L2, L5
	MQA204T_CO5	<b>Understand</b> principles and implementation of Quality by Design (QbD) in pharmaceutical manufacturing.	L2, L5
	MQA204T_CO6	<b>Understand</b> principles and implementation of Process Analytical Technology (PAT) in pharmaceutical manufacturing.	L2, L5
MQA205P Pharmaceutical Quality Assurance Practical II - Practical	MQA205P_CO1	<b>Understand</b> the analysis of various drugs in single and combination dosage forms.	L2, L5
	MQA205P_CO2	<b>Understand</b> equipment qualification in the pharmaceutical industry.	L2, L5
	MQA205P_CO3	<b>Understand</b> various validation activities in pharmaceuticals.	L2, L5
	MQA205P_CO4	<b>Understand</b> applications of QbD and PAT in pharmaceutical manufacturing.	L2, L5
	MQA205P_CO5	<b>Understand</b> checklists for various departments of the pharmaceutical industry.	L2, L5
<b>M. Pharm I (Semester-III) in Pharmaceutical Quality Assurance</b>			
MRM301T Research Methodology & Biostatistics - Theory	MRM301T_CO1	<b>Develop</b> a clear understanding of research concepts.	L3, L6
	MRM301T_CO2	<b>Study</b> research methodologies in-depth to enhance research skills.	L3, L4
	MRM301T_CO3	<b>Acquire</b> a comprehensive understanding of biostatistics.	L1, L3
	MRM301T_CO4	<b>Understand</b> and apply CPCSEA guidelines in the context of research.	L2, L5
MQA Journal Club - Theory	MQA Journal Club_CO1	<b>Develop</b> the ability to formulate research questions in a clear and answerable form.	L3, L6
	MQA Journal Club_CO2	<b>Conduct</b> critical appraisal of articles, evaluating their validity, significance of results, and clinical applicability.	L3
	MQA Journal Club_CO3	<b>Perform</b> a systematic search in pharmaceutical bibliographic databases to identify relevant articles and compile scientific data using computer software.	L3
<b>M. Pharm I (Semester-I) in Pharmaceutical Chemistry</b>			
MPC101T Modern Pharmaceutical Analytical Techniques - Theory	MPC101T_CO1	<b>Apply</b> knowledge of chemicals and excipients to make informed decisions in pharmaceutical analysis	L3
	MPC101T_CO2	<b>Evaluate</b> the accuracy and reliability of analytical results obtained from the analysis of various drugs in single and combination dosage forms	L5
	MPC101T_CO3	<b>Develop</b> Theoretical and Practical Skills with Analytical Instruments	L3, L6

<b>MPC102T Advanced Organic Chemistry - I - Theory</b>	<b>MPC102T_CO1</b>	<b>Understand</b> and explain the different reactive organic intermediates involved in determining reaction mechanisms.	<b>L2, L5</b>
	<b>MPC102T_CO2</b>	<b>Analyze</b> and explain nucleophilic uni- and bimolecular (SN1 and SN2) reactions, as well as E1, E2 reactions and their mechanisms.	<b>L4</b>
	<b>MPC102T_CO3</b>	<b>Discuss</b> the mechanism and applications of various named reactions in organic chemistry.	<b>L6</b>
	<b>MPC102T_CO4</b>	<b>Explain</b> the applications of various synthetic reagents involved in organic reactions.	<b>L2, L5</b>
	<b>MPC102T_CO5</b>	<b>Understand</b> various protecting and de-protecting groups used in organic synthesis.	<b>L2, L5</b>
	<b>MPC102T_CO6</b>	<b>Explain</b> the chemistry, synthesis, and mechanisms of reactions in heterocyclic nuclei.	<b>L2, L5</b>
	<b>MPC102T_CO7</b>	<b>Discuss</b> the principle and applications of retrosynthesis in organic chemistry.	<b>L6</b>
	<b>MPC102T_CO8</b>	<b>Discuss</b> the disconnection approach to develop synthetic strategies for small target molecules.	<b>L6</b>
<b>MPC103T Advanced Medicinal Chemistry - I - Theory</b>	<b>MPC103T_CO1</b>	<b>Understand</b> the different stages of drug discovery and the role of medicinal chemistry in drug research.	<b>L2, L5</b>
	<b>MPC103T_CO2</b>	<b>Apply</b> various strategies to design and develop new drug-like molecules for biological targets and drug receptor concepts.	<b>L3</b>
	<b>MPC103T_CO3</b>	<b>Elaborate</b> on prodrug development and its applications in medicinal chemistry.	<b>L6</b>
	<b>MPC103T_CO4</b>	<b>Learn</b> the structural activity relationship (SAR) of important classes of drugs.	<b>L3</b>
	<b>MPC103T_CO5</b>	<b>Explain</b> types of enzyme inhibition and their applications in medicine.	<b>L2, L5</b>
	<b>MPC103T_CO6</b>	<b>Discuss</b> peptidomimetics approaches and their applications in drug design.	<b>L6</b>
<b>MPC104T Chemistry of Natural Products - Theory</b>	<b>MPC104T_CO1</b>	<b>Explain</b> the importance of natural compounds as lead molecules for new drug discovery.	<b>L2, L5</b>
	<b>MPC104T_CO2</b>	<b>Learn</b> the different types, isolation, purification, and characterization of alkaloids, flavonoids, steroids, and terpenoids, and their chemistry and medicinal importance.	<b>L3</b>
	<b>MPC104T_CO3</b>	<b>Understand</b> molecular modification, biological activity, and general methods of structural determinations of alkaloids.	<b>L2, L5</b>
	<b>MPC104T_CO4</b>	<b>Elaborate</b> on general methods of structural elucidation and stereochemistry of compounds of natural origin.	<b>L6</b>
	<b>MPC104T_CO5</b>	<b>Explain</b> the chemistry and physiological significance of vitamins.	<b>L2, L5</b>
	<b>MPC104T_CO6</b>	<b>Discuss</b> recombinant DNA technology as a tool for new drug discovery.	<b>L6</b>
	<b>MPC104T_CO7</b>	<b>Learn</b> about constituents present in crude drugs responsible for anti-diabetic activity, liver dysfunction, and antitumor properties.	<b>L3</b>
	<b>MPC104T_CO8</b>	<b>Understand</b> advanced methods of structural elucidation of compounds of natural origin.	<b>L2, L5</b>

<b>MPC105P Pharmaceutical Chemistry Practice - I - Practical</b>	<b>MPC105P_CO1</b>	<b>Analyze</b> Pharmacopoeia compounds and their formulations using instrumental techniques.	<b>L4</b>
	<b>MPC105P_CO2</b>	<b>Perform</b> simultaneous analysis of multi-component formulations by UV spectroscopy.	<b>L3</b>
	<b>MPC105P_CO3</b>	<b>Conduct</b> experiments and estimations based on chromatography, fluorimetry, and flame photometry.	<b>L3</b>
	<b>MPC105P_CO4</b>	<b>Implement</b> purification techniques on organic solvents, conduct reactions of strategic importance, and demonstrate proficient application of synthetic methods and analytical skills in organic chemistry	<b>L3</b>
	<b>MPC105P_CO5</b>	<b>Apply</b> advanced synthetic techniques to proficiently carry out the multistep synthesis of pharmaceutically relevant compounds, demonstrating a high level of synthesis and problem-solving skills in organic chemistry	<b>L3</b>
	<b>MPC105P_CO6</b>	<b>Estimate</b> elements, functional groups of organic natural compounds, and carry out degradation reactions on selected plant constituents.	<b>L5, L6</b>
	<b>MPC105P_CO7</b>	<b>Analyze</b> the data obtained from isolation and characterization, identifying key parameters and interpreting spectroscopic information	<b>L4</b>
<b>M. Pharm I (Semester-II) in Pharmaceutical Chemistry</b>			
<b>MPC201T Advanced Spectral Analysis - Theory</b>	<b>MPC201T_CO1</b>	<b>Interpret</b> the UV and IR spectra of various organic compounds.	<b>L2, L5</b>
	<b>MPC201T_CO2</b>	<b>Interpret</b> the NMR spectra of various organic compounds using different techniques.	<b>L2, L5</b>
	<b>MPC201T_CO3</b>	<b>Interpret</b> the Mass spectra of various organic compounds using different techniques.	<b>L2, L5</b>
	<b>MPC201T_CO4</b>	<b>Understand</b> the principles, instrumentation, and application of various chromatographic techniques employed for the analysis of organic compounds.	<b>L2, L5</b>
	<b>MPC201T_CO5</b>	<b>Understand</b> the principles, instrumentation, and application of Thermal methods of analysis, Raman Spectroscopy, and Radioimmune assay.	<b>L2, L5</b>
<b>MPC202T Advanced Organic Chemistry- II - Theory</b>	<b>MPC202T_CO1</b>	<b>Understand</b> the principles of Green chemistry.	<b>L2, L5</b>
	<b>MPC202T_CO2</b>	<b>Explore</b> the applications of Green chemistry.	<b>L2, L5</b>
	<b>MPC202T_CO3</b>	<b>Apply</b> knowledge of peptide chemistry to analyze and predict the behavior of peptides in various contexts	<b>L3</b>
	<b>MPC202T_CO4</b>	<b>Study</b> various catalysts used in organic reactions.	<b>L3, L4</b>
	<b>MPC202T_CO5</b>	<b>Acquire</b> knowledge of the concept of stereochemistry.	<b>L1, L3</b>
	<b>MPC202T_CO6</b>	<b>Understand</b> the concept of asymmetric synthesis.	<b>L2, L5</b>
<b>MPC203T - Computer Aided Drug Design - Theory</b>	<b>MPC203T_CO1</b>	<b>Demonstrate</b> a thorough understanding of the historical evolution of Computer-Aided Drug Design, including its basic concepts, and critically assess its contemporary applications.	<b>L2</b>
	<b>MPC203T_CO2</b>	<b>Analyze</b> and differentiate between the physicochemical properties of compounds, employing both experimental and theoretical methodologies, and interpret the outcomes using QSAR principles.	<b>L4</b>



	MPC203T_CO3	<b>Apply</b> various methods, including 3D QSAR approaches and statistical techniques, to assess and predict the bioactivity of molecules, emphasizing the importance of statistical parameters in the drug design process.	L3
MPC204T - Pharmaceutical Process Chemistry - Theory	MPC204T_CO1	<b>Impart</b> knowledge on the development and optimization of synthetic routes that are safe, cost-effective, environmentally friendly, and efficient.	L3
	MPC204T_CO2	<b>Describe</b> the pilot plant procedures for manufacturing Active Pharmaceutical Ingredients (APIs) and new chemical entities, focusing on the scale-up process in drug development.	L2
	MPC204T_CO3	<b>Demonstrate</b> the ability to perform work-up and separation procedures effectively in pharmaceutical process chemistry.	L2
	MPC204T_CO4	<b>Predict</b> the outcomes of organic reactions by applying a fundamental understanding of the general reactivity of functional groups and their mechanisms.	L6
	MPC204T_CO5	<b>Understand</b> industrial safety protocols in pharmaceutical process chemistry.	L2, L5
MPC205P - Pharmaceutical Chemistry Practice - II - Practical	MPC205P_CO1	<b>Analyze</b> pharmacopoeia compounds and their formulations using instrumental techniques and interpret spectroscopic data effectively.	L4
	MPC205P_CO2	<b>Perform</b> experiments on synthesis, adapting various approaches to gain hands-on experience in medicinal chemistry.	L3
	MPC205P_CO3	<b>Conduct</b> multistep synthesis of medicinally important compounds, demonstrating proficiency in complex synthetic processes.	L3
	MPC205P_CO4	<b>Understand</b> the importance of drug design and apply different techniques in the practical setting.	L2, L5
<b>M. Pharm II (Semester-III) in Pharmaceutical Chemistry</b>			
MRM301T Research Methodology and Biostatistics - Theory	MRM301T_CO1	<b>Develop</b> the ability to apply appropriate research methods, choose a suitable research design, and establish a framework for conducting research projects.	L3, L6
	MRM301T_CO2	<b>Describe</b> the relevant statistical methods necessary for a specific research design and formulate appropriate research hypotheses for a research project.	L2
	MRM301T_CO3	<b>Develop</b> the ability to articulate and implement medical ethics, control regulations, cultural considerations, confidentiality, and conflict of interest in research studies.	L3, L6
	MRM301T_CO4	<b>Explain</b> CPCSEA guidelines, SOPs for laboratory animal facilities, environmental protection, and personnel training in compliance with ethical standards.	L2, L5
	_CO5	<b>Implement</b> basic principles of medical research while ensuring medical care in accordance with the Declaration of Helsinki.	L3
MPH Journal Club	MPH Journal	<b>Develop</b> the ability to formulate research questions	L3, L6

[Theory   Regular]	Club_CO1	in an answerable form.	
	MPH Journal Club_CO2	<b>Discuss</b> critical appraisal methods for evaluating the validity, significance of results, and clinical applicability of research articles.	L6
	MPH Journal Club_CO3	<b>Conduct</b> a systematic search in pharmaceutical bibliographic databases to identify relevant articles and compile scientific data using computer software.	L3
<b>M. Pharm I (Semester-I) in Pharmacology</b>			
MPL101T Modern Pharmaceutical Analytical Techniques - Theory	MPL101T_CO1	<b>Apply</b> knowledge of chemicals and excipients to make informed decisions in pharmaceutical analysis	L3
	MPL101T_CO2	<b>Evaluate</b> the accuracy and reliability of analytical results obtained from the analysis of various drugs in single and combination dosage forms	L5
	MPL101T_CO3	<b>Develop</b> Theoretical and Practical Skills with Analytical Instruments	L3, L6
MPL102T Advanced Pharmacology - I - Theory	MPL102T_CO1	<b>Discuss</b> the pathophysiology of certain diseases.	L6
	MPL102T_CO2	<b>Educate</b> students about the pharmacotherapy of certain diseases.	L3
	MPL102T_CO3	<b>Explain</b> the mechanism of drug actions at the cellular and molecular levels.	L2, L5
	MPL102T_CO4	<b>Understand</b> the adverse effects, contraindications, and clinical uses of drugs used in the treatment of diseases.	L2, L5
	MPL102T_CO5	<b>Impart</b> recent advances in the drugs used for the treatment of various diseases.	L3
MPL103T Pharmacological and Toxicological Screening Methods- I - Theory	MPL103T_CO1	<b>Appraise</b> regulations and ethical requirements for the usage of experimental animals.	L5
	MPL103T_CO2	<b>Describe</b> various animals used in the drug discovery process and good laboratory practices in the maintenance and handling of experimental animals.	L2
	MPL103T_CO3	<b>Describe</b> various newer screening methods involved in the drug discovery process.	L2
	MPL103T_CO4	<b>Appreciate</b> and correlate preclinical data to humans.	L3
	MPL103T_CO5	<b>Describe</b> general principles and methods of evaluation of immunoassay.	L2
MPL104T Cellular and Molecular Pharmacology - Theory	MPL104T_CO1	<b>Explain</b> information on the pharmacological modulation of cellular response and receptor signal transduction processes.	L2, L5
	MPL104T_CO2	<b>Educate</b> students to analyze the molecular and cellular pathways affected by drugs.	L3
	MPL104T_CO3	<b>Recall</b> the applicability of molecular pharmacology, biomarkers, pharmacogenetics, and pharmacogenomics in the drug discovery process.	L1
	MPL104T_CO4	<b>Demonstrate</b> genetic elements of DNA, fingerprint analysis, cell culture techniques, and various molecular techniques applicable in drug discovery.	L2
MPL105P Pharmacology Practical - I - Practical	MPL105P_CO1	<b>Understand the various routes of drug administration, techniques of blood sampling, anesthesia and euthanasia of experimental animals</b>	L2, L5

	MPL105P_CO2	Evaluate the effectiveness and efficiency of various screening methods in the context of drug discovery projects	L5
	MPL105P_CO3	Apply knowledge to execute isolation, identification, and estimation procedures for proteins and DNA/RNA from diverse sources	L3
<b>M. Pharm I (Semester-II) in Pharmacology</b>			
MPL201T Advanced Pharmacology-II Theory	MPL201T_CO1	Assess the relevance and significance of various pharmacological theories and concepts in the broader context of healthcare and medicine	L5
	MPL201T_CO2	Explore and comprehend recent advances in drugs used for the treatment of various diseases.	L2, L5
	MPL201T_CO3	Gain an in-depth understanding of the concepts of drug action and the mechanisms involved.	L1
	MPL201T_CO4	Discuss the pathophysiology and pharmacotherapy of specific diseases, emphasizing the integration of theoretical and practical knowledge.	L6
	MPL201T_CO5	Analyze and comprehend the adverse effects, contraindications, and clinical uses of drugs employed in the treatment of diseases.	L4
MPL202T Pharmacological & Toxicological Screening Methods-II - Theory	MPL202T_CO1	Explain the various types of toxicity studies	L2, L5
	MPL202T_CO2	Appreciate the importance of ethical and regulatory requirements for toxicity studies	L3
	MPL202T_CO3	Understand reproductive toxicology studies and genotoxicity studies	L2, L5
	MPL202T_CO4	Discuss IND enabling studies and Safety pharmacology studies	L6
	MPL202T_CO5	Explain importance and applications of toxicokinetic studies	L2, L5
MPL203T Principles of Drug Discovery-Theory	MPL203T_CO1	Describe in detail about various stages involved in modern drug discovery process	L2
	MPL203T_CO2	Explain the role of genomics, proteomics, and bioinformatics in drug discovery	L2, L5
	MPL203T_CO3	Explain various targets for drug discovery	L2, L5
	MPL203T_CO4	Explain various lead seeking method and lead optimization	L2, L5
	MPL203T_CO5	Describe in detail about the concept of Rational Drug Design	L2
	MPL203T_CO6	Explain the concept of molecular docking and its applications	L2, L5
	MPL203T_CO7	Explain the concept of QSAR and QSAR statistical methods	L2, L5
	MPL203T_CO8	Explain Rationale of prodrug design and practical consideration of prodrug design	L2, L5
MPL 204T Clinical Research and Pharmacovigilance-Theory	MPL 204T_CO1	Provide students with a value addition and address current requirements in the dynamic fields of clinical research and pharmacovigilance.	L3
	MPL 204T_CO2	Create knowledge and skills to develop comprehensive plans for conceptualizing, designing, conducting, managing, and reporting on clinical trials	L6
	MPL 204T_CO3	Explore the global scenario of pharmacovigilance,	L2, L5

		covering various methods used to generate safety data and their applications in different regions.	
	MPL 204T_CO4	<b>Instruct</b> students in the development of drug safety data, spanning pre-clinical and clinical phases of drug development, as well as post-market surveillance practices.	L3
	MPL 204T_CO5	<b>Evaluate</b> the effectiveness of different methods for assessing and reporting adverse drug reactions, considering their reliability and relevance	L5
MPL205P Pharmacology Practical - II- Practical	MPL205P_CO1	<b>Apply</b> knowledge to design in-vitro experiments that incorporate different isolated tissue models	L3
	MPL205P_CO2	<b>Demonstrate</b> Proficiency in Applying OECD Guidelines to Conduct Acute Toxicity Studies for Safety Evaluations	L2
	MPL205P_CO3	<b>Formulate</b> strategies for effective monitoring and management of Adverse Drug Reactions (ADR) in cardiovascular research	L6
<b>M. Pharm II (Semester-III) in Pharmacology</b>			
MRM301T Research Methodology and Biostatistics - Theory	MRM301T_CO1	<b>Develop</b> the ability to apply appropriate research methods, choose a suitable research design, and establish a framework for conducting research projects.	L3, L6
	MRM301T_CO2	<b>Describe</b> the relevant statistical methods necessary for a specific research design and formulate appropriate research hypotheses for a research project.	L2
	MRM301T_CO3	<b>Develop</b> the ability to articulate and implement medical ethics, control regulations, cultural considerations, confidentiality, and conflict of interest in research studies.	L3, L6
	MRM301T_CO4	<b>Explain</b> CPCSEA guidelines, SOPs for laboratory animal facilities, environmental protection, and personnel training in compliance with ethical standards.	L2, L5
	_CO5	<b>Implement</b> basic principles of medical research while ensuring medical care in accordance with the Declaration of Helsinki.	L3
MPH Journal Club [Theory   Regular]	MPH Journal Club_CO1	<b>Develop</b> the ability to formulate research questions in an answerable form.	L3, L6
	MPH Journal Club_CO2	<b>Discuss</b> critical appraisal methods for evaluating the validity, significance of results, and clinical applicability of research articles.	L6
	MPH Journal Club_CO3	<b>Conduct</b> a systematic search in pharmaceutical bibliographic databases to identify relevant articles and compile scientific data using computer software.	L3



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