

**KHARVEL SUBHARTI COLLEGE OF PHARMACY**

**Name of the Program with program code: Master of Pharmacy (PH-02)**

<b>Programme Name</b>	<b>Programme Specific Outcomes</b>	<b>Course Name</b>	<b>Course Code</b>	<b>Course Outcomes</b>
<b>M. Pharm. (Pharmaceutics)</b>	<b>PSO.1:</b> Impart knowledge on the novel drug delivery systems, approaches, criteria for selection of polymers and drugs and their formulation and evaluation.	Modern Pharmaceutical Analytical Techniques	MPH 101 T	<b>After completion of course student is able to know-</b> <ul style="list-style-type: none"> <li>• Chemicals and Excipients.</li> <li>• The analysis of various drugs in single and combination dosage forms.</li> <li>• Theoretical and practical skills of the instruments.</li> </ul>
	<b>PSO.2:</b> To know various preformulation elements, industrial management and GMP considerations, Pilot Plant Scale up Techniques, Stability testing, sterilization and packaging of dosage forms.	Drug Delivery System	MPH102 T	<b>Upon completion of the course, student shall be able to understand-</b> <ul style="list-style-type: none"> <li>• The various approaches for development of novel drug delivery systems.</li> <li>• The criteria for selection of drugs and polymers for the development of delivering system.</li> <li>• The formulation and evaluation of Novel drug delivery systems.</li> </ul>
	<b>PSO.3:</b> To impart knowledge and skills in generic drug development, various regulatory filings the approval	Modern Pharmaceutics	MPH 103 T	<b>Upon completion of the course, student shall be able to understand-</b> <ul style="list-style-type: none"> <li>• The elements of preformulation studies.</li> <li>• The Active Pharmaceutical Ingredients and Generic drug Product development.</li> <li>• Industrial Management and GMP Considerations.</li> <li>• Optimization Techniques &amp; Pilot Plant Scale Up</li> </ul>

<p>process, and concept of generics across the globe.</p> <p><b>PSO.4:</b> To impart knowledge and skills for dose calculations, dose adjustments and apply bio pharmaceuticals theories in practical problem solving. The pharmacokinetic models, bioequivalence and potential clinical pharmacokinetic problem analysis.</p> <p><b>PSO.5:</b> Skill development in Pharmaceutical research, Pharmacoinformatics, in drug development in Computational modelling, Preclinical development, clinical development, Artificial Intelligence and Robotics, and Computational fluid dynamics.</p>			<p>Techniques.</p> <ul style="list-style-type: none"> <li>Stability Testing, sterilization process &amp; packaging of dosage forms.</li> </ul>
	Regulatory Affairs	MPH 104 T	<p><b>Upon completion of the course, it is expected that the students will be able to understand-</b></p> <ul style="list-style-type: none"> <li>The Concepts of innovator and generic drugs, drug development process.</li> <li>The Regulatory guidance's and guidelines for filing and approval process.</li> <li>Preparation of Dossiers and their submission to regulatory agencies in different countries.</li> <li>Post approval regulatory requirements for actives and drug products.</li> <li>Submission of global documents in CTD/ eCTD formats.</li> <li>Clinical trials requirements for approvals for conducting clinical trials.</li> <li>Pharmacovigilance and process of monitoring in clinical trials.</li> </ul>
	Molecular Pharmaceutics	MPH 201 T	<p><b>Upon completion of the course student shall be able to understand-</b></p> <ul style="list-style-type: none"> <li>The various approaches for development of novel drug delivery systems.</li> <li>The criteria for selection of drugs and polymers for the development of NTDS.</li> </ul>

<p><b>PSO.6:</b> To impart knowledge and skills necessary for cosmetics and cosmeceuticals, their safety and efficacy and current technologies in cosmetic industry.</p> <p><b>PSO.7:</b> To gain knowledge in use of advanced instrumentation, formulation and evaluation of controlled release formulations, floating drug delivery systems, transdermal drug delivery systems, micromeritics, and mathematical simulations.</p> <p><b>PSO.8:</b> To train the students and develop their technical skill knowledge in computer simulations, population modelling, in vitro and in vivo studies.</p>			<ul style="list-style-type: none"> <li>• The formulation and evaluation of novel drug delivery systems.</li> </ul>
	Advanced Biopharmaceutics & Pharmacokinetics	MPH 202 T	<p><b>Upon completion of this course it is expected that students will be able understand-</b></p> <ul style="list-style-type: none"> <li>• The basic concepts in biopharmaceutics and pharmacokinetics.</li> <li>• The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination.</li> <li>• The critical evaluation of biopharmaceutic studies involving drug product equivalency.</li> <li>• The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters.</li> <li>• The potential clinical pharmacokinetic problems and application of basics of pharmacokinetics.</li> </ul>
	Computer Aided Drug delivery System	MPH 203 T	<p><b>Upon completion of this course it is expected that students will be able to understand</b></p> <ul style="list-style-type: none"> <li>• History of Computers in Pharmaceutical Research and Development.</li> <li>• Computational Modeling of Drug Disposition.</li> <li>• Computers in Preclinical Development.</li> <li>• Optimization Techniques in Pharmaceutical Formulation.</li> </ul>

	<p><b>PSO.9:</b> To create a talent pool by involving students in research projects and to make students undertake research projects under faculty guidance for publication.</p> <p><b>PSO.10:</b> To foster ambitious desire among students to undertake higher studies and career growth.</p>			<ul style="list-style-type: none"> <li>• Computers in Market Analysis.</li> <li>• Computers in Clinical Development.</li> <li>• Artificial Intelligence (AI) and Robotics.</li> <li>• Computational fluid dynamics (CFD).</li> </ul>
		Cosmetic & Cosmeceuticals	MPH 204 T	<p><b>Upon completion of the course, the students shall be able to understand-</b></p> <ul style="list-style-type: none"> <li>• Key ingredients used in cosmetics and cosmeceuticals.</li> <li>• Key building blocks for various formulations.</li> <li>• Current technologies in the market.</li> <li>• Various key ingredients and basic science to develop cosmetics and cosmeceuticals.</li> <li>• Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.</li> </ul>

Programme Name	Programme Specific outcomes	Course Name	Course Code	Course Outcomes
<b>M.Pharm (Pharmaceutical Chemistry)</b>	<b>PSO.1:</b> To imbibe the conceptual understanding of the Pharmaceutical and Medicinal chemistry.	Modern Pharmaceutical Analytical Techniques	MPC 101 T	<b>After completion of course student is able to know-</b> <ul style="list-style-type: none"> <li>• The analysis of various drugs in single and combination dosage forms.</li> <li>• Theoretical and practical skills of the instruments.</li> </ul>
	<b>PSO.2:</b> To deal with various advanced instrumental techniques for Quantification, Interpretation, characterization of novel and exiting drugs.	Advanced Organic Chemistry-I	MPC 102 T	<b>Upon completion of course, the student shall be to understand-</b> <ul style="list-style-type: none"> <li>• The principles and applications of reterosynthesis.</li> <li>• The mechanism &amp; applications of various named reactions.</li> <li>• The concept of disconnection to develop synthetic routes for small target molecule.</li> <li>• The various catalysts used in organic reactions.</li> <li>• The chemistry of heterocyclic compounds.</li> </ul>
	<b>PSO.3:</b> To impart knowledge on single step and multi-step synthetic reactions, identification and interpretation of intermediates and conversion into final products. <b>PSO.4:</b> To know the Pharmacopieal assays by spectroscopical methods,	Advanced Medicinal Chemistry	MPC 103 T	<b>At completion of this course it is expected that students will be able to understand-</b> <ul style="list-style-type: none"> <li>• Different stages of drug discovery.</li> <li>• Role of medicinal chemistry in drug research.</li> <li>• Different techniques for drug discovery.</li> <li>• Various strategies to design and develop new drug like molecules for biological targets.</li> <li>• Peptidomimetics.</li> </ul>

<p>calibration techniques, determination of preservatives, vitamin contents in drugs and foods.</p> <p><b>PSO.5:</b> To create knowledge with various hyphenated analytical instrumental techniques for identification, characterization, and quantification of drugs.</p> <p><b>PSO.6:</b> To impart knowledge about extraction, separation of drugs from biological samples using different techniques and guidelines for analytical methods.</p> <p><b>PSO.7:</b> To know about quality assurance aspects of pharmaceutical industries such as CGMP, Documentations, certifications, GLP, and other regulatory affairs.</p>	Chemistry of Natural Products	MPC 104 T	<p><b>At completion of this course it is expected that students will be able to understand-</b></p> <ul style="list-style-type: none"> <li>• Different types of natural compounds and their chemistry and medicinal importance.</li> <li>• The importance of natural compounds as lead molecules for new drug discovery.</li> <li>• The concept of rDNA technology tool for new drug discovery.</li> <li>• General methods of structural elucidation of compounds of natural origin.</li> <li>• Isolation, purification and characterization of simple chemical constituents from natural source.</li> </ul>
	Advanced Spectral Analysis	MPC 201 T	<p><b>At completion of this course it is expected that students will be able to understand</b></p> <ul style="list-style-type: none"> <li>• Interpretation of the NMR, Mass and IR spectra of various organic compounds.</li> <li>• Theoretical and practical skills of the hyphenated instruments.</li> <li>• Identification of organic compounds.</li> </ul>
	Advanced Organic Chemistry-II	MPC 202 T	<p><b>Upon completion of course, the student shall able to understand-</b></p> <ul style="list-style-type: none"> <li>• The principles and applications of Green chemistry.</li> <li>• The concept of peptide chemistry.</li> <li>• The various catalysts used in organic reactions.</li> <li>• The concept of stereochemistry and asymmetric synthesis.</li> </ul>

	<p><b>PSO.8:</b> To create a talent pool by involving students in research projects and to make students undertake small and large research projects/grants under faculty guidance for higher qualification.</p> <p><b>PSO.9:</b> To promote ambitious desire among students to undertake higher studies.</p>	Computer Aided Drug Design	MPC 203 T	<p><b>At completion of this course it is expected that students will be able to understand-</b></p> <ul style="list-style-type: none"> <li>• Role of CADD in drug discovery.</li> <li>• Different CADD techniques and their applications.</li> <li>• Various strategies to design and develop new drug like molecules.</li> <li>• Working with molecular modelling software's to design new drug molecules</li> <li>• The in silico virtual screening protocols.</li> </ul>
		Pharmaceutical Process Chemistry	MPC 204 T	<p><b>At completion of this course it is expected that students will be able to understand-</b></p> <ul style="list-style-type: none"> <li>• The strategies of scale up process of apis and intermediates.</li> <li>• The various unit operations and various reactions in process chemistry.</li> </ul>

Programme Name	Programme Specific Outcomes	Course Name	Course Code	Course Outcomes
<b>M.Pharm (Pharmacology)</b>	<b>PSO.1:</b> Relate the acquired scientific information and principles of pharmacokinetics and pharmacodynamics in drug discovery process.	Modern Pharmaceutical Analytical Techniques	MPL 101 T	<b>After completion of course student is able to know-</b> <ul style="list-style-type: none"> <li>• Chemicals and Excipients.</li> <li>• The analysis of various drugs in single and combination dosage forms.</li> <li>• Theoretical and practical skills of the instruments.</li> </ul>
	<b>PSO.2:</b> Interpret data of pharmaceutical experiments in drug discovery as per the needs of pharmaceutical industries.	Advanced Pharmacology-I	MPL 102 T	<b>Upon completion of the course the student shall be able to-</b> <ul style="list-style-type: none"> <li>• Discuss the pathophysiology and pharmacotherapy of certain diseases.</li> <li>• Explain the mechanism of drug actions at cellular and molecular level</li> <li>• Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases.</li> </ul>
	<b>PSO.3:</b> Translate the high-level of understanding of drug action into key stages in preclinical and clinical research studies.	Pharmacological and Toxicological screening Methods-I	MPL 103 T	<b>Upon completion of the course the student shall be able to-</b> <ul style="list-style-type: none"> <li>• Appraise the regulations and ethical requirement for the usage of experimental animals.</li> <li>• Describe the various animals used in the drug discovery process and good laboratory practices in maintenance and handling of experimental animals.</li> <li>• Describe the various newer screening methods involved in the drug discovery process.</li> </ul>
<b>PSO.4:</b> Demonstrate knowledge of professional and ethical responsibilities in				



<p>clinical and non-clinical laboratory as required by regulatory bodies.</p> <p><b>PSO.5:</b> Evaluate current drug information in the delivery of pharmaceutical care and assure in regard to drug usage and their adverse effects.</p> <p><b>PSO.6:</b> Appraise pharmacological model for investigation through logics and problem solving ability.</p> <p><b>PSO.7:</b> Retrieve, analyze, interpret and formulate drug or medicine information.</p>			<ul style="list-style-type: none"> <li>• Appreciate and correlate the preclinical data to humans.</li> </ul>
	Cellular and Molecular Pharmacology	MPL 104 T	<p><b>Upon completion of the course, the student shall be able to-</b></p> <ul style="list-style-type: none"> <li>• Explain the receptor signal transduction processes.</li> <li>• Explain the molecular pathways affected by drugs.</li> <li>• Appreciate the applicability of molecular pharmacology and biomarkers in drug discovery process.</li> <li>• Demonstrate molecular biology techniques as applicable for pharmacology.</li> </ul>
	Advanced Pharmacology-II	MPL 201 T	<p><b>Upon completion of the course the student shall be able to-</b></p> <ul style="list-style-type: none"> <li>• Explain the mechanism of drug actions at cellular and molecular level.</li> <li>• Discuss the Pathophysiology and pharmacotherapy of certain diseases.</li> <li>• Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases.</li> </ul>
	Pharmacological and Toxicological screening Methods-II	MPL 202 T	<p><b>Upon completion of the course, the student shall be able to-</b></p> <ul style="list-style-type: none"> <li>• Explain the various types of toxicity studies.</li> <li>• Appreciate the importance of ethical and regulatory requirements for toxicity studies.</li> </ul>

				<ul style="list-style-type: none"> <li>• Demonstrate the practical skills required to conduct the preclinical toxicity studies.</li> </ul>
		Principles of Drug Discovery	MPL 203 T	<p><b>Upon completion of the course, the student shall be able to-</b></p> <ul style="list-style-type: none"> <li>• Explain the various stages of drug discovery.</li> <li>• Appreciate the importance of the role of genomics, proteomics and bioinformatics in drug discovery.</li> <li>• Explain various targets for drug discovery.</li> <li>• Explain various lead seeking method and lead optimization.</li> <li>• Appreciate the importance of the role of computer aided drug design in drug discovery.</li> </ul>
		Clinical Research and Pharmacovigilance	MPL 204 T	<p><b>Upon completion of the course, the student shall be able to-</b></p> <ul style="list-style-type: none"> <li>• Explain the regulatory requirements for conducting clinical trial.</li> <li>• Demonstrate the types of clinical trial designs.</li> <li>• Explain the responsibilities of key players involved in clinical trials.</li> <li>• Execute safety monitoring, reporting and close-out activities.</li> <li>• Explain the principles of Pharmacovigilance.</li> <li>• Detect new adverse drug reactions and their assessment.</li> <li>• Perform the adverse drug reaction reporting</li> </ul>

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