

POSTGRADUATE PHARMACY PROGRAM

CRITERION	Course Outcomes (COs)
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CRITERION

- . Course Outcomes (COs) and Program Outcomes (POs)
- . Establish the correlation between the courses and the Program Outcomes (NBA defined Program Outcomes as mentioned in Annexure I)
- . Course Outcomes (should include course outcomes of one course from each semester of study, however, should be prepared for all courses)

On successful completion of this Course, students will be able to:

MPT101: Theory Modern Pharmaceutical Analytical Techniques

S. NO.	Statements
MPT101.1	The thorough theoretical and practical understanding of advanced analytical instruments of various spectroscopic techniques including NMR spectroscopy, Mass Spectroscopy.
MPT101.2	The principle, instrumentation and applications of separation techniques like Electrophoresis and chromatography. and X ray Crystallography.
MPT101.3	The analysis of various drugs in single and combination dosage forms.
MPT101.4	To acquire sufficient skill in handling of equipment's/procedures for estimation of pharmaceuticals.
MPT101.5	Able to work in a team so as to involve in interdisciplinary research projects

MPH102: Theory Drug delivery systems

S. NO.	Statements
MPH102.1	Define Sustained Release and Controlled Release formulations and introduction basic concept and mechanism of action of sustained release formulation
MPH102.2	Explain the Principles & Fundamentals, Types, Activation; Modulated drug delivery systems; Mechanically activated, pH activated, Enzyme activated, and Osmotic activated drug delivery Systems, Feedback regulated drug delivery systems
MPH102.3	Explain Principle, concepts advantages and disadvantages, Modulation of GI transit time approaches to extend GI transit. Buccal drug delivery systems: Principle of Muco adhesion, advantages and disadvantages, Mechanism of drug permeation, Methods of formulation and its evaluations and details about Ocular drug delivery systems
MPH102.4	Explain structure of skin and barriers, Penetration enhancers, Transdermal drug delivery systems formulation and evaluation.
MPH102.5	Importance of Protein and Peptide Delivery: Barriers for protein delivery. Formulation and Evaluation of delivery systems of proteins and other macromolecules and Vaccine delivery systems

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On successful completion of this Course, students will be able to:

MPH103: Theory Modern Pharmaceutics

S. NO.	Statements
MPH103.1	Justify the elements of Preformulation studies.
MPH103.2	Examine Pharmaceutical Validation, ICH&WHO guidelines for calibration and validation of equipments
MPH103.3	Explain Industrial Management and CGMP considerations
MPH103.4	Categorize Optimization Techniques & Pilot Plant Scale up Techniques
MPH103.5	Illustrate Stability Testing, Compression and compaction and study of consolidation parameters

MPH104: Theory Regulatory affairs

S. NO.	Statements
MPH104.1	Explain the Master formula record, DMF (Drug Master File), distribution records ANDA regulatory approval process, NDA approval process and drug product assessment, in –vivo, scale up process approval changes, post marketing surveillance, outsourcing Bioavailability and Bio equivalence to CRO
MPH104.2	Explain the Regulatory requirement for API, biologics, novel, therapy obtaining NDA, ANDA for generic drugs
MPH104.3	Explain Chemistry, Manufacturing & Control (CMC), post approval regulatory affairs. Regulation for combination products and medical devices. ICH – Guidelines, Illustrate Regulatory requirements of EU, MHRA, TGA and ROW countries.
MPH104.4	Explain about Non clinical drug development and Investigation of medicinal products dossier, dossier (IMPD).
MPH104.5	Illustrate the clinical trial protocols, ethics committee, Consent process and procedures. HIPAA- new, requirement to clinical study process and pharmacovigilance safety monitoring in clinical trials.

MPH105: Practical Pharmaceutics I

S. NO.	Statements
MPH105.1	Differentiate the In-vitro dissolution profile of CR/ SR marketed formulation.
MPH105.2	Develop Formulation and evaluation of sustained release matrix tablets
MPH105.3	Explain the preformulation studies of tablets
MPH105.4	Explain the Micromeritic properties of powders and granulation.
MPH105.5	Develop the Heckel plot, Higuchi and peppas plot and determine similarity factors

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MPH201: Theory Molecular Pharmaceutics(Nano Technology & Targeted DDS)

S. NO.	Statements
MPH201.1	Explain the concepts of drug targeting and brain targeting.
MPH201.2	Develop the nanoparticles, liposomes, microspheres and monoclonal antibodies and evaluate them for specific targeting.
MPH201.3	Illustrate the preparation and applications of Niosomes, Aquasomes, Phytosomes, Electrosomes
MPH201.4	Classify and explain about the aerosols and intra nasal delivery routes, their preparation methods and evaluation methods.
MPH201.5	Focus on the gene therapy, diseases treated using gene therapy, Gene expression systems, liposomal drug delivery systems and its Bio distribution and Pharmacokinetics.

MPH202: Theory Advanced Biopharmaceutics and Pharmacokinetics

S. NO.	Statements
MPH202.1	Explain drug absorption from the Gastro intestinal tract, factors affecting absorption, mechanism of absorption,
MPH202.2	Develop biopharmaceutic considerations in drug product design and <i>in vitro</i> Drug Product Performance, dissolution methods, <i>invitro-invivo</i> correlation.
MPH202.3	Focus on Pharmacokinetics basic considerations, pharmacokinetic models, compartment modelling, drug interactions.
MPH202.4	Apply drug product performance <i>invivo</i> -bioavailability and Bioequivalence, assessing bioavailability, bioequivalence studies,
MPH202.5	Analyze modified-Release Drug Products, Targeted Drug Delivery Systems and Biotechnological Products

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MPH203: Theory Computer Aided Drug Development	
S. NO.	Statements
MPH203.1	Administer the history of Computers in Pharmaceutical Research and Development Analyze queueing in open and closed networks.
MPH203.2	Build the computational Modeling of Drug Disposition and Computers in Preclinical Development Solve problems using linear programming.
MPH203.3	Categorize the optimization Techniques in Pharmaceutical Formulation.
MPH203.4	Examine the computers in Market Analysis and Clinical Development
MPH203.5	Illustrate the artificial Intelligence (AI) and Robotics, Computational fluid dynamics (CFD)
MPH204: Theory Cosmetics and cosmeceuticals	
S. NO.	Statements
MPH204.1	Describe regulatory provisions for manufacturing and labeling of Cosmetic products as per Indian regulation
MPH204.2	Explain biological aspects of skin ,hair problems , Cleansing and care needs for face, eye lids, lips, hands, feet, nail, scalp, neck, body and under-arm.
MPH204.3	Develop building blocks for different product formulations of cosmetics/cosmeceuticals
MPH204.4	Establish design of Cosmeceutical products like Sun protection, sunscreens dry skin, acne, pigmentation, prickly heat, wrinkles, body odor.,dandruff, dental cavities, bleeding gums, mouth odor and sensitive teeth
MPH204.5	Analyze herbal Cosmetics for skin, Hair and oral care, Challenges in formulating herbal cosmetics.

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MPH205: Practical Pharmaceutics II	
S. NO.	Statements
MPH205.1	Estimate the effect of temperature change, non-solvent addition, incompatible polymer addition in microcapsules preparation
MPH205.2	Formulate and evaluate Alginate beads, gelatin /albumin microspheres, liposomes/niosomes and spherules. Influence of dissolution characteristics of slightly soluble drug by solid dispersion technique.
MPH205.3	Development and evaluation of Creams development and evaluation of Shampoo and Toothpaste base .To incorporate herbal and chemical actives to develop products To address Dry skin, acne, blemish, Wrinkles, bleeding gums and dandruff
MPH205.4	Compare dissolution of two different marketed products /brands and importance Protein binding studies of a highly protein bound drug & poorly protein bound drug and determine Bioavailability studies of Paracetamol in animals
MPH205.5	Develop the Pharmacokinetic and IVIVC data by Winnoline R software for permeability and Design Expert® Software . generalise the Computational Modeling Of Drug Disposition To develop Clinical Data Collection manual To carry out Sensitivity Analysis, and Population Modeling
MRM301: Research Methodology and Biostatistics	
S. NO.	Statements
MRM301.1	Analyze the value, scope, objectives and requirements of research.
MRM301.2	Discuss the basic concepts of statistical analysis
MRM301.3	Apply the basic principles of medical research and ethics.
MRM301.4	Understand the guidelines for the maintenance of laboratory animals(CPCSEA Guidelines).
MRM301.5	Create efficiency in thesis writing editing and formatting.