M.PHARMACY PHARMACEUTICS I SEMESTER

After successful completion of this course students will be able to:

Modern Pharmaceutical Analytical Techniques MPH 101 T (Theory)	1. To understand the basic knowledge on assay of single and multiple component pharmaceuticals by using various analytical instruments 2. To develop basic practical skills using instrumentation techniques 3. Skills in selecting the suitable techniques for analysis of drugs and pharmaceuticals 4. To expand the theoretical knowledge on various instrumental techniques available for analysis of organic 5. Substances. 6. To apply the knowledge learnt in developing new procedures of their own design 7. Comparing various methods of analysis and their outcomes
Pharmaceutics MPH 102 T (Theory)	1. To recall the basic concepts of sustained release, controlled release, polymer science and personalized medicine. 2. explain (impart) the principles and fundamentals of controlled drug delivery systems, protein-peptide drug delivery and vaccine drug delivery systems. 3. To (train) develop the formulations of gastro retentive, ocular, transdermal, protein-peptide and vaccine drug delivery systems. 4. To analyze the formulations of gastro retentive and ocular drug delivery systems. 5. To assess the transdermal and protein-peptide drug delivery systems. 6. To evaluate the formulated vaccine drug delivery systems.
Modern Pharmaceutics MPH 103 T (Theory)	1. To recall the concepts of preformulation and relate them to formulation development. 2. To illustrate the parameters of optimization and its applications in formulation development. 3. To develop validation and calibration master plan as per regulatory guidelines. 4. To categorize the policies of cGMP, layout of buildings, equipment and management of production. 5. To explain the principles of tablet compression and compaction. 6. To compile the consolidation parameters to determine the stability of a dosage form.
IPR & Regulatory Affair MPH 104 T (Theory)	1. To recall the concepts of drug product development, innovator and generic products, their drug master file 2. To outline the scale up post approval changes, post marketing surveillance and outsourcing of bioavailability studies to CRO. 3. To apply the regulatory agencies like USFDA, EU, MHRA, TGA and BOW.countries for product approval 4. To contrast CTD and eCTD format for combination products and medical devices. 5. To compare the submission process of IND, NDA, ANDA and preparation of Medicinal Products Dossier 6. To build the ability to develop clinical trial protocol, pharmacovigilance and safety monitoring in clinical trials.

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Pharmaceutics Practical-I MPH 105 P (Practical)	1. To recall the basic principles of analytical techniques instrumentation used for drug analysis. 2. To summarize the preformulation studies and basic excipients used for various controlled/sustained drug delivery systems 3. To make use of various analytical instruments for estimation of drugsin various formulations. 4. To simplify the formulation techniques, prepare matrix tablets, floating tablets and cosmetics. 5. To assess the drug release from sustained and controlled drug delivery systems. 6. To evaluate the dosage forms, similarity factor.

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M.PHARMACY PHARMACEUTICS II SEMESTER

After successful completion of this course students will be able to:

Molecular Pharmaceutics MPH 201 T (Theory)	1. To define the concepts involved in targeting drug delivery specific to tumor and brain. 2. To outline the formulation, optimization and evaluation of nanoparticles, liposomes and multiparticulate drug carrier systems. 3. To develop nanoparticles, liposomes and multiparticulate and other drug delivery systems for drug delivery. 4. To simplify the formulation of pulmonary drug delivery systems and their evaluation. 5. To perceive the concepts of gene therapy and liposomal gene delivery. 6. To discuss the concepts of therapeutic antisense molecules
Advanced Biopharmaceutics and Pharmacokinetics MPH 202 T (Theory)	1. To recall the basic concepts of absorption, distribution, metabolism and excretion of drugs. 2. To understand the mechanisms, interpret various factors affecting drug absorption, distribution, metabolism and excretion of drugs. 3. To apply the pharmacokinetic models for the determination of pharmacokinetic parameters. 4. To analyze the drug product performance by in-vitro, in-vivo and in-situ models. 5. To determine the bioavailability testing protocol of a drug and compare the bioequivalence among marketed products. 6. To predict pharmacokinetic and pharmacodynamic drug interactions
Computer Aided Drug Delivery System MPH 203 T (Theory)	1. To recall the basics of computers in pharmaceutical research and development. 2. To illustrate the computational modeling of drug disposition. 3. To utilize the concepts for computer-aided formulation development. 4. To simplify the pharmacokinetic and pharmacodynamic characteristics of drugs by simulations. 5. To assess the applications of computers in clinical data management. 6. To discuss the impact of artificial intelligence, robotics and computational fluid dynamics.
Cosmetic and Cosmeceuticals MPH 204 T (Theory)	1. To remember Indian regulatory requirements for manufacture, sale, import and labeling of cosmetics. 2. To outline the biological aspects of cosmetics, basic structure, functions, common problems associated with skin, hair and oral cavity. 3. To apply the principles of formulation building blocks for different cosmetic/cosmeceutical products. 4. To simplify the controversial ingredients used in the formulation of cosmetics. 5. To justify the cosmeceutical products for solving problems related to skin, hair and oral cavity. 6. To elaborate the regulatory guidelines forherbal cosmetics, herbal

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	ingredients used in hair care, skin care and oral care.
Pharmaceutics Practical-II MPH 205 P (Practical)	1. To recall the basic techniques for preparation of microspheres, liposomes, niosomes and solid dispersions. 2. To compare the dissolution studies of various marketed products. 3. To develop various novel drug delivery systems. 4. To test for drug binding characteristics, cell permeation and bioavailability of the formulations. 5. To evaluate the novel drug delivery systems. 6. To design formulations by QbD concept, use simulations for estimation of pharmacokinetics and pharmacodynamics.

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M.PHARMACY PHARMACOLOGY I SEMESTER

After successful completion of this course students will be able to:

Modern Pharmaceutical Analytical Techniques MPL 101 T (Theory)	1. To recall selected instrumental analytical techniques (spectroscopic, chromatographic, electrochemical methods) and relate with volumetric analysis 2. To gain knowledge on interaction of EMR with matter, affinity of matter with stationary phase and mobile phase, physical and chemica changes of matter on heating, potential differences in different aqueous and organic solution 3. To build the analytical understanding in the level of ion, atom, group and molecular structure of organic and inorganic compounds with different functional groups and their applications in pharmacy 4. To categorize different organic and inorganic compounds using suitable spectroscopy, chromatography, electrophoresis, thermal and immuno assay. 5. To elaborate principle, theory and instruments employed for the analysis of drugs. 6. To maximize knowledge of electrophoresis, immunological, thermal and X-Ray crystallographic techniques.
Advanced Pharmacology –I MPL 102 T (Theory)	1. To learn basic principles of pharmacokinetic and pharmacodynamic parameters of drugs. 2. To understand various Neurotansmitters and their physiology and to Illustrate pharmacology of Drugs acting on peripheral nervous system. 3. To construct the pharmacology of drugs acting on central nervous system 4. To contrast the relative pros and cons in the use of drugs for various cardiac complications. 5. To assess the drugs acting on hematopoietic system 6. To compile the role of autocoids and related drugs.
Pharmacological and Toxicological Screening Methods – I MPL 103 T (Theory)	1. To gain basic knowledge on regulations and ethical requirement for the maintenance and breeding of laboratory animals and the role of transgenic animals in preclinical research 2. To outline General principles of invivo, in vitro, screening techniques for drugs acting on CNS and ANS 3. To identify the newer screening methods for drug acting on respiratory, reproductive and gastrointestinal system. 4. To distinguish the screening methods for new substances acting on cardiovascular system 5. To appraise the screening methods of the newer drugs for metabolic disorders 6. To predict the invivo, in vitro screening models for immunomodulators, to discuss General principles of immunoassay and extrapolation of in vitro/preclinical data to human
Cellular and Molecular Pharmacology MPL 104 T (Theory)	1. To learn basic structure and function of genome in the living organism and the importance of siRNA and micro RNA 2. To summarize various phases of cell cycle, apoptosis,

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	necrosis and autophagy 3. To construct the role of receptors and secondary messengers in cellsignaling pathways 4. To analyse the principles and applications of genomic and proteomic tools DNA ecletrphorsosis, PCR, SDS page, ELISA, western blotting Recombinant DNA technology and gene therapy 5. To evaluate significance of Pharmacogenomics and immunotherapeutics 6. Toconstruct the various cell culture techniques, Principles and applications of cell viability/ glucose uptake/Calcium influx assays, flow cytometry and biosmilars
Pharmacology Practical – I MPL 105 P (Practical)	1. To recall handling of laboratory animals, various routes of drug administrations, blood collection, anaesthesia and euthanasia techniques. 2. To demonstrate the CNS stimulant, depressant, anxiogenics anxiolytic, anticonvulsant, analgesic, anti-inflammatory, local anesthetic, mydriatic and miotic activities using animal models. To Identify the concentration test compounds using HPLC,UV,GC, fluorimetry and flame photometry To examine diuretic, antiulcer activities and to analyse Oral glucose tolerance test. 3. To interpret the isolation of DNA/RNA and to assess PCR, Western Blotting, gel electrophoresis techniques and Enzyme based in- vitro/Cell viability assays 4. To predict Comet assay and to elaborate the pharmacokinetics parameters of drugs by using biological samples and software

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M.PHARMACY PHARMACOLOGY II SEMESTER

After successful completion of this course students will be able to:

Advanced Pharmacology – II MPL 201 T (Theory)	1. To relate functions of hormones and to list out drugs acting on endocrine system. 2. To outline the principles of chemotherapy and illustrate the mechanism of action of antibiotics, Antifungal, antiviral, and anti-TB drugs 3. To identify the chemotherapeutic agents for Protozoal Helimenthetic infections and cancer. 4. To categorize the inflammatory mediators, allergic /hypersensitivity reactions and simplify pharmacotherapy of asthma and COPD. 5. To assess the mechanism of drugs acting on GIT and applications of chronopharmacology to treat disorders. 6. To elaborate the role of free radicals in etiopathology of various diseases and adapt the recent Advances in treatment of various diseases.
Pharmacological and Toxicological Screening Methods II MPL 202 T (Theory)	1. To recall types of toxicology, to list out the regulatory guide lines for conducting toxicity studies and its importance in drug development 2. To Illustrate Acute, sub-acute and chronic oral, dermal and inhalational toxicity studies as per OECD guidelines. To construct reproductive toxicology, tearatogenicity, Genotoxicity and In vivo carcinogenicity studies. 3. To categorize IND enabling studies 4. To appraise and importance of safety pharmacological studies (Tier-1 and 2) 5. To compile the Importance and applications of toxicokinetic studies and alternative methods to animal toxicity testing.
Principles of Drug Discovery MPL 203 T (Theory)	1. To recall the modern drug discovery process, target Discovery and validation and role of transgenic animalsin target validation. 2. To relate the concepts of combinatorial chemistry, high throughput screening and in silico lead discovery techniques 3. To identify the prediction of protein structure and the NMR and X-ray crystallography in protein structure prediction 4. To contrast the Rational Drug Design Methods and Virtual Screening techniques 5. To interpret the various molecular Docking studies and to assess the importance of QSAR and SAR studies 6. To elaborate the Statistical methods used in QSAR and compile the Prodrug design process
Clinical Research and Pharmacovigilance MPL 204 T (Theory)	1. To label various regulatory requirements for clinical trials. 2. To demonstrate the types and designs of clinical trial and to infer roles and responsibilities of Clinical Trial

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	Personnel 3. To construct the documentation process of clinical trials and to identify Adverse Drug Reactions contrast the roles and responsibilities of Pharmacovigilance 4. To appraise various methods of ADR reporting and tools used inPharmacovigilance 5. To predict principles and concepts of Pharmacoepidemiology, Pharmacoeconomics and safety pharmacology
Pharmacology Practical-II MPL 205 P (Practical)	1. To understand the dose response relationship, effect of drugs on DRC and PD2 value 2. To outline the acute, sub acute and chronictoxicity studies as per OECD guidelines 3. To identify the effects of various drugs on isolated heart preparations, and to Illustratethe rat BP, heart rate and ECG. 4. To evaluate the drug concentrations by various bioassay methods using isolated tissue preparations 5. To prioritize the Repeated dose toxicity studies and evaluate Drug mutagenicity study using mice bone-marrow chromosomal aberration. 6. To elaborate Protocol for clinical trial, ADR monitoring. In-silico docking studies/pharmacophore based screening/QSAR studies and ADR reporting

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M.PHARMACY PHARMACOLOGY & PHARMACEUTICS III SEMESTER & IV SEMESTER

After successful completion of this course students will be able to:

1. To select the scientific concept based on literature and define the objectives of research.
2. To outline the hypothesis and summarize the concept for presentation.
3. To plan for a meeting, discuss SOWT analysis, the design and methods used in concept.
4. To analyze the variables and their inter relationships.
5. To conclude the results and to discuss its significance.
6. To appraise the concept for societal needs, acknowledge and improve presentation skills.
7. To recall the fundamentals, carry out literature review on proposed research topic and identify research problem.
8. To outline the requirements toper forms the proposed research.
9. To construct the research hypothesis.
10. To take part in research experiments meticulously and documentation as per format.
11. To evaluate and conclude the results using statistical analysis.
12. To appraise societal application and appreciation.

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