Acharya & BM Reddy College of Pharmacy

Bengaluru-560107

Course Outcomes

Master of Pharmacy in Pharmaceutics (MPH)

Department	ACP	Semester	1	Course Code	MPA101T	Course ID	MPA101
Course Title		**Modern Pharmaceutical Analytical Techniques**					
Course Outcome No.		**Course Outcome Statements**					
MPA101.1		Determine the structure of various categories of drugs by interpreting the results and data obtained from a variety of analytical techniques such as UV, IR, NMR, Mass, X-ray, flame emission and atomic absorption spectroscopic techniques					
MPA101.2		Separate the components of chemical mixture by different chromatographic Techniques like paper, TLC, HPTLC, Gas chromatography, HPLC and electrophoresis					
MPA101.3		Explain the concepts, principles, procedures involved in radio immuno assay, spectrofluorimetry and X-ray diffraction studies.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPH102T**	**Course ID**	**MPH102**
Course Title		**Drug Delivery System**					
Course Outcome No.		**Course Outcome Statements**					
MPH102.1		Outline the approaches and concept of various novel drug delivery system.					
MPH102.2		Select the polymers suitable for design of novel drug delivery system.					
MPH102.3		Formulate and evaluate oral controlled drug delivery system.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPH103T**	**Course ID**	**MPH103**
Course Title		**Modern Pharmaceutics**					
Course Outcome No.		**Course Outcome Statements**					
MPH103.1		Explain preformulation studies, Solubility studies, factors which effect compression, compression forces, formulation of tablets, dispersions and parenterals and optimization techniques					
MPH103.2		Describe stability studies as per WHO & ICH guidelines, cGMP, Validation, Qualifications and apply statistical tests like ANOVA and t test.					
MPH103.3		Apply analytical and technical skills in development of pharmaceutical dosage form and analyze the performance using statistical software.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPH104T**	**Course ID**	**MPH104**
Course Title		**Regulatory Affairs**					
Course Outcome No.		**Course Outcome Statements**					
MPH104.1		Describe the concepts of innovator and generic drugs, drug development process, the Regulatory Guidance's and guidelines for filing and approval process related to NDA & ANDA					
MPH104.2		Explain the post approval regulatory requirements for the drug products, submission of global documents, Regulatory requirements of EU, MHRA, TGA and ROW countries.					

MPH104.3		Assess the importance of preparation of dossiers and their submission to regulatory agencies in different countries. Clinical trials requirements for approvals for conducting clinical trials, pharmacovigilance and process of monitoring in clinical trials.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPA105P**	**Course ID**	**MPA105**
Course Title		**Modern Pharmaceutical Analytical Techniques Practical**					
Course Outcome No.		**Course Outcome Statements**					
MPA105.1		Determine the structure of various categories of drugs by interpreting the results and data obtained from a variety of analytical techniques such as UV, visible and IR spectroscopic techniques					
MPA105.2		Separate the components of chemical mixture by different chromatographic techniques like paper, TLC, HPLC and electrophoresis					
MPA105.3		Perform skillfully in all their laboratory performances as per prescribed analytical guidelines.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPH105P**	**Course ID**	**MPH105**
Course Title		**Pharmaceutics Practical -I**					
Course Outcome No.		**Course Outcome Statements**					
MPH105.1		Outline the approaches and concept of various novel controlled drug delivery system					
MPH105.2		Interpret the results of dissolution studies and correlate with *in vivo* performance of dosage form.					
MPH105.3		Develop and evaluate oral controlled, oral targeted and transdermal drug delivery systems.					
MPH105.4		Characterize the API's & Excipients preformulation studies, Solubility studies, factors which affect compression, compression forces, formulation of tablets, dispersions and parenterals and optimization techniques.					
MPH105.5		Demonstrate stability studies as per WHO & ICH guidelines, cGMP, Validation, Qualifications and apply statistical tests like ANOVA and t-test.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPH201T**	**Course ID**	**MPH201**
Course Title		**Molecular Pharmaceutics (Nano tech and Targeted DDS)**					
Course Outcome No.		**Course Outcome Statements**					
MPH201.1		Develop, characterize and evaluate Micro and Nano DDS for targeted drug delivery of drugs.					
MPH201.2		Design and evaluate Pulmonary drug delivery systems and veterinary formulations.					
MPH201.3		Apply the principle of molecular basis of drugs in design of Nano DDS for targeted drug delivery.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPH202T**	**Course ID**	**MPH202**
Course Title		**Advanced Biopharmaceutics & Pharmacokinetics**					
Course Outcome No.		**Course Outcome Statements**					
MPH202.1		Describe physiological, physicochemical and dosage form-related factors that affects drug absorption, distribution and elimination from different dosage forms.					

MPH202.2	Design and formulate new dosage form with increased bioavailability and derive the pharmacokinetic compartment models.
MPH202.3	Evaluate the, bioequivalence & in vitro-in vivo correlation for different drug products.
MPH202.4	Apply biopharmaceutical and pharmacokinetics knowledge in the formulation of safe and effective medicines.

Department	**ACP**	**Semester**	**2**	**Course Code**	**MPH203T**	**Course ID**	**MPH203**
Course Title		**Computer Aided Drug Delivery System**					
Course Outcome No.		**Course Outcome Statements**					
MPH203.1		Discuss the history of computers in pharmaceutical research and development, statistical & computational modeling of drug disposition.					
MPH203.2		Perform skillfully the computers in preclinical development, optimization techniques in the pharmaceutical formulation, computers in market analysis.					
MPH203.3		Follow the computers applications in biopharmaceutical & pharmacokinetic characterization, clinical development, artificial intelligence, robotics and computational fluid dynamics.					

Department	**ACP**	**Semester**	**2**	**Course Code**	**MPH204T**	**Course ID**	**MPH204**
Course Title		**Cosmetic and Cosmeceuticals**					
Course Outcome No.		**Course Outcome Statements**					
MPH204.1		Identify the approaches for developing cosmetics based on problems related to body parts and elaborate various commonly used additives in cosmetics.					
MPH204.2		Formulate and prepare various types of synthetic and herbal cosmetics.					
MPH204.3		State regulatory features about the labeling requirements of cosmetics and salient safety criteria essential for cosmetic products.					

Department	**ACP**	**Semester**	**2**	**Course Code**	**MPH205P**	**Course ID**	**MPH205**
Course Title		**Pharmaceutics Practical II**					
Course Outcome No.		**Course Outcome Statements**					
MPH205.1		Carry out the dissolution studies of different marketed dosage form and predict the dissolution rate.					
MPH205.2		Formulate and evaluate synthetic and herbal cosmetics preparations.					
MPH205.3		Evaluate the, bioequivalence &*in vitro-in vivo* correlation for different drug products					
MPH205.4		Calculate the pharmacokinetic parameters using compartment models.					

Department	**ACP**	**Semester**	**2**	**Course Code**	**MPH206P**	**Course ID**	**MPH206**
Course Title		**Molecular Pharmaceutics (Nano tech and Targeted DDS)**					
Course Outcome No.		**Course Outcome Statements**					
MPH206.1		Develop and evaluate the microencapsulation preparation by temperature change and non-solvent addition method.					
MPH206.2		Formulate and evaluate the novel drug delivery products such as alginate beads, microspheres, spherules, liposomes and niosomes.					
MPH206.3		Adopt the optimization techniques in the pharmaceutical formulations using design of experiment concept.					

Master of Pharmacy in Pharmacology (MPL)

Department	**ACP**	**Semester**	**1**	**Course Code**	**MPA101T**	**Course ID**	**MPA101**
Course Title		**Modern Pharmaceutical Analytical Techniques**					
Course Outcome No.		**Course Outcome Statements**					
MPA101.1		Determine the structure of various categories of drugs by interpreting the results and data obtained from a variety of analytical techniques such as UV, IR, NMR, Mass, X-ray, flame emission and atomic absorption spectroscopic techniques					
MPA101.2		Separate the components of chemical mixture by different chromatographic Techniques like paper, TLC, HPTLC, Gas chromatography, HPLC and electrophoresis					
MPA101.3		Explain the concepts, principles, procedures involved in radio immuno assay, spectrofluorimetry and X-ray diffraction studies.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPL102T**	**Course ID**	**MPL102**
Course Title		**Advanced Pharmacology-I**					
Course Outcome No.		**Course Outcome Statements**					
MPL102.1		Explain the mediators and mechanism of drugs action at molecular and cellular level.					
MPL102.2		Explain the biosynthesis, storage, metabolism and degradation of various mediators.					
MPL102.3		Describe the pharmacological action, adverse effects, toxicology, drug interaction and ADME of various drugs.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPL 103T**	**Course ID**	**MPL103**
Course Title		**Pharmacological and Toxicological Screening Methods-I**					
Course Outcome No.		**Course Outcome Statements**					
MPL103.1		The regulations and ethics concerning animal studies and experiments on human beings.					
MPL103.2		Describe various animals used in the drug discovery process and good laboratory practice in maintenance and handling of experimental animals.					
MPL103.3		Describe the various newer screening methods involved in the drug discovery process.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPL104T**	**Course ID**	**MPL104**
Course Title		**Cellular and Molecular Pharmacology**					
Course Outcome No.		**Course Outcome Statements**					
MPL104.1		Structure of the cell, the importance of mitosis in growth, repair and asexual reproduction.					
MPL104.2		Cell Proliferation, cell renewal, cell death					

MPL104.3		The production of genetically identical cells and control of replication.					
MPL104.4		Elucidation of genetic code, gene expression, recombinant DNA technology, gene cloning, & Cloning vector					
MPL104.5		Outline the concept of protein engineering, and protein production and process.					
MPL104.6		New technologies for bio-analytical assays in cell biology.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPA105P**	**Course ID**	**MPA105**
Course Title		**Modern Pharmaceutical Analytical Techniques Practical**					
Course Outcome No.		**Course Outcome Statements**					
MPA105.1		Determine the structure of various categories of drugs by interpreting the results and data obtained from a variety of analytical techniques such as UV, visible and IR spectroscopic techniques					
MPA105.2		Separate the components of chemical mixture by different chromatographic techniques like paper, TLC, HPLC and electrophoresis					
MPA105.3		Perform skillfully in all their laboratory performances as per prescribed analytical guidelines					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPL105P**	**Course ID**	**MPL105**
Course Title		**Pharmacology Practical I**					
Course Outcome No.		**Course Outcome Statements**					
MPL105.1		Record and analyze screening of new drugs using animals models					
MPL105.2		Demonstrate molecular biology techniques as applicable for drug discovery.					
MPL105.3		Explain regulations and ethics concerning animal studies.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPL201T**	**Course ID**	**MPL201**
Course Title		**Advanced Pharmacology II**					
Course Outcome No.		**Course Outcome Statements**					
MPL201.1		Explain chemical mediators and mechanism of drugs action at molecular and cellular level by which the drug act.					
MPL201.2		Explain the biosynthesis, storage, metabolism and degradation of various neurotransmitters.					
MPL201.3		Describe the pharmacological action, adverse effects, toxicology, drug interaction and ADME of various drugs					
MPL201.4		Describe the toxicological profile of drugs and the methods of prevention of toxicity.					

Department	**ACP**	**Semester**	**2**	**Course Code**	**MPL202T**	**Course ID**	**MPL202**
Course Title		**Pharmacological and Toxicological Screening Methods-II**					
Course Outcome No.		**Course Outcome Statements**					
MPL202.1		Explain the different types of toxicity studies and Regulatory guidelines.					
MPL202.2		Appreciate the importance of ethical and regulatory requirements for toxicity studies.					
MPL202.3		Demonstrate the practical skills required to conduct the toxicokinetic studies in preclinical toxicity studies.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPL203T**	**Course ID**	**MPL203**
Course Title		**Principles of Drug Discovery**					
Course Outcome No.		**Course Outcome Statements**					
MPL203.1		Describe the various stages and principles of drug discovery and briefly explain the role of genomics and proteomics in drug target identification and validation.					
MPL203.2		Explain briefly on lead identification and lead optimization.					
MPL203.3		Describe the applications of. NMR and X-Ray crystallography in protein structure predictions.					
MPL203.4		Briefly explain the structure based and ligand-based drug design methods and discuss the pharmacophore mapping and QSAR analysis.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPL204T**	**Course ID**	**MPL204**
Course Title		**Clinical Research & Pharmacovigilance**					
Course Outcome No.		**Course Outcome Statements**					
MPL204.1		Describe the principle involved in the ethical, legal, and regulatory issues in clinical human subject's research, including the role of Institutional Review Boards (IRBs).					
MPL204.2		Describe principle and issues involved in monitoring patient-oriented research.					
MPL204.3		Devise methods for ADR detection, predictability, preventability and learn how to report ADRs.					
MPL204.4		Detect populations most at risk of, and apply pharmacovigilance principles to prevent ADRs.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPL205P**	**Course ID**	**MPL205**
Course Title		**Experimental Pharmacology practical-II**					
Course Outcome No.		**Course Outcome Statements**					
MPL205.1		Record and analyze the effect of drugs on BP, ECG, and heart rate in experimental animals.					
MPL205.2		Demonstrate the oral, dermal, repeated dose toxicity and mutagenicity study in preclinical toxicity studies.					

MPL205.3		Design ADR monitoring protocol, In-silico drug design & docking studies and Clinical trial protocol in drug discovery.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPL206P**	**Course ID**	**MPL206**
Course Title		**Experimental Pharmacology practical-III**					
Course Outcome No.		**Course Outcome Statements**					
MPL206.1		Record and analyze dose response curve of drugs using isolated tissues preparations					
MPL206.2		Determine concentration of drugs using graphical methods of bioassays using isolated tissues preparation					
MPL206.3		Identify and analyze the effects of agonists and antagonist on isolated tissues preparations using bioassays					

Master of Pharmacy in Pharmaceutical Chemistry (MPC)

Department	**ACP**	**Semester**	**1**	**Course Code**	**MPA101T**	**Course ID**	**MPA101**
Course Title		**Modern Pharmaceutical Analytical Techniques**					
Course Outcome No.		**Course Outcome Statements**					
MPA101.1		Determine the structure of various categories of drugs by interpreting the results and data obtained from a variety of analytical techniques such as UV, IR, NMR, Mass, X-ray, flame emission and atomic absorption spectroscopic techniques.					
MPA101.2		Separate the components of chemical mixture by different chromatographic techniques like paper, TLC, HPTLC, Gas chromatography, HPLC and electrophoresis.					
MPA101.3		Explain the concepts, principles, procedures involved in radio immuno assay, spectrofluorimetry and X-ray diffraction studies.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPC102 T**	**Course ID**	**MPC102**
Course Title		**Advanced Organic Chemistry-I**					
Course Outcome No.		**Course Outcome Statements**					
MPC102.1		Paraphrase the synthetic approaches for the synthesis of organic compounds.					
MPC102.2		Recognize the mechanisms of synthetically important reactions like Brook rearrangement, Ullmann coupling reactions, Dieckmann Reaction.					
MPC102.3		Describe the basic principles, terminologies and advantages of retrosynthesis.					
MPC102.4		Perform, replicate a procedure, apply safety precautions, and practice chemical safety in the Laboratory.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPC103T**	**Course ID**	**MPC103**
Course Title		**Advanced Medicinal Chemistry**					
Course Outcome No.		**Course Outcome Statements**					
MPC103.1		Describe the different stages of drug discovery and the role of medicinal chemistry in drug discovery.					
MPC103.2		Explain the different techniques involved in drug discovery.					
MPC103.3		Explain the various strategies to design and develop new drug like molecules for biological targets.					
MPC103.4		Examine peptidomimetics.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPC104T**	**Course ID**	**MPC104**
Course Title		**Chemistry of Natural Products**					
Course Outcome No.		**Course Outcome Statements**					
MPC104.1		Relate the chemistry of medicinal compounds from natural origin.					
MPC104.2		Explain the industrial requirements for quality control and quality assurance of herbal drugs. Formulate and standardize various herbal products.					

MPC104.3	Outline the biotechnological techniques for obtaining and improving the quality of natural products.						
MPC104.4	Elucidate the structures of medicinal compounds from natural origin						
MPC104.5	Construct a high degree of proficiency and develop competence in isolation and estimation of phytoconstituents from herbs						
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPA105P**	**Course ID**	**MPA105**
Course Title	**Modern Pharmaceutical Analytical Techniques Practical**						
Course Outcome No.	**Course Outcome Statements**						
MPA105.1	Determine the structure of various categories of drugs by interpreting the results and data obtained from a variety of analytical techniques such as UV, visible and IR spectroscopic techniques						
MPA105.2	Separate the components of chemical mixture by different chromatographic techniques like paper, TLC, HPLC and electrophoresis						
MPA105.3	Perform skillfully in all their laboratory performances as per prescribed analytical guidelines						
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPC105P**	**Course ID**	**MPC105**
Course Title	**Pharmaceutical Chemistry Practical I**						
Course Outcome No.	**Course Outcome Statements**						
MPC105.1	Carry out chemical reactions in the Laboratory.						
MPC105.2	Develop new drug like molecules for biological targets.						
MPC105.3	Determine the structures of medicinal compounds from natural origin.						
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPC201T**	**Course ID**	**MPC201**
Course Title	**Advanced Spectral Analysis**						
Course Outcome No.	**Course Outcome Statements**						
MPC201.1	Determine the structure of various categories of drugs by interpreting the results and data obtained from a variety of analytical techniques such as UV, IR, NMR, Raman and Mass spectroscopic techniques.						
MPC201.2	Describe the instrumentation, separation and applications of different chromatographic techniques.						
MPC201.3	Enumerate the principle and applications of DSC, DTA, TGA and immuno assay.						
MPC201.4	Perform laboratory work as per prescribed analytical guidelines.						
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPC202T**	**Course ID**	**MPC202**
Course Title	**Advanced Organic Chemistry-II**						
Course Outcome No.	**Course Outcome Statements**						
MPC202.1	Describe basic principles, merits and demerits of microwave, ultrasound and peptide synthesis.						
MPC202.2	Explain the techniques involved in pericyclic and stereochemical reaction.						
MPC202.3	Explain the various strategies in the synthesis of medicinal important compounds.						

MPC202.4		Perform, replicate a procedure, apply safety precautions and practice chemical safety in the laboratory.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPC203T**	**Course ID**	**MPC203**
Course Title		**Computer Aided Drug Design**					
Course Outcome No.		**Course Outcome Statements**					
MPC203.1		Explain the approaches used in Quantitative Structure Activity Relationships in drug discovery.					
MPC203.2		Design new lead molecules using structure based drug design.					
MPC203.3		To calculate drug like properties.					
MPC203.4		Examine Pharmacophore modeling & in-silico virtual screening protocols.					

Department	**ACP**	**Semester**	**2**	**Course Code**	**MPC204T**	**Course ID**	**MPC204**
Course Title		**Pharmaceutical Process Chemistry**					
Course Outcome No.		**Course Outcome Statements**					
MPC204.1		Examine synthetic strategy; scale up process and unit operations in manufacture of APIs.					
MPC204.2		Explain the different unit processes for hazards and fermentation processes in pilot plant.					
MPC204.3		Relate chemical processes, principles, and analyze synthesis.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPC205P**	**Course ID**	**MPC205**
Course Title		**Pharmaceutical Chemistry Practical II**					
Course Outcome No.		**Course Outcome Statements**					
MPC205.1		Application of techniques such as UV, IR, NMR, Raman and Mass spectral techniques.					
MPC205.2		Design and synthesis of medicinal important compounds.					
MPC205.3		Design and develop new drug like molecules.					
MPC205.4		Perform different types of pilot plant procedures for new chemical entities.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPC206P**	**Course ID**	**MPC206**
Course Title		**Computer Aided Drug Design Practical**					
Course Outcome No.		**Course Outcome Statements**					
MPC206.1		Design and develop new drug like molecules.					
MPC206.2		Analyze ADMET properties of drug molecules using software.					
MPC206.3		Determine physicochemical properties of drug molecules using software.					

Master of Pharmacy in Pharmaceutical Analysis (MPA)

Department	**ACP**	**Semester**	**1**	**Course Code**	**MPA101T**	**Course ID**	**MPA101**
Course Title		**Modern Pharmaceutical Analytical Techniques**					
Course Outcome No.		**Course Outcome Statements**					
MPA101.1		Determine the structure of various categories of drugs by interpreting the results and data obtained from a variety of analytical techniques such as UV, IR, NMR, Mass, X-ray, flame emission and atomic absorption spectroscopic techniques					
MPA101.2		Separate the components of chemical mixture by different chromatographic techniques like paper, TLC, HPTLC, Gas chromatography, HPLC and electrophoresis.					
MPA101.3		Explain the concepts, principles, procedures involved in radio immuno assay, spectrofluorimetry and X-ray diffraction studies.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPA102T**	**Course ID**	**MPA102**
Course Title		**Advanced Pharmaceutical Analysis**					
Course Outcome No.		**Course Outcome Statements**					
MPA102.1		Estimate the drugs and functional group by various titrimetric methods					
MPA102.2		Describe the analytical principle, procedure and application of various reagents and biological test of various vaccines					
MPA102.3		Classify and quantify the Impurities as per ICH guidelines					
MPA102.4		Analyze the biological products by stability testing as per ICH guidelines					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPA103T**	**Course ID**	**MPA103**
Course Title		**Pharmaceutical Validation**					
Course Outcome No.		**Course Outcome Statements**					
MPA103.1		Prepare the validation protocol for pharmaceutical manufacturing equipment analytical instruments, laboratory equipments and Utility system.					
MPA103.2		Discuss on validation of various process carried out in pharmaceutical industry.					
MPA103.3		Demonstrate various analytical method validation guidelines and protocol forthe estimation of pharmaceutical drugs from various sample matrices.					
MPA103.4		Describe the Regulatory aspects of pharmaceutical and bulk drug manufacture, drug analysis and provisions of consumer protection act, environment protection act.					

Department	ACP	Semester	1	Course Code	MPA104T	Course ID	MPA104
Course Title		**Food Analysis**					
Course Outcome No.		**Course Outcome Statements**					
MPA104.1		Perform and reproduce the analytical procedure for determining constituents, additives and pesticide residue in food					
MPA104.2		Interpret analytical data and analyse to find out quality of food products					
MPA104.3		Compile, follow and explain the llegislation regulations of food products					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPA105P**	**Course ID**	**MPA105**
Course Title		**Modern Pharmaceutical Analytical Techniques Practical**					
Course Outcome No.		**Course Outcome Statements**					
MPA105.1		Determine the structure of various categories of drugs by interpreting the results and data obtained from a variety of analytical techniques such as UV, visible and IR spectroscopic techniques					
MPA105.2		Separate the components of chemical mixture by different chromatographic techniques like paper, TLC, HPLC and electrophoresis					
MPA105.3		Perform skillfully in all their laboratory performances as per prescribed analytical guidelines					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MPA106P**	**Course ID**	**MPA106**
Course Title		**Pharmaceutical Analysis Practical-I**					
Course Outcome No.		**Course Outcome Statements**					
MPA106.1		Estimate the drugs and functional group by various titrimetric methods					
MPA106.2		Perform skilfully calibration of analytical instruments and apparatus					
MPA106.3		Carryout the validation protocol in analytical method development					
MPA106.4		Apply the various method for the analysis of oil and reducing sugar					

Department	ACP	Semester	2	Course Code	MPA201T	Course ID	MPA201
Course Title		**Advanced Instrumental Analysis**					
Course Outcome No.		**Course Outcome Statements**					
MPA.201.1		Determine the structure of various categories of drugs by interpreting the results and data obtained from a variety of analytical techniques such as UV, IR, NMR, Raman and Mass spectroscopic techniques.					
MPA.201.2		Describe the instrumentation, separation and applications of different chromatographic techniques.					
MPA.201.3		Enumerate the principle and applications of DSC, DTA, TGA, immuno assay and ORD.					

Department	ACP	Semester	2	Course Code	MPA202T	Course ID	MPA202
Course Title		**Modern Bio-Analytical Techniques**					
Course Outcome No.		**Course Outcome Statements**					
MPA.202.1		Classify techniques for the extraction of drugs from biological samples					
MPA.202.2		Enumerate the Origin, requirements, guidelines of GCP ICH, ICMR, guidelines and GCP practice					
MPA.202.3		Describe the USFDA & UDSCO Guidelines for BA/BE studies for orally administered drug products					
MPA.202.4		Explain the Extraction and separation of drugs and metabolites from biological matrices using different chromatography techniques					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPA203T**	**Course ID**	**MPA203**
Course Title		**Quality Control and Quality Assurance**					
Course Outcome No.		**Course Outcome Statements**					
MPA.203.1		Summarize role of ICH Q series, cGMP and GLP aspects in relation to pharmaceutical industry					
MPA.203.2		Discuss roles and responsibilities of manufacturing, quality control & quality assurance departments in pharmaceutical industry					
MPA.203.3		Analyse raw materials, finished products and packaging materials in Pharma Industry according to IP, USP and BP.					
MPA.203.4		Integrate importance of documentation in pharmaceutical industry					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPA204T**	**Course ID**	**MPA204**
Course Title		**Cosmetic Analysis and Evaluation**					
Course Outcome No.		**Course Outcome Statements**					
MPA.204.1		Classify various cosmetic products and describe their applications					
MPA.204.2		Explain the principle and procedure involved in the analysis of various cosmetics products					
MPA.204.3		Enumerate the instrumentation technique for the analysis of cosmetic products					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPA205P**	**Course ID**	**MPA205**
Course Title		**Pharmaceutical Analysis Practical-I**					
Course Outcome No.		**Course Outcome Statements**					
MPA.205.1		Determine the structure of various categories of drugs by interpreting the results and data obtained from a variety of analytical techniques such as UV and Wood ward-Feiser rule.					

MPA.205.2		Interpret the various organic compounds by FT-IR, NMR and Mass spectrometry					
MPA.205.3		Perform the Extraction and determination of drugs and metabolites from biological matrices using different chromatography techniques					
MPA.205.4		Determine the analytical constant of various cosmetic products.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MPA206P**	**Course ID**	**MPA206**
Course Title		**Pharmaceutical Analysis Practical-II**					
Course Outcome No.		**Course Outcome Statements**					
MPA.206.1		Design a protocol for BA/BE studies of pharmaceutical drugs					
MPA.206.2		Perform quality control test for finished products and packaging materials					
MPA.206.3		Analyze raw materials, finished products and packaging materials in Pharma Industry according to IP, USP and BP					

Master of Pharmacy in Pharmaceutical Quality Assurance (MQA)

Department	**ACP**	**Semester**	**1**	**Course Code**	**MPA101T**	**Course ID**	**MPA101**
Course Title		**Modern Pharmaceutical Analytical Techniques**					
Course Outcome No.		**Course Outcome Statements**					
MPA101.1		Determine the structure of various categories of drugs by interpreting the results and data obtained from a variety of analytical techniques such as UV, IR, NMR, Mass, X-ray, flame emission and atomic absorption spectroscopic techniques					
MPA101.2		Separate the components of chemical mixture by different chromatographic techniques like paper, TLC, HPTLC, Gas chromatography, HPLC and electrophoresis.					
MPA101.3		Explain the concepts, principles, procedures involved in radio immuno assay, spectrofluorimetry and X-ray diffraction studies.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MQA102T**	**Course ID**	**MQA102**
Course Title		**Quality Management System**					
Course Outcome No.		**Course Outcome Statements**					
MQA102.1		Describe on evolution of Quality and approaches in planning and implementation of quality.					
MQA102.2		Enumerate the importance of customer, concept of internal and external customers and various models of cost of quality.					
MQA102.3		Demonstrate approaches and strategies used to enhance pharmaceutical quality management.					
MQA102.4		Illustrate Six System Inspection model, Corrective & Preventive Actions (CAPA) Statistical Process control Regulatory Compliance in pharmaceutical quality management.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MQA103T**	**Course ID**	**MQA103**
Course Title		**Quality Control and Quality Assurance**					
Course Outcome No.		**Course Outcome Statements**					
MQA103.1		Describe about the concept and evolution of Quality Control and Quality Assurance applicable to pharmaceutical industries					
MQA103.2		Describe about cGMP, ICH, and other regulatory guidelines and GLP in various pharmaceutical industry process.					
MQA103.3		Enumerate methods and tools used to analyse raw materials, finished products, and packaging materials, in process quality control (IPQC).					
MQA103.4		Illustrate manufacturing operations and controls and documentation in pharmaceutical industry.					

Department	ACP	Semester	1	Course Code	MQA104T	Course ID	MQA104
Course Title		Product Development and Technology Transfer					
Course Outcome No.		Course Outcome Statements					
MQA104.1		Explain the principles and concepts of drug discovery and development					
MQA104.2		Enumerate methods and techniques used to conduct preformulation studies and stability testing during product development.					
MQA104.3		Elucidate the concept, significance, design and layout of pilot plant scale up study and operations, pharmaceutical packaging.					
MQA104.4		Demonstrate Quality control test for Containers, closures and secondary packing materials and R&D process to technology transfer.					
Department	ACP	Semester	1	Course Code	MPA105P	Course ID	MPA105
Course Title		Modern Pharmaceutical Analytical Techniques Practical					
Course Outcome No.		Course Outcome Statements					
MPA105.1		Determine the structure of various categories of drugs by interpreting the results and data obtained from a variety of analytical techniques such as UV, visible and IR spectroscopic techniques					
MPA105.2		Separate the components of chemical mixture by different chromatographic techniques like paper, TLC, HPLC and electrophoresis					
MPA105.3		Perform skillfully in all their laboratory performances as per prescribed analytical guidelines					
Department	ACP	Semester	1	Course Code	MQA105P	Course ID	MQA105
Course Title		Pharmaceutical Quality Assurance Practical I					
Course Outcome No.		Course Outcome Statements					
MQA105.1		Discuss on various components and inspection models of quality management system in pharmaceutical industries.					
MQA105.2		Demonstrate roles and responsibilities of manufacturing, quality control & quality assurance departments in pharmaceutical industry.					
MQA105.3		Integrate necessary information to transfer technology of existing products between various manufacturing places.					
Department	ACP	Semester	2	Course Code	MQA201T	Course ID	MQA201
Course Title		Hazards and Safety Management					
Course Outcome No.		Course Outcome Statements					
MQA201.1		Describe basic knowledge about the environment and its allied problem.					
MQA201.2		Ensure safety standards and protocol in pharmaceutical industry					

MQA201.3		Enumerate different kinds of hazard management systemand provide comprehensive knowledge on the safety management					
MQA201.4		Demonstrate methods of Hazard assessment, procedure, methodology for safe industrial atmosphere.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MQA202T**	**Course ID**	**MQA202**
Course Title		**Pharmaceutical Validation**					
Course Outcome No.		**Course Outcome Statements**					
MQA202.1		Prepare the validation protocol for pharmaceutical manufacturing equipment analytical instruments, laboratory equipments and Utility system.					
MQA202.1		Discuss on validation of various process carried out in pharmaceutical industry.					
MQA202.1		Demonstrate various analytical method validation guidelines and protocol for the estimation of pharmaceutical drugs from various sample matrices.					
MQA202.1		Describe the General Principles, Concepts of Intellectual Property, IPP, IPR, Copyright, Trademark and protocol for patent filing.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MQA203T**	**Course ID**	**MQA203**
Course Title		**Audits and Regulatory Compliance**					
Course Outcome No.		**Course Outcome Statements**					
MQA203.1		Explain the Planning process for auditing.					
MQA203.2		Design the protocol for auditing vendors and other pharmaceutical activities.					
MQA203.3		Design the protocol for the auditing of Microbiological laboratory					
MQA203.4		Design the protocol for auditing of Quality Assurance and engineering department.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MQA204T**	**Course ID**	**MQA204**
Course Title		**Pharmaceutical Manufacturing Technology**					
Course Outcome No.		**Course Outcome Statements**					
MQA204.1		Describe on the common practice in the pharmaceutical industry developments, plant layout and production planning.					
MQA204.2		Explain the principles and practices of aseptic process technology, non sterile manufacturing technology and packaging Technology					
MQA204.3		Prepare the protocol for stability of packaging materials used for pharmaceutical purpose.					
MQA204.4		Demonstrate the application of Quality by design (QbD) and process analytical technology (PAT) in pharmaceutical manufacturing.					

Department	**ACP**	**Semester**	**2**	**Course Code**	**MQA205P**	**Course ID**	**MQA205**
Course Title		**Pharmaceutical Quality Assurance Practical II**					
Course Outcome No.		**Course Outcome Statements**					
MQA205.1		Analyse and report antibiotic residues, contaminations present in various environmental samples.					
MQA205.2		Design and examine plant layout for sterile, nonsterile preparation and tablet production in pharmaceutical industries.					
MQA205.3		Identify and evaluate sources of variability related to quality parameters of the finished product					

Department	**ACP**	**Semester**	**2**	**Course Code**	**MQA206P**	**Course ID**	**MQA206**
Course Title		**Pharmaceutical Validation Practical**					
Course Outcome No.		**Course Outcome Statements**					
MQA206.1		Analyse and report different contaminants and impurities present in various pharmaceutical drugs and formulations					
MQA206.2		Perform the validation of various pharmaceutical manufacturing equipment					
MQA206.3		Carryout analytical method validation, cleaning validation and validation of pharmaceutical testing equipments					

Master of Pharmacy in Pharmaceutical Regulatory Affairs (MRA)

Department	**ACP**	**Semester**	**1**	**Course Code**	**MRA101T**	**Course ID**	**MRA101**
Course Title		**Good Pharmaceutical Practices**					
Course Outcome No.		**Course Outcome Statements**					
MRA101.1		Develop good regulatory practices in the healthcare and related industries					
MRA101.2		Demonstrate a plan for the readiness and conduct of audits and inspections.					
MRA101.3		Categorize the key regulatory and compliance elements with respect to GMP, GLP, GALP GDP.					
MRA101.4		Describe the quality management system in the Pharmaceutical Industry.					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MRA102T**	**Course ID**	**MRA102**
Course Title		**Pharmaceutical regulations in India**					
Course Outcome No.		**Course Outcome Statements**					
MRA102.1		Assess the approval process and regulatory requirements for FPMBC					
MRA102.2		Examine the Indian Pharmacopoeial and BIS standards					
MRA102.3		Review and validate the guidelines for drug testing in animals					
MRA102.4		Practice the concept of Intellectual Property Rights					
MRA102.5		Assess the regulatory requirements for bioequivalence study					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MRA103T**	**Course ID**	**MRA103**
Course Title		**International Pharmaceutical Regulation-I**					
Course Outcome No.		**Course Outcome Statements**					
MRA103.1		Analyze the US and Canadian regulations of FNPCMB					
MRA103.2		Compare the European and Australian regulations related to FNPCMB					
MRA103.3		Discuss the Japanese Brazilian, Chinese, ASEAN and South Asian regulations for FNPCMB					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MRA104T**	**Course ID**	**MRA104**
Course Title		**Clinical Research Regulations**					
Course Outcome No.		**Course Outcome Statements**					
MRA104.1		Know Clinical drug, medical device development process, different types and phases of clinical trials					
MRA104.2		Discuss the History, origin and ethics of clinical and biomedical research and evaluation					
MRA104.3		Compare Indian GCP, CDSCO and ICMR guidelines for biomedical research.					

MRA104.4		Analyze the European union guidance for clinical evaluation and safety for medicinal products and medical devices					
MRA104.5		Integrate FDA guidance for bioavailability and bioequivalence requirements for medicinal products					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MRA105P**	**Course ID**	**MRA105**
Course Title		**Good Pharmaceutical Practices Practical**					
Course Outcome No.		**Course Outcome Statements**					
MRA105.1		Prepare documents for QC tests for various dosage forms as per GMP and GPP requirements					
MRA105.2		Develop protocols and dossiers related to various aspects like SOP, BMR, CTD, IPR, clinical trials.					
MRA105.3		Analyze requirements for brand/generic products labeling and for import of drugs					
Department	**ACP**	**Semester**	**1**	**Course Code**	**MRA106P**	**Course ID**	**MRA106**
Course Title		**International Pharmaceutical Regulatory Practical II**					
Course Outcome No.		**Course Outcome Statements**					
MRA106.1		Compile a checklist for registration of IND/NDA/ANDA as per ICH format and for clinical trial application as per US/ EU/Japan					
MRA106.2		Analyze the response submitted to warning letters issued by USFDA					
MRA106.3		illustrate regulatory submission by eCTD software and marketing authorization procedures as per various regulatory bodies.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MRA201T**	**Course ID**	**MRA201**
Course Title		**Documentation and Regulatory Writing**					
Course Outcome No.		**Course Outcome Statements**					
MRA201.1		Discuss the basic documentation in pharmaceutical industry					
MRA201.2		Discuss on dossier preparation eCTD and CTD submission					
MRA201.3		Learn and understand the basics of internal, external audits inspection systems in pharmaceutical companies and follow up actions					
MRA201.4		Learn the regulatory aspects of product life-cycle management and product recalls.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MRA202T**	**Course ID**	**MRA202**
Course Title		**Biological Regulations**					
Course Outcome No.		**Course Outcome Statements**					
MRA202.1		Compare Biological Regulations and Guidelines of India, USA and EU.					
MRA202.2		Analyze Regulations related to Vaccines, in India, USA and EU					
MRA202.3		Explain regulations related to Blood and Blood Products Regulations in India, USA and EU					

Department	ACP	Semester	2	Course Code	MRA203T	Course ID	MRA203
Course Title		**International Pharmaceutical Regulations II**					
Course Outcome No.		**Course Outcome Statements**					
MRA203.1		Identify various emerging markets.					
MRA203.2		Discuss the WHO regulations					
MRA203.3		Differentiate the regulatory requirements of Asian Countries, CIS and GCC					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MRA204T**	**Course ID**	**MRA204**
Course Title		**Medical Device Regulations**					
Course Outcome No.		**Course Outcome Statements**					
MRA204.1		Identify basics of Medical Devices, including ethical and quality system regulations.					
MRA204.2		Know the medical devices and IVDs directives in European Union and USA.					
MRA204.3		Compare regulatory requirements and approval process for medical devices as per, WHO and Asian Countries.					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MRA205P**	**Course ID**	**MRA205**
Course Title		**Pharmaceutical Regulatory Affairs Practical II**					
Course Outcome No.		**Course Outcome Statements**					
MRA205.1		Comment on the CAPA process adopted					
MRA205.2		Prepare checklist /documents for BLA, Vaccine approval, Blood and blood products and raw material analysis.					
MRA205.3		Comprehend eCTD submission checklist and clinical trial application requirement					
Department	**ACP**	**Semester**	**2**	**Course Code**	**MRA206P**	**Course ID**	**MRA206**
Course Title		**International Pharmaceutical Regulatory Practical II**					
Course Outcome No.		**Course Outcome Statements**					
MRA206.1		Compare registration requirements as per various emerging markets					
MRA206.2		Prepare checklist for submission of 510k, PMA and CE marking					
MRA206.3		Discuss various requirements for medical devices like STED application, medical device facility audit checklist and clinical investigation plan					