M.Pharm Pharmaceutical Chemistry Program outcome

PO1(MPC)	To inculcate in-depth knowledge to carryout independent research in organic and medicinal chemistry to develop new cost effective and ecofreindly synthetic routes to synthesize drugs and develop new drug molecules
PO2(MPC)	Understand the basics of organic reactions and mechanisms of named reactions, retrosynthetic principles, various analytical techniques and utilize this knowledge to plan organic reactions for the synthesis, purification and characterization of drugs and natural compounds
PO3(MPC)	To familiarize with the recent developments and state of art technologies utilized in drug design , development , synthesis, scale up and analysis and attain practical knowledge in these techniques
PO4(MPC)	Utilize various computational tools, molecular modeling applications, scientific database retrieval systems for the development of independent drug discovery projects

M.Pharm Pharmaceutical Chemistry- Course outcomes

ID	OUTCOME
CO1(MPC)	To understand the principles and applications of various Modern analytical techniques and attain practical skills in handling various analytical instruments
CO2(MPC)	Able to understand organic reactions, mechanisms and identify appropriate synthetic routes for the synthesis of drug intermediates and drugs

CO3(MPC)	To attain detailed knowledge on the processes of drug discovery, design and development ; to gain knowledge on medicinal chemistry of several classes of drugs
CO4(MPC)	To attain detailed knowledge on isolation, purification, chracterization using physical and spectral data and pharmacological activities of medicinal compounds from natural origin,
CO5(MPC)	Able to analyse organic intermediates and drugs using various analytical instruments. Able to carryout various organic reactions of synthetic importance, perorm purification and characterization using Chromatographic and spectroscopic techniques
CO6(MPC)	To acquire detailed knowledge on hyphenated anlytical techniques and deal with analytical data and interprete to identify structures and purity of the compounds
CO7(MPC)	Able to understand the importance of green chemistry synthesis, to gain knowledge on catalysis, catalysts, assymmetric organic synthesis, Photo chemistry and peptide chemistry and their importance in drug synthesis
CO8(MPC)	Able to understand the concepts of various computer aded drug design tools, Student can able to utilize various molecular modeling softwares , online tools used in drug design and development.
CO9(MPC)	To impart knowledge in optimization of organic reactions for scale up, development of new synthetic routes for eco friendly, safe and cost effective applications
CO10(MPC)	To utilize various green chemistry protocols and conventional techniques for the synthesis of drugs(API) and intermediates, Characterize the compounds with spectral data, to handle molecular modeling softwares to perform in silico studies and molecualr properties prediction
CO11(MPC)	Able to understand research methodologies, biostatistical tools that can be employed in research, various medical care protocols, CPCSEA guidelines for laboratory animals.

CO12(MPC)	Able to understand the details of a journal and its importance along with protocols of writing a journal.
CO13(MPC)	Able to acquire freedom to express their ideas and thoughts of their perspective in choosing a project of their own interest under the supervision of respective guides.
CO14(MPC)	Able to explain their research projects through seminars, along with their thesis, in partial fulfillment for the award of their post-graduation degree

M.Pharm Pharmaceutical Chemistry- Program outcome and course outcome Map

I- SEMESTER				
Code:MPC:101T - Sub: MPAT				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)		**X**	**X**	
CO2(MPC)				
CO3(MPC)				
CO4(MPC)				

CO5(MPC)		**X**	**X**	
CO6(MPC)				
CO7(MPC)				
CO8(MPC)				
CO9(MPC)				
CO10(MPC)				
CO11(MPC)				
CO12(MPC)				

Code:MPC:102T - Sub: AOC-1				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)				
CO2(MPC)	**X**	**X**	**X**	
CO3(MPC)				
CO4(MPC)				
CO5(MPC)	**X**	**X**	**X**	
CO6(MPC)				
CO7(MPC)				
CO8(MPC)				

CO9(MPC)				
CO10(MPC)				
CO11(MPC)				
CO12(MPC)				
Code:MPC:103T- Sub: AMC				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)				
CO2(MPC)				
CO3(MPC)	X	X	X	
CO4(MPC)				
CO5(MPC)	X	X	X	
CO6(MPC)				
CO7(MPC)				
CO8(MPC)				
CO9(MPC)				
CO10(MPC)				
CO11(MPC)				
CO12(MPC)				

Code:MPC:104T- Sub: CNP				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)				
CO2(MPC)				
CO3(MPC)				X
CO4(MPC)		X	X	
CO5(MPC)		X	X	X
CO6(MPC)				
CO7(MPC)				X
CO8(MPC)				
CO9(MPC)				
CO10(MPC)				
CO11(MPC)				
CO12(MPC)				
Code:MPA:105TP- Sub: PHARMACEUTICAL CHEMISTRY PRACTICAL I				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)	**X**	**X**	**X**	
CO2(MPC)	**X**	**X**		**X**

CO3(MPC)		**X**		**X**
CO4(MPC)		X		
CO5(MPC)		**X**		**X**
CO6(MPC)				
CO7(MPC)				
CO8(MPC)				
CO9(MPC)				
CO10(MPC)				
CO11(MPC)				
CO12(MPC)				

II- SEMESTER				
Code:MPC:201T - Sub: ASA				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)				
CO2(MPC)				
CO3(MPC)				
CO4(MPC)				
CO5(MPC)				

CO6(MPC)		X	X	
CO7(MPC)				
CO8(MPC)				
CO9(MPC)				
CO10(MPC)		X	X	
CO11(MPC)				
CO12(MPC)				
CO13(MPC)				
CO14(MPC)				

Code:MPC:202T - Sub: AOC-2				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)				
CO2(MPC)	**X**	**X**	**X**	
CO3(MPC)				
CO4(MPC)				
CO5(MPC)	**X**	**X**	**X**	
CO6(MPC)				
CO7(MPC)				
CO8(MPC)				

CO9(MPC)				
CO10(MPC)				
CO11(MPC)				
CO12(MPC)				
CO13(MPC)				
CO14(MPC)				
Code:MPC:203T- Sub: CADD				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)				
CO2(MPC)				
CO3(MPC)				
CO4(MPC)				
CO5(MPC)				
CO6(MPC)				
CO7(MPC)				
CO8(MPC)			X	X
CO9(MPC)				
CO10(MPC)			X	X
CO11(MPC)				

CO12(MPC)				
CO13(MPC)				
CO14(MPC)				
Code:MPC:204T- Sub: PPC				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)				
CO2(MPC)				
CO3(MPC)				
CO4(MPC)				
CO5(MPC)				
CO6(MPC)				
CO7(MPC)				
CO8(MPC)		**X**		
CO9(MPC)		**X**	**X**	
CO10(MPC)				
CO11(MPC)				
CO12(MPC)				
Code:MPA:205TP- Sub: PHARMACEUTICAL CHEMISTRY PRACTICAL I				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**

CO1(MPC)				
CO2(MPC)				
CO3(MPC)				
CO4(MPC)				
CO5(MPC)				
CO6(MPC)				
CO7(MPC)				
CO8(MPC)				
CO9(MPC)				
CO10(MPC)		**X**	**X**	**X**
CO11(MPC)				
CO12(MPC)				

III- SEMESTER				
Code:MPC:301T - Sub: RMB				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)				
CO2(MPC)				
CO3(MPC)				

CO4(MPC)				
CO5(MPC)				
CO6(MPC)				
CO7(MPC)				
CO8(MPC)				
CO9(MPC)				
CO10(MPC)				
CO11(MPC)			X	X
CO12(MPC)				
CO13(MPC)				
CO14(MPC)				

Discussion/Presentation (Proposal Presentation)				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)				
CO2(MPC)				
CO3(MPC)				
CO4(MPC)				
CO5(MPC)				
CO6(MPC)				

CO7(MPC)				
CO8(MPC)				
CO9(MPC)				
CO10(MPC)				
CO11(MPC)				
CO12(MPC)	**X**	**X**	**X**	**X**
CO13(MPC)				
CO14(MPC)				
Research Work				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)				
CO2(MPC)				
CO3(MPC)				
CO4(MPC)				
CO5(MPC)				
CO6(MPC)				
CO7(MPC)				
CO8(MPC)				
CO9(MPC)				

CO10(MPC)				
CO11(MPC)				
CO12(MPC)				
CO13(MPC)	**X**	**X**	**X**	**X**
CO14(MPC)				

IV- SEMESTER				
Research Work				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)				
CO2(MPC)				
CO3(MPC)				
CO4(MPC)				
CO5(MPC)				
CO6(MPC)				
CO7(MPC)				
CO8(MPC)				
CO9(MPC)				

CO10(MPC)				
CO11(MPC)				
CO12(MPC)				
CO13(MPC)	X	X	X	X
CO14(MPC)	X	X	X	X
Discussion/Presentation				
	PO1(MPC)	**PO2(MPC)**	**PO3(MPC)**	**PO4(MPC)**
CO1(MPC)				
CO2(MPC)				
CO3(MPC)				
CO4(MPC)				
CO5(MPC)				
CO6(MPC)				
CO7(MPC)				
CO8(MPC)				
CO9(MPC)				
CO10(MPC)				
CO11(MPC)				
CO12(MPC)				

CO13(MPC)				
CO14(MPC)	**X**	**X**	**X**	**X**

SPECIFIC LEARNING OUTCOMES (SLO)-– I Semester

M.PHARM-PHARMACEUTICAL CHEMISTRY (MPC)		
Code:101T- MODERN PHARMACEUTICAL ANALYTICAL TECHNIQUES (MPAT)		
Id	**Unit / Topic**	**Outcome statement**
SLO1(MPAT)	Spectroscopy	Able to understand the principles and instrumentation of UV-Vis, IR, Flame emission spectroscopy along with spectro fluorometry and their applications
SLO2(MPAT)	NMR spectroscopy	To understand Principles, Instrumentation, Solvent requirements, chemical shifts of NMR; briefly about FT-NMR and 13CNMR
SLO3(MPAT)	Mass spectroscopy	To understand Mass Spectroscopy, appreciate various Ionization techniques, Fragmentation Rules, Mass Analysers and its Applications
SLO4(MPAT)	Chromatography	Able to understand in detail about various types of Chromatographic techniques (TLC, HPLC, HPTLC, GC, UPLC,

		etc)
SLO5(MPAT)	Electrophoresis and X-Ray Crystallography	To understand the princple, instrumentation and appreciate various methods of Electrophoresis and X-ray Crystallography
SLO6(MPAT)	Potentiometry and Thermal techniques	To know about methods of advanced Instrumentation of Potentiometry and Thermal techniques (DSC, DTA, DDTA, TGA)
CODE:102T- ADVANCED ORGANIC CHEMISTRY-I(AOC-I)		
SLO1(AOC-I)	Basic Aspects of Organic Chemistry	To understand basic concepts of organic chemistry, types of reactions and appreciate their reaction mechanisms
SLO2(AOC-I)	Named Reactions	To understand the reaction mechanism and synthetic applications of various named reactions
SLO3(AOC-I)	Synthetic reagents and Applications	To acquire knowledge on various reagents used in organic synthesis and their applications
SLO4(AOC-I)	Protecting groups	To appreciate the concept of protection and deprotection of functional groups in organic synthesis
SLO5(AOC-I)	Heterocyclic chemistry	To understand the reaction mechanism of the named reactions involved in the synthesis of various heterocyclic ring systems and synthesis of drugs containing them
SLO6(AOC-I)	Retrosynthesis	To understand the principles of retrosynthesis analysis and guidelines for the disconnection of organic molecules

CODE:103T- ADVANCED MEDICINAL CHEMISTRY (AMC)		
SLO1(AMC)	Drug discovery	Able to understand different stages of drug discovery and to know about drug targets
SLO2(AMC)	Prodrug design	To appreciate the concept of prodrug design and their applications in drug discovery
SLO3(AMC)	Combating drug resistance	To understand causes of drug resistance and the strategies to combat drug resistance
SLO4(AMC)	Analog Design	To acquire knowledge on molecular modification techniques used in analogue design
SLO5(AMC)	Medicinal chemsitry of drugs	Systematic study, SAR, Mechanism of action and synthesis of new generation molecules of various classes of drugs
SLO6(AMC)	Stereochemistry and drug action	To understand the importance of sterochemistry in pharmaco kinetics and pharmacodynamics of the drug
SLO7(AMC)	Rational Design of Enzyme Inhibitors	Able to understand the various strategies applied in rational design of enzyme inhibitors
SLO8(AMC)	Peptidomimetics	To understand the concept of peptidomimetics and variuos strategeis in drug design
CODE:104T- CHEMISTRY OF NATURAL PRODUCTS(CNP)		
SLO1(CNP)	Leads from Natural	Able toidentify various leads from natural products for the

	products	discovery of new drugs
SLO2(CNP)	Alkaloids , Flavanoids and Steroids	To uderstand the isolation, purification and structure elucidation of various alkaloids and flavanoids
SLO3(CNP)	Terpenoids and Vitamins	To uderstand the isolation, purification and structure elucidation of terpenoids and physiological significance of Vitamins
SLO4(CNP)	rDNA technology	To appreciate the concept and methods of rDNA technology in drug disovery and crude drugs in indigenious system
SLO5(CNP)	Structural Characterization of Natural Compounds	Able to solve the structures of natural compounds using IR, 1H NMR , 13C NMR and Mass spectroscopy
CODE:105T- PHARMACEUTICAL CHEMISTRY PRACTICAL-I (PCP-I)		
SLO1(PCP-I)	Able to perform analysis of drugs using various analytical techniques	
SLO2(PCP-I)	Able to perform organic reactions of synthetic importance	
SLO3(PCP-I)	Able to synthesize, purify and characterize medicinally important molecules	
SLO4(PCP-I)	Able to perform isolation and characterization of natural compounds from natural sources	

SPECIFIC LEARNING OUTCOMES (SLO)- M.PHARM PHARMACEUTICAL CHEMISTRY – II Semester

Code:201T - M.PHARM-PHARMACEUTICAL CHEMISTRY (MPC)

ID	Unit / Topic	
SLO1(ASA)	UV and IR spectroscopy	To understand and aquire knowledge on interpretation of UV absorption and FTIR, ATR-IR spectra of organic compounds
SLO2(ASA)	NMR spectroscopy	To understand the characterization of organic compounds using 1-D and 2-D NMR, NOESY , COSY, HECTOR and INADEQUATE
SLO3(ASA)	Mass Spectroscopy	To understand the principles and interpretation of Mass spectra of organic compounds
SLO4(ASA)	Chromatography	To understand the principle, instrumentatio and applications of various chromatographic techniques coupled with spectroscopy
SLO5(ASA)	Thermal methods of analysis, Raman spectroscopy and RIA	To understand the principle, instrumentatio and applications of DSC, DTA , TGA, Raman spectroscopy , RIA and ELISA
CODE:202T		
SLO1(AOC-II)	Green Chemistry	To understand the fundamental principles of green chemistry, appreciate various green synthesis strategies in organic chemsitry

SLO2(AOC-II)	Chemistry of peptides	To understand the principles of solid phase and solution phase peptide synthesis and to know various peptide synthesis strategies
SLO3(AOC-II)	Photochemical and pericylic Reactions	To understand the principles of photochemical and pericyclic reactions in organic synthesis and appreciate varoius mechanisms.
SLO4(AOC-II)	Catalysis	To understand the importnace of heterogeneous , homogenous catalysis, transition metal, Phase transfer and bio catalysis in organic synthesis and to know various Catalysts used in synthesis.
SLO5(AOC-II)	Stereochemistry & Asymmetric Synthesis	To understand the basics of stereochemistry and fundemental principles of assymmetric organic synthesis
CODE:203T		
SLO1(CADD)	Introduction to Computer Aided Drug Design (CADD)	To know the role of CADD and various tools used in drug discovery and design, and to understand the concept of QSAR.
SLO2(CADD)	QSAR	To understand and appreciate the various QSAR and

		3D QSAR methods used in drug design
SLO3(CADD)	Molecular Modeling and Docking	-
SLO4(CADD)	Molecular Properties and Drug Design	-
SLO5(CADD)	Pharmacophore Mapping and Virtual Screening	To understand the concept of Pharmacophore mapping and virtual screening, perform virtual screening using softwares
CODE:204T		
SLO1(PPC)	Introduction, Synthetic strategy	To gain knowledge on various stages of scale up; Bench, Pilot and large scale process and their quality control
SLO2(PPC)	Unit operations	To understand the principle and application of various unit operations and their utilization in large scale organic synthesis
SLO3(PPC)	Unit Processes - I	To understand mechanism, Kinetics and process equipment of various unit processes Nitration, Halogenation and Oxidation
SLO4(PPC)	Unit Processes - II	To understand mechanism, Kinetics and process

		equipment of various unit processes Reduction , fermentation and reaction kinetic analysis
SLO5(PPC)	Industrial Safety	Able to know about industrial safety measures, safety assessment and safety regulations of pharmaceutical and chemical industries
CODE:205T		
SLO1(PPII)	Able to synthesize various organic compounds , intermediates and drugs using conventional and microwave methods	
SLO2(PPII)	Able to identify compounds by interpreting their UV absorption, FTIR, NMR and Mass spectra	
SLO3(PPII)	Able to determine/predict various physico chemical, Pharmaco kinetic and pharmacodynamic parametrs using softwares	
SLO4(PPII)	Able to design analogues and perform in silico screening by docking, QSAR and Pharmacophore screening methods using softwares	

SPECIFIC LEARNING OUTCOMES (SLO)- M.PHARM PHARMACEUTICAL CHEMISTRY – III Semester

M.PHARM PHARMACEUTICAL CHEMISTRY (MPC)
Code:301T

Id	Unit/Topic	Outcome statement
SLO1(RMB)	Unit I	To Understand General research methodology
SLO2(RMB)	Unit II	Able to acquire knowledge in Biostatistics
SLO3(RMB)	Unit III	Able to detail protocols of Medical research
SLO4(RMB)	Unit IV	To have Clear perspective of CPCSEA guidelines for laboratory animal facilities
SLO5(RMB)	Unit V	To understand the declaration of Helsinki rule, additional principles combined with medical care

M.Pharm Pharmaceutical Chemistry- Course outcome and Specific Learning Outcome Map

I-SEMESTER											
	CO1	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**	**CO7**	**CO8**	**CO9**	**C010**	**CO11**
SLO1(MPAT)	**X**										
SLO2(MPAT)	**X**										
SLO3(MPAT)	**X**										
SLO4(MPAT)	**X**										

SLO5(MPAT)	**X**										
SLO1(AOC-I)		**X**									
SLO2(AOC-I)		**X**									
SLO3(AOC-I)		**X**					**X**				
SLO4(AOC-I)		**X**					**X**				
SLO5(AOC-I)		**X**					**X**				
SLO6(AOC-I)		**X**					**X**				
SLO1(AMC)			**X**	**X**				**X**	**X**		
SLO2(AMC)			**X**	**X**				**X**			
SLO3(AMC)			**X**	**X**				**X**			
SLO4(AMC)			**X**					**X**			
SLO5(AMC)			**X**								
SLO6(AMC)			**X**					**X**			
SLO7(AMC)			**X**					**X**			
SLO8(AMC)			**X**					**X**			
SLO1(CNP)			**X**	**X**					**X**		
SLO2(CNP)			**X**	**X**					**X**		
SLO3(CNP)				**X**					**X**		

SLO4(CNP)	**X**			**X**							
SLO5(CNP)	**X**			**X**	**X**						
SLO1(PCP-I)	**X**				**X**						
SLO2(PCP-I)		**X**			**X**						
SLO3(PCP-I)			**X**		**X**						
SLO4(PCP-I)				**X**	**X**						

II-SEMESTER											
	CO1	**CO2**	**CO3**	**CO4**	**CO5**	**CO6**	**CO7**	**CO8**	**CO9**	**C010**	**CO11**
SLO1(ASA)	**X**					**X**					
SLO2(ASA)	**X**					**X**					
SLO3(ASA)	**X**					**X**					
SLO4(ASA)						**X**					
SLO5(ASA)						**X**					
SLO1(AOC-II)							**X**				
SLO2(AOC-II)							**X**				

SLO3(AOC-II)		**X**					**X**				
SLO4(AOC-II)		**X**					**X**				
SLO5(AOC-II)							**X**				
SLO1(CADD)			**X**					**X**			
SLO2(CADD)			**X**					**X**			
SLO3(CADD)								**X**			
SLO4(CADD)								**X**			
SLO5(CADD)								**X**			
SLO1(PPC)				**X**			**X**		**X**		
SLO2(PPC)		**X**				**X**			**X**		
SLO3(PPC)		**X**	**X**			**X**	**X**		**X**		
SLO4(PPC)			**X**				**X**		**X**		
SLO5(PPC)									**X**		
SLO1(PPII)	**X**						**X**			**X**	
SLO2(PPII)		**X**				**X**				**X**	

SLO3(PPII)			**X**				**X**			**X**	
SLO4(PPII)								**X**		**X**	
III SEMESTER											
SLO1(RMB)											**X**
SLO2(RMB)											**X**
SLO3(RMB)											**X**
SLO4(RMB)											**X**
SLO5(RMB)											**X**