



## MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY BATHINDA-151001 (PUNJAB), INDIA

(A State University Estb. by Govt. of Punjab vide Punjab Act No. 5 of 2015 and Approved u/s 2(f) & 12 (B) of UGC; Member AIU)

Department: Pharmaceutical Sciences & Technology

Program: M. Pharmacy (Pharmaceutics)

### COURSE ARTICULATION MATRIX (STUDY SCHEME: 2017)

Subject	S Code	Semester	Credit	Duration (Hrs)	L T P	COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PSO1	PSO2	PSO3	PSO4	PSO5	PSO6	PSO7	PSO8			
Modern Pharmaceutical Analytical Techniques	MPH101T	1	4	60	4 0 0	CO1	Chemicals and Excipients	1			1		1	2	2	3		2			2			
						CO2	The analysis of various drugs in single and combination dosage forms		1	1		1	2	2	2		2							2
						CO3	Theoretical and practical skills of the instruments	1		1		1	2	2	3	1	2		1	3				1
Avg.								1	1	1	1		1	2	2	2.66667	1	2		1	2.33333			
Drug delivery system	MPH102T	1	4	60	4 0 0	CO1	The various approaches for development of novel drug delivery systems.		2	1			1	2	2	2					2			



						CO3	Preparation of Dossiers and their submission to regulatory agencies in different countries	1	1						2	2		2			2		
						CO4	Post approval regulatory requirements for actives and drug products	1	1						2	2		2			2		
						CO5	Submission of global documents in CTD/ eCTD formats	1	1						2	2		2			2		
						CO6	Clinical trials requirements for approvals for conducting clinical trials	1	1						2	2		2			2		
						CO7	Pharmacovigilance and process of monitoring in clinical trials.	1	1									1					
Avg.															1.8					1.85			
								1	1					2	333	2				714		1.5	2
Pharmaceutics Practical I	MPH105P	1	6	180	006	CO1	The elements of formulation studies	1		1			1	2		2		2	2			2	
						CO2	Optimization Techniques & Pilot plant scale up techniques		1		1		1	2		2		1	2		1		
						CO3	The various approaches for development of novel drug delivery systems	1	1				1	1	1	2		1	2	1			
						CO4	The criteria for selection of drugs and polymers for the development of delivering system	1				1	1	1		2		2	1				
						CO5	The analysis of various drugs in single and combination dosage forms	2	1				1	1		2		2	2		2		
Avg.								1.2	1		1										1.66		
								5				1	1	1.4	1	2			1.6	1.8	1	666	7

Molecular Pharmaceutics	MPH201T	2	4	60	400	CO1	The various approaches for development of novel drug delivery Systems		1		1			2	1	2		1	1						
						CO2	The understanding of critical variables (material and process) for the development of novel drug/ gene delivery systems.		1		1			1		1						1			
						CO3	The formulation, evaluation & application of novel drug/ gene delivery systems.		1		1			1				1					1		
						Avg.												1.3333			1	1.5	1	1	1
Advanced Biopharmaceutics and Pharmacokinetics	MPH202T	2	4	60	400	CO1	The basic concepts in biopharmaceutics and pharmacokinetics	1	1				1	1		1				2	2				
						CO2	The use raw data and derive the pharmacokinetic models and parameters the best describe the process of drug absorption, distribution, metabolism and elimination	1	1				1	1									2	2	
						CO3	The critical evaluation of biopharmaceutic studies involving drug product equivalency	1	1				1	2		2								1	
						CO4	The design and evaluation of dosage regimens of the drugs using pharmacokinetic and biopharmaceutic parameters	1	1				1	1		2			1					2	
						CO5	The potential clinical pharmacokinetic problems and application of basics of pharmacokinetic	1	1				1	1		2								2	
Avg.						1	1					1	1.2			1.75		1	2	1.8					

Computer Aided Drug Development	MPH203T	2	4	60	400	CO1	History of Computers in Pharmaceutical Research and Development		1									1	2					
						CO2	Computational Modeling of Drug Disposition		1					1				2				2	1	
						CO3	Computers in Preclinical Development		1					1	1			2	1			2		
						CO4	Optimization Techniques in Pharmaceutical Formulation		1					2		2						2	1	
						CO5	Computers in Market Analysis		1							2								
						CO6	Computers in Clinical Development		1					1	2	2						2	1	
						CO7	Artificial Intelligence (AI) and Robotics		1						1	2		1	3					
						CO8	Computational fluid dynamics(CFD)		1					1		2							1	
						Avg.																1.333333		
							1										1.2	2		7	7	3	1	
Cosmetics and Cosmeceuticals	MPH204T	2	4	60	400	CO1	Key ingredients used in cosmetics and cosmeceuticals	1	1			1	2		1		1		2					
						CO2	Key building blocks for various formulations	1	1			1	1		2		2						2	
						CO3	Current technologies in the market	1	1			1		2										1
						CO4	Various key ingredients and basic science to develop cosmetics and cosmeceuticals	1	1			1	1	1	2		2						2	2

						CO5	Scientific knowledge to develop cosmetics and cosmeceuticals with desired Safety, stability, and efficacy.									2		2			2			2			1						
Avg.																																	
Pharmaceutics Practical II	MPH205P	2	6	180	0 0 6	CO1	Various key ingredients and basic science to develop Novel drug delivery system.	1	1						1	1.5	1.5		1.75							1	2	1.6					
						CO2	Optimization Techniques in pharmaceutical formulation using factorial design			1				1					1	1										1	2	1	
						CO3	The use raw data and derive the pharmacokinetic models and parameters the best describe the process of during absorption, distribution, metabolism	1	1											1											1	2	
						CO4	The formulation and evaluation of novel drug delivery systems	1								1	1			1	1									1	2	1	
						CO5	Drafting of various pharmaceutical Process related documentation	2	1											1											1	2	
						Avg.																											

Enter Correction levels 1, 2 or 3 as defined below:

1. Slight (Low) - upto 30%

2. Moderate (Medium) – above 30% and upto 70%

3. Substantial (High) – above 70%

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So on..... (1<sup>st</sup> semester to last semester)