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: **DEPATMENT OF PHARMACEUTICAL SCIENCES & TECHNOLOGY**

Program: B PHARMACY

COURSE ARTICULATION MATRIX (STUDY SCHEME: 2018)

Subject	S Code	Semester	Credit	Duration (Hrs)	L T P	COs	Statement	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
Human Anatomy and Physiology I	BP101T	1	4	45	3 1 0	CO1	Explain the gross morphology, structure and functions of various organs of the human body.	2									2
						CO2	Describe the various homeostatic mechanisms and their imbalances.	2									2

						CO3	Identify the various tissues and organs of different systems of human body.	2									2
						CO4	Perform the various experiments related to special senses and nervous system.	2									2
						C05	Appreciate coordinated working pattern of different organs of each system.	2									2
							AVG	2									2
Pharmaceutical Analysis I	BP102T	1	4	45	3 1 0	CO1	understand the principles of volumetric and electro chemical analysis	2		2	2						1
						CO2	carryout various volumetric and electrochemical titrations.	2		2	2						1
						CO3	develop analytical skills	2		2	1						

							AVG	2		2	1.6						1
Pharmaceutics- I	BP103T	1	4	45	3 1 0	CO1	Know the history of profession of pharmacy	1						1			
						CO2	Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations	2	1	1							
						CO3	the professional way of handling the prescription	1		1			1				1
						CO4	Preparation of various conventional dosage forms	2			1						
							AVG	1.5	1	1	1		1				1
Pharmaceutical Inorganic Chemistry	BP104T				3 1 0	CO1	know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals	2									
						CO2	understand the medicinal and	2									

							pharmaceutical importance of inorganic compounds										
							AVG	2									
Communication Skills	BP105T	1	2	30	2 0 0	CO1	Understand the behavioral needs for a Pharmacist to function effectively in the areas of pharmaceutical operation	2									2
						CO2	Communicate effectively (Verbal and Non Verbal)									3	
						CO3	Effectivelymanage the team as a team player										
						CO4	Develop interview skills									3	
						CO5	Develop Leadership qualities and essentials					3					
							AVG	2				3				3	
Remedial Biology	BP106RBT	1	2	30	2 0 0	CO1	know the classification and salient features of five kingdoms of life	2		1			2				2

						CO2	understand the basic components of anatomy & physiology of plant	2		1			2				2
						CO3	know understand the basic components of anatomy & physiology animal with special reference to human	2		1			2				2
							AVG	2		1			2				2
Remedial Mathematics	BP106T	1	2	30	2 0 0	CO1	Know the theory and their application in Pharmacy	1		1							
						CO2	Solve the different types of problems by applying theory	1	1	2							
						CO3	Appreciate the important application of mathematics in Pharmacy	1		1							
							AVG	1	1	1. 3							
Hum an	BP1 07P	1	2	60	0 0 4	CO1	Understand the processes	3					2				

							involved with maintenance of homeostasis and anticipate what may occur when homeostatic balance mechanisms are lost.										
						CO2	Identify structures in the body and analyze their relationship when other structures	3									2
						CO3	Employ the scientific process for understanding principles of Anatomy and Physiology.	3					1				
						CO4	Demonstrate practical knowledge of human gross and microscopic Anatomy using humancadavers and prepared histological slides.	3					1				
							AVG	3					1.3				

Pharmaceutical Analysis	BP108P	1	2	60	0 0 2	CO1	Prepare primary and secondary standard solutions.	3		2	2						
						CO2	Perform standardization of secondary standard solutions.	2		2							
						CO3	Determine percentage purity of given pharmaceutical drugs by titrimetric analysis. Determine normality of a solution by electro-analytical methods	2		2	2						
							AVG	2.3		2	2						
Pharmaceutics	BP109P	1	2	60	0 0 2	CO1	Compound some conventional solid, liquid and semisolid dosage forms.	3									2
						CO2	Select an appropriate container and storage	3									

							conditions for a product											
						CO3	Label the pharmaceuticals .	2						1				
						CO4	Compare various monophasic preparations depending upon their formulation.	3		2								
							AVG	3		2				1				
Pharmaceutical Inorganic Chemistry	BP110P	1	2	60	0 0 2	CO1	Adjudge the level of specific impurities in the given inorganic compounds by performing different limit tests.	3			2							
						CO2	Use different chemical methods to prepare inorganic pharmaceuticals .	2				2						
						CO3	Perform identification tests as per Indian Pharmacopoeia.	3				2						

						CO4	Determine the impurities qualitatively be performing tests for purity.	3			2						
							AVG	2.75			2	2					
Communication Skills	BP111P	1	1	30	0 0 2	CO1	Recognize phonemes for proper articulation of words									3	
						CO2	Explain the key concepts of writing skills and listening skills					2				3	
						CO3	Apply listening skills and reading skills for comprehension									3	
						CO4	Develop professional written document					3					
							AVG					2.5				3	
Remedial Biology	BP112RBT	1	1	30	0 0 2	CO1	Identify different types of human bones	3					2				
						CO2	Prepare microscopic sections of parts of the plant	3			2						

						CO3	Determine Blood groups	3			2						
						CO4	Record blood pressure and tidal volume	3			2						
							AVG	3			2		2				
Human Anatomy and Physiology II	BP201T	2	4	60	3 1 0	CO1	Explain the gross morphology, structure and functions of various organs of the human body	2									2
						CO2	Describe the various homeostatic mechanisms and their imbalances	2									2
						CO3	Identify the various tissues and organs of different systems of human body.	2									2
						CO4	Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure,	2									2

							heart rate, pulse and respiratory volume.										
						CO5	Appreciate coordinated working pattern of different organs of each system	2									2
						CO6	Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.	2									2
							AVG	2									2
Pharmaceutical Organic Chemistry I	BP202T	2	4	60	3 1 0	CO1	write the structure, name and the type of isomerism of the organic compound	1									
						CO2	write the reaction, name the reaction and orientation of reactions	1									
						CO3	account for reactivity/stability of compounds	1									

						CO4	identify/confirm the identification of organic compound	2									
							AVG	1.25									
Biochemistry	BP203T	2	4	60	3 1 0	CO1	Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.	1			1						
						CO2	Understand the metabolism of nutrient molecules in physiological and pathological conditions.	1			1						
						CO3	Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.	1			1						

							AVG	1			1						
Pathophysiology	BP204T	2	4	60	3 1 0	CO1	Describe the etiology and pathogenesis of the selected disease states.	2		1			2				2
						CO2	Name the signs and symptoms of the diseases; and	2		1			2				2
						CO3	Mention the complications of the diseases.	2		1			2				2
							AVG	2		1			2				2
Computer Applications in Pharmacy	BP205T	2	3	30	3 0 0	CO1	know the various types of application of computers in pharmacy.	2									
						CO2	know the various types of databases	2									
						CO3	know the various applications of databases in pharmacy	2			1						
							AVG	2			1						

Environmental Sciences	BP206T	2	3	30	3 0 0	CO1	Create the awareness about environmental problems among learners.										
						CO2	Impart basic knowledge about the environment and its allied problems.										
						CO3	Develop an attitude of concern for the environment.										
						CO4	Motivate learner to participate in environment protection and environment improvement.					2					
						CO5	Acquire skills to help the concerned individuals in identifying and solving environmental problems.			1		2					
							AVG			1		2					

Human Anatomy and Physiology II	BP207P	2	2	60	3 0 0	CO1	Categorize nervous system and recognizes cells of the nervous system. Explain the importance of nervous system.	3					2				
						CO2	Explain the physiology of skeletal muscle contraction. Explain the properties of digestive and excretory system	3									1
						CO3	Explain the importance of respiratory system.	3									1
						CO4	Explain the structure and functions of male and female reproductive systems.	3					1				
							AVG	3					1.5				1
Pharmaceutical	BP208P	2	2	60	0 0 4	CO1	Detect the extra elements present in compounds.	2			2						

						CO2	Identify organic compounds by systematic qualitative analysis.	3		2							
						CO3	Determine the boiling point/melting point of organic compounds.	3			2						
						CO4	Construct molecular models of compounds using atomic models sets.	2		2							
							AVG	2.5		2	2						
Biochemistry	BP209P	2	2	60	0 0 4	CO1	Identify normal and abnormal biochemical constituents of urine and estimate biochemical parameters in blood and urine.	2					2				
						CO2	Perform identification tests as per Indian Pharmacopoeia. Handle various instruments	3		2							

							used in biochemical investigations										
						CO3	Analyse and determine the factors affecting enzyme activity.	3									2
						CO4	Analyse and report the physiological and pathological constituents of urine.	2									2
							AVG	2.5		2							2
Computer Applications in Pharmacy	BP210P	2	1	60	0 0 2	CO1	Use MS Word to create questionnaires and other documentation related to pharmacy. Use MS Access to modify the data bases created.	2		1							
						CO2	Handle web and XML pages to export table, forms and queries.	1		1							
						CO3	Generate report; work with queries on MS Access.	2		1							

						CO4	Create database, HTML web page.	2		1										
							AVG	1.75		1										

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Pharmaceutical Organic Chemistry II	BP301T	3	4	45	3 1 0	CO1	write the structure, name and the type of isomerism of the organic compound	2		1							
						CO2	write the reaction, name the reaction and orientation of reactions	2	1	1							
						CO3	account for reactivity/stability of compounds	2	1		2						
						CO4	prepare organic compounds	2	1	1							

							AVG	2	1	1	2						
Physical Pharmaceutics II	BP302T	3	4	45	3 1 0	CO1	Understand various physicochemical properties of drug molecules in the designing the dosage forms	2			2						
						CO2	Know the principles of chemical kinetics & to use them for stability testing nad determination of expiry date of formulations	2			2						
						CO3	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.	2			2						

							AVG.	2			2						
Pharmaceutical Microbiology	BP303T	3	4	45	3 1 0	CO1	Understand methods of identification, cultivation and preservation of various microorganisms	1									
						CO2	To understand the importance and implementation of sterlization in pharmaceutical processing and industry	2	2								
						CO3	Learn sterility testing of pharmaceutical products.	1		1						2	
						CO4	Carried out microbiological standardization Pharmaceuticals.	2			2						

						CO5	Understand the cell culture technology and its applications in pharmaceutical industries.	1									
							AVG.	1.4	2	1	2					2	
Pharmaceutical Engineering	BP304T	3	4	45	3 1 0	CO1	To know various unit operations used in Pharmaceutical industries	2	1		2						
						CO2	To understand the material handling techniques.	2									
						CO3	To perform various processes involved in pharmaceutical manufacturing process	2		2	2						
						CO4	To carry out various test to prevent environmental pollution.	2									

						CO5	To appreciate and comprehend significance of plant lay out design for optimum use of resources.	2								
						CO6	To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries	2			2					
							AVG	2	1	2	2					
Pharmaceutical Organic Chemistry II	BP305T	3	4	45	3 1 0	CO1	Take up synthesis of various organic compounds by different chemical reactions	3								
						CO2	Purify organic compounds using various procedures like recrystallization and steam distillation.	3		2						

						CO3	Calculate the percentage yields of the products obtained by synthesis	3					1				
						CO4	Apply recrystallization and steam distillation methods for purification of synthesized organic compound	3									
							AVG.	3	1	2	2		2				
Physical Pharmaceutics I	BP306T	3	2	60	0 0 4	CO1	Perform solubility studies for different drugs.	3			2						
						CO2	Determine pKa values and estimate HLB values.	3			2						
						CO3	Perform and determine the percentage composition.	3			2						

						CO4	Calculate Critical Micellar Concentration of various surfactants	3			2						
							AVG.	3			2						
Pharmaceutical Microbiology	BP307P	3	2	60	0 0 4	CO1	Study of apparatus used in microbiology Different methods of sterilization and sterility testing of pharmaceuticals	3			2						
						CO2	Prepare culture media for the growth of microorganisms Identify and isolate bacteria	3					2				
						CO3	Perform aseptic procedures for inoculation	3									

						CO4	Determine MIC of antimicrobial agents.	3			2						
							AVG	3			2		2				
Pharmaceutical Engineering	BP308P	3	2	60	0 0 4	CO1	Perform experiments related to unit operations	3			3						
						CO2	Operate equipments used in the manufacture of pharmaceutical products.	3			3						
						CO3	Interpret results of the experiments conducted	3			2						
						CO4	Illustrate the material and energy requirements for optimizing the pharmaceutical unit processes.	3			3						

							AVG.	3			2.75							
Pharmaceutical Organic Chemistry III	BP401T	4	4	45	3 1 0	CO1	understand the methods of preparation and properties of organic compounds	2		2	2							1
						CO2	explain the stereo chemical aspects of organic compounds and stereo chemical reactions	2		2	2							1
						CO3	know the medicinal uses and other applications of organic compounds.	2		2	2							1
							AVG.	2		2	2							1

Medicinal Chemistry I	BP4012T	4	4	45	3 1 0	CO1	understand the chemistry of drugs with respect to their pharmacologic al activity	2	1								
						CO2	understand the drug metabolic pathways, adverse effect and therapeutic value of drugs	2									
						CO3	know the Structural Activity Relationship (SAR) of different class of drugs										
						CO4	write the chemical synthesis of some drugs				2						
							AVG	2	1		2						

Physical Pharmaceutics II	BP403T	4	4	45	3 1 0	CO1	Understand various physicochemical properties of drug molecules in the designing the dosage forms	2			2						
						CO2	Know the principles of chemical kinetics & to use them for stability testing nad determination of expiry date of formulations	2	1		2		2				
						CO3	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.	2	1		2		2				
							AVG.	2	1		2		2				

Pharmacology I	BP404T	4	4	45	3 1 0	CO1	Understand the pharmacological actions of different categories of drugs	2	1				2				
						CO2	Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels	2	1				2				
						CO3	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.	2	1				2				
						CO4	Observe the effect of drugs on animals by simulated experiments	2	1				2				
						CO5	Appreciate correlation of pharmacology with other bio medical sciences										

							AVG.	2	1				2						
Pharmacognosy & Phytochemistry I	BP405T	4	4	45	3 1 0	CO1	to know the techniques in the cultivation and production of crude drugs	1			1								
						CO2	to know the crude drugs, their uses and chemical nature	1											
						CO3	know the evaluation techniques for the herbal drugs	1			1		1						
						CO4	to carry out the microscopic and morphological evaluation of crude drugs	1			2		1						
							AVG	1			1. 33		1						
Medicinal Chemistry I	BP406 P	4	2	60	0 0 4	CO1	Synthesize medicinal compounds	3			2								

						CO2	Estimate partition coefficient of drugs	3									2
						CO3	Determine the amount of drug present in a sample	3			2						
						CO4	Estimate purity of drugs	3									1
							AVG.	3			2						1.5
Physical Pharmaceutics II	BP407P	4	2	60	0 0 4	CO1	Estimate various flow properties of powders	3			1						
						CO2	Determine the particle size using various methods	3			2						
						CO3	Understand the effect of suspending agents on sedimentation volume.	3			2						
						CO4	Determine various order of reactions.	3		2							
							AVG	3		2	1.66						

Pharmacology I	BP408P	4	2	60	0 0 4	CO1	Identify the appliances used in experimental pharmacology	3					1					
						CO2	Demonstrate routes of drug administration in animals	3						2				
						CO3	Choose suitable anesthetics for animal studies	3						3				
						CO4	Perform common laboratory techniques in animals	3						2				
							AVG.	3					1	2.3				
Pharmacognosy & Phytochemistry I	BP409P	4	2	60	0 0 4	CO1	Demonstrate chemical tests to identify unorganized crude drugs	3										
						CO2	Evaluate the quality and purity of crude drugs	3		2								
						CO3	Perform linear measurements for crude drug identification	3						1				

						CO4	Develop quality control methods for standardization of herbal drugs	3			2										
							AVG.	3		2	2			1						1	

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MEDICINAL CHEMISTRY – II	BP501T	5	4	45	3 1 0	CO1	Understand the chemistry of drugs with respect to their pharmacological activity	2									2		2
						CO2	Understand the drug metabolic pathways, adverse effect and therapeutic value of drugs	2		2	2						1		1
						CO3	Know the Structural Activity Relationship of different class of drugs	2									2		2

						CO4	Study the chemical synthesis of selected drugs.	2			2						2		2
Average								**2**			**2**						**1.75**		**1.75**
Industrial Pharmacy -1	BP502T	5	4	45	3 1 0	CO1	Know the various pharmaceutical dosage forms and their manufacturing techniques	2		2	2								2
						CO2	Know various considerations in development of pharmaceutical dosage forms	2											2
						CO3	Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality.												2
Average								**2**		**2**	**2**								**2**

PHARMACOLOGY-II	BP503T	5	4	45	3 1 0	CO1	Understand the mechanism of drug action and its relevance in the treatment of different diseases	2		1		1					2		2
						CO2	Demonstrate isolation of different organs/tissues from the laboratory animals by simulated experiments	2		1		1	2				2		1
						CO3	Demonstrate the various receptor actions using isolated tissue preparation	2		1		2	2				2		1
						CO4	Appreciate correlation of pharmacology with related medical sciences	2		2	2	2							
Average								**2**		**1.25**	**2**	**1.5**	**2**				**2**		**1.33**

PHARMACOGNOSY AND PHYTOCHEMISTRY II	BP504T	5	4	45	310	CO1	To know the modern extraction techniques, characterization and identification of the herbal drugs and phytoconstituents	1			1		1						1
						CO2	To understand the preparation and development of herbal formulation.	1											
						CO3	to understand the herbal drug interactions	1	1		1								1
						CO4	to carryout isolation and identification of phytoconstituents	1	1		1							1	1
Average								**1**	**1**		**1**		**1**					**1**	**1**

PHARMACEUTICAL JURISPRUDENCE	BP505T	5	4	45	310	CO1	The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals .	2												
						CO2	Various Indian pharmaceutical Acts and Laws	2												
						CO3	The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals	2												
						CO4	The code of ethics during the pharmaceutical practice	2						3	3					
Average								**2**						**3**	**3**					
Industrial Pharmacy I	BP506P	5	4	60	310	CO1	Prepare formulations of different dosage forms as per the batch formula	2												2

						CO2	Operate different equipment's used in preparation of dosage forms	3											1
						CO3	Relate the physicochemical properties of drugs to dosage form characteristics	1											2
						CO4	Evaluate different dosage forms by performing quality control tests	2											1
Average								**2**											**1.5**
PHARMACOLOGY-II	BP507P	5	4	60	310	CO1	Choose physiological salt solutions for isolated tissue preparations	2											2
						CO2	Demonstrate drug effects using computer models	1			2								
						CO3	Conduct experiments on isolated tissue preparation and in vivo studies	2											3

Average								**1.6**			**2**									**2.5**
PHARMACOGNOSY AND PHYTOCHEMISTRY II	BP508P	5	4	60	310	CO1	Identify crude drugs by morphological and microscopical characteristics	1												2
						CO2	Isolate phytoconstituents from crude drugs	1												
						CO3	Perform Paper and Thin Layer Chromatography	2												
						CO4	Carryout chemical tests for the identification of unorganized crude drugs	3												2
Average								**1.75**												**2**
CHEMISTRY –	BP601T	6	4	45	310	CO1	Understand the importance of drug design and different techniques of drug design.	2	1											

						CO2	Understand the chemistry of drugs with respect to their biological activity.	2											
						CO3	Know the metabolism, adverse effects and therapeutic value of drugs.	2											
						CO4	Know the importance of SAR of drugs.	1			2								
Average																			
PHARMACOLOGY-III	BP602T	6	4	45	310	CO1	understand the mechanism of drug action and its relevance in the treatment of different infectious diseases	3		2		1	1				2		2
						CO2	comprehend the principles of toxicology and treatment of various poisonings	2		1		1	2				2		2

						CO3	appreciate correlation of pharmacology with related medical sciences	2		2		2	2				2		2
Average								**2.3**		**1.6**		**1.3**	**2.5**				**2**		**2**
Herbal Drug Technology	BP603T	6	4	45	310	CO1	understand raw material as source of herbal drugs from cultivation to herbal drug product	3											2
						CO2	know the WHO and ICH guidelines for evaluation of herbal drugs	2		1				2	2				2
						CO3	know the herbal cosmetics, natural sweeteners, nutraceuticals	3											2
						CO4	appreciate patenting of herbal drugs, GMP	2						2	2				2
Average								**2.5**		**1**				**2**	**2**				**2**

Biopharmaceutics	BP604T	6	4	45	310	CO1	Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance	2											2
						CO2	Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination	2											2
						CO3	To understand the concepts of bioavailability and bioequivalence of drug products and their significance.	2											2

						CO4	Understand various pharmacokinetic parameters, their significance & applications.	2											2
Average								**2**											**2**
Pharmaceutical Biotechnology	BP605T	6	4	45	310	CO1	Understanding the importance of Immobilized enzymes in Pharmaceutical Industries	2											
						CO2	Genetic engineering applications in relation to production of pharmaceuticals	2											
						CO3	Importance of Monoclonal antibodies in Industries	2											
						CO4	Appreciate the use of microorganisms in fermentation technology	2			2								

Average								**2**			**2**								
Pharmaceutical Quality Assurance	BP606T	6	4	45	310	CO1	understand the cGMP aspects in a pharmaceutical industry	1											2
						CO2	appreciate the importance of documentation	1											1
						CO3	understand the scope of quality certifications applicable to pharmaceutical industries	1											1
						CO4	understand the responsibilities of QA & QC departments	2											1
Average								**1.25**											**1.25**
Medicinal Chemistry-II	BP607P	6	4	60	310	CO1	Explain the physical chemical properties of drugs using drug design software.	3											1

						CO2	Draw chemical structures and reactions by Chem draw software.	1											
						CO3	Analyze the purity of medicinal compounds.	2											1
						CO4	Prepare medicinally important compounds / intermediates	3											2
Average								**2.25**											**1**
Pharmacology-III	BP608P	6	4	60	310	CO1	Calculate doses for laboratory animals	2						3					2
						CO2	Perform toxicity studies following standard guidelines	2											1
						CO3	Estimate biochemical parameters in body fluids	1											

						CO4	Demonstrate effect of drugs using computer models	1											1
Average								**1.5**						**3**					**1**
Herbal Drug Technology	BP609P	6	4	60	310	CO1	Perform phytochemical screening of the extracts	2											
						CO2	Prepare herbal formulations and herbal cosmetics using standardised extracts	2											3
						CO3	Carryout monograph analysis of herbal drugs	2											1
						CO4	Evaluate excipients of natural origin	1											
Average								**1.75**											**1**
Methods of	BP701T	7	4	45	310	CO1	Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis	2											2

						CO2	Understand the chromatographic separation and analysis of drugs.	2											1
						CO3	Perform quantitative & qualitative analysis of drugs using various analytical instruments.	1			2								2
Average								**1.6**			**2**								**1.6**
Industrial Pharmacy - II	BP702T	7	4	45	310	CO1	Know the process of pilot plant and scale up of pharmaceutical dosage forms	2	1		1								
						CO2	Understand the process of technology transfer from lab scale to commercial batch	2	1		1								
						CO3	Know different Laws and Acts that regulate pharmaceutical industry	2						2					

						CO4	Understand the approval process and regulatory requirements for drug products	2						2					
Average								**2**	1		1			**2**					
Pharmacy Practice	BP703T	7	4	45	310	CO1	know various drug distribution methods in a hospital	2					1				1		1
						CO2	appreciate the pharmacy stores management and inventory control	2	1				1				1		1
						CO3	monitor drug therapy of patient through medication chart review and clinical review	2		2			2				2	2	2
						CO4	obtain medication history interview and counsel the patients	2					1				1	1	2
						CO5	identify drug related problems	2	1				1				1		2

						CO6	detect and assess adverse drug reactions	2	1	2			1				1		1
						CO7	interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states	2	2				1				1		1
						CO8	know pharmaceutical care services	2					1				1		1
						CO9	do patient counseling in community pharmacy	2				2	1				2	2	1
						CO10	appreciate the concept of Rational drug therapy	2					1				1		1
Average								**2**	**1**	**2**		**0.2**	**1.1**				**1.2**	**0.5**	**1.3**
Novel drug delivery system	BP704T	7	4	45	310	CO1	To understand various approaches for development of novel drug delivery systems.	2			2								2

						CO2	To understand the criteria for selection of drugs and polymers for the development of Novel drug delivery systems, their formulation and evaluation.	2		1	2								2
Average								**2**		**1**	**2**								
Instrumental method of analysis practical	BP705P	7	2	60	004	CO1	To understand the working of UV spectrophotometer	2		2	2						1		2
						CO2	To identify and understand assay procedure of various drugs.	2		2	1								2
						CO3	To understand the working, principle of chromatography	2		2	2						1		2
Average								**2**		**2**	**1.6**						**1**		**2**

BIOSTATISITCS AND RESEARCH METHODOLOGY	BP801T	8	4	45	310	CO1	Know the operation of M.S. Excel, SPSS, R and MINITAB®, DoE (Design of Experiment)	1	1	1	1								1
						CO2	Know the various statistical techniques to solve statistical problems	1			1								1
						CO3	Appreciate statistical techniques in solving the problems.	1		1									1
Average								**1**	**1**	**1**	**1**								**1**
SOCIAL AND PREVENTIVE PHARMACY	BP802T	8	4	45	310	CO1	Acquire high consciousness/realization of current issues related to health and pharmaceutical problems within the country and worldwide.	1	2								1		

						CO2	Have a critical way of thinking based on current healthcare development.	1	2										
						CO3	Evaluate alternative ways of solving problems related to health and pharmaceutical issues.	2	1								2		
Average								**1.3**	**1.6**								**1.5**		
PHARMA MARKETING MANAGEMENT	BP 803ET	8	4	45	310	CO1	The course aims to provide an understanding of marketing concepts and techniques and their applications in the pharmaceutical industry.	1	1			1	2			1			1
Average								**1**	**1**			**1**	**2**		**1**				**1**

PHARMACEUTICAL REGULATORY SCIENCE	BP804ET	8	4	45	310	CO1	Know about the process of drug discovery and development	2			3								2
						CO2	Know the regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals	2						2	1				2
						CO3	Know the regulatory approval process and their registration in Indian and international markets	2						3	2				2
Average								**2**			**3**			**2.5**	**1.5**				**2**
PHARMACOVIGILANCE	BP805T	8	4	45	310	CO1	Why drug safety monitoring is important?	2					1				1	1	1
						CO2	History and development of pharmacovigilance	2											

						CO3	National and international scenario of pharmacovigilance	1												
						CO4	Dictionaries, coding and terminologies used in pharmacovigilance	2												
						CO5	Detection of new adverse drug reactions and their assessment	2					2				2	2	2	
						CO6	International standards for classification of diseases and drugs	2					1						1	
						CO7	Adverse drug reaction reporting systems and communication in pharmacovigilance	2					2				2	2	1	

						CO8	Methods to generate safety data during pre clinical, clinical and post approval phases of drug's life cycle	1											1
						CO9	Drug safety evaluation in paediatrics, geriatrics, pregnancy and lactation	2	1				2						2
						CO10	Pharmacovigilance Program of India (PvPI) requirement for ADR reporting in India.	2					2						1
						CO11	ICH guidelines for ICSR, PSUR, expedited reporting, pharmacovigilance planning	1											1
Average								**1.7**	**1**				**1.6**				**1.6**	**1.6**	**1.3**
LAND STANDAR	BP806ET	8	4	45	310	CO1	know WHO guidelines for quality control of herbal drugs	2											2

						CO2	know Quality assurance in herbal drug industry	1											1
						CO3	know the regulatory approval process and their registration in Indian and international markets	2											2
						CO4	appreciate EU and ICH guidelines for quality control of herbal drugs	2											2
Average								**1.8**											**1.8**
COMPUTER AIDED DRUG DESIGN	BP807ET	8	4	45	310	CO1	Design and discovery of lead molecules	1	2										1
						CO2	The role of drug design in drug discovery process	1	2										1
						CO3	The concept of QSAR and docking	1											1

						CO4	Various strategies to develop new drug like molecules.	2											1
Average								**1.3**	**2**										**1**
CELL AND MOLECULAR BIOLOGY	BP808ET	8	4	45	310	CO1	Summarize cell and molecular biology history.	2											
						CO2	Summarize cellular functioning and composition.	2											
						CO3	Describe the chemical foundations of cell biology.	2											
						CO4	Summarize the DNA properties of cell biology.	2											
						CO5	Describe protein structure and function.	2			2								
						CO6	Describe cellular membrane structure and function	2			1								
						C07	Describe basic molecular genetic mechanisms.	2			2								

						C08	Summarize the Cell Cycle	2										
Average								**2**			**1.6**							
COSMETIC SCIENCE	BP809ET	8	4	45	310	CO1	Understand the defination of cosmetics as per Indian and EU regulations, evolution of cosmeceuticals from cosmetics.	2						2				
						CO2	Understand the principle of formulation and building blocks of skin care products.	2			2							
Average								**2**			**2**			**2**				
CLINICAL SCREENING	BP810ET	8	4	45	310	CO1	Appreciate the applications of various commonly used laboratory animals.	2						2	2			2

						CO2	Appreciate and demonstrate the various screening methods used in preclinical research	2						2	2				2
						CO3	Appreciate and demonstrate the importance of biostatistics and research methodology	2						2	2				2
						CO4	Design and execute a research hypothesis independently	2						2	2				2
Average								**2**						**2**	**2**				**2**
Advanced Instrumentation Techniques	BP811ET	8	4	45	310	CO1	understand the advanced instruments used and its applications in drug analysis	1			2								2
						CO2	understand the chromatographic separation and analysis of drugs.	2			1								1

						CO3	understand the calibration of various analytical instruments	2			1								2
						CO4	know analysis of drugs using various analytical instruments.	1			2								1
Average								**1.5**			**1.5**								**1.5**
Dietary Supplements and Nutraceuticals	BP812ET	8	4	45	310	CO1	Understand the need of supplements by the different group of people to maintain healthy life.	3											
						CO2	Understand the outcome of deficiencies in dietary supplements.	3											
						CO3	Appreciate the components in dietary supplements and the application.	2									1		

						CO4	Appreciate the regulatory and commercial aspects of dietary supplements including health claims.	2							2				
Average								**2.5**							**2**		**1**		

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

1. Slight (Low)- upto 30% 2. Moderate (Medium) – above 30% and upto70% 3. Substantial (High) – above 70%

So on…….. (1st semester to last semester)