



G. Pulla Reddy College of Pharmacy

ISO 9001 - 2000 Certified College

(Affiliated to Osmania University and Approved by AICTE & PCI)



B. PHARM- PROGRAM OUTCOMES (PCI)

PO1 :	Gain knowledge on basics of biology, structure & function of various systems of human body, fundamentals & principles of analytical chemistry, basics & preparation of different dosage forms, monographs of inorganic drugs & pharmaceuticals, soft-skills management, and problems solving in pharmacy.
PO2:	Able to understand physiology, pathophysiological mechanisms, biochemical processes, diagnosis of various pathological conditions, understand metabolism of bioactive molecules, performing haematological tests & biochemical tests. Basic understanding of organic reactions, identification, preparation, awareness of environmental problems, application of databases in pharmacy.
PO3:	Understanding stability, reactivity, standardisation & medicinal uses of organic compounds. Physical, physico-chemical properties & unit operations involved in dosage forms. Basics and pharmaceutical applications of microbiology.
PO4:	Gain knowledge on stereochemical aspects, synthesis of organic compounds & derivatives, chemistry, mechanism of action, pharmacology & therapeutic uses of natural & synthetic medicinal compounds. Fundamentals of crude drugs and their medicinal properties, understand & demonstrate chemical kinetics in the formulation of dosage forms.
PO5:	Gain knowledge of physico-chemical properties of drug substance, formulation, manufacturing, evaluation and packaging of various solid, liquid and semi-solid dosage forms. Chemistry, preparation, assay, mechanism of action, structure activity relationship, pharmacodynamics, pharmacokinetics of various classes of drugs and their application in treatment of various diseases. Fundamentals, medicinal properties, isolation, characterisation, quality control & evaluation of crude drugs and development of herbal formulations. Indian pharmaceutical acts & laws and regulatory authorities governing the manufacture and sale of pharmaceuticals.
PO6:	Gain knowledge in drug design techniques, chemistry, assay, mechanism of action, structure activity relationship & pharmacology of various categories of drugs. Experimental screening models for drug discovery. Biopharmaceutics & pharmacokinetic applications in pharmacotherapy. Learn about raw materials, formulation, quality control, patenting & regulatory requirements of nutraceuticals & herbal cosmetics. Information & techniques, production & uses of biopharmaceuticals. Quality assurance, quality control systems, documentation and validation in pharmaceutical industry.
PO7:	Gain knowledge in spectroscopic studies & chromatographic techniques of drugs. Designing & evaluation of novel drug delivery systems. Technology transfer from lab scale to industry, regulatory affairs & quality management systems in pharmaceutical industry. Role of pharmacist in community and hospital. application of knowledge gained in isolation, identification, standardisation, formulation, manufacturing & evaluation of pharmaceuticals.
PO8:	Use of statistical principles in research and development of pharmaceuticals. Knowledge of National health programs and pharmacist role. Advanced techniques used in drug design, screening, analysis of pharmaceuticals, cosmetics & nutraceuticals. Methods & importance of reporting adverse drug reactions. knowledge of regulatory science, Pharmaceutical industrial & business management.



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B. PHARM- COURSE OUTCOMES (PCI)

S.NO	NAME	SUBJECT NAME	COURSE OUTCOMES
1	CO1	HAP I (T&P)	Able to understand basic human anatomy , physiology, working pattern of different organs of each system and Know the homeostatic mechanisms and their imbalances
2	CO2	PH.ANALYSIS I (T&P)	Able to understand fundamentals & principles of analytical chemistry, predict the sources of mistakes & errors and develop analytical skills and understand the knowledge about assay of pharmaceutical substances
3	CO3	PH.CEUTICS-I (T&P)	Able to understand history of profession of pharmacy, prescription writing & handling, incompatibilities & calculations in preparation of dosage forms
4	CO4	PH. INORGANIC CHEMISTRY (T&P)	Able to know the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals, medicinal and pharmaceutical importance of inorganic compounds
5	CO5	COMMUNICATION SKILLS (T&P)	Able to communicate effectively, develop interview skills, leadership qualities and manage the team.
6	CO6	REMEDIAL BIOLOGY (T&P)	Gain knowledge on classification & salient features of five kingdoms of life, basic components of anatomy & physiology of plant and animal including human.
7	CO7	MATHS	Gain knowledge on how to solve different types of problems by applying theory and applications of mathematics in pharmacy.
8	CO8	HAP II (T&P)	Able to Identify various tissues and organs of different systems of human body and know coordinated working pattern of different organs of each system
9	CO9	PH.ORG CHEMISTRY I (T&P)	Basic understanding of organic reactions, identification, preparation, name the reaction and orientation of reaction & reactivity or stability of compounds & Confirm the functional



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			groups by qualitative tests
10	CO10	BIO CHEMISTRY (T&P)	Upon completion of the course student shall be able to understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes, metabolism of nutrient molecules in physiological and pathological conditions, genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins, qualitative and quantitative analysis of biochemical constituents of blood and urine.
11	CO11	PATHOPHYSIOLOGY	Upon completion of the course the students shall be able to understand etiology, pathogenesis, signs, symptoms, complications & diagnosis of selected diseases
12	CO12	COMPUTER APPLICATIONS (T&P)	To understand the various types of applications of computers in pharmacy, types of databases and applications of biological databases in pharmacy
13	CO13	ENVIRONMENTAL SCIENCES	Able to know the problems in environment and how to protect environment.
14	CO14	PH.ORG CHEMISTRY II (T&P)	The student shall be able to know the physical and chemical properties of aromatic compounds, phenols, amines, polynuclear hydrocarbons. Stability and reactions of cycloalkanes. Analyze fats and oils and prepare some aromatic compounds.
15	CO15	PHYSICAL PH CEUTICS I (T&P)	Understand the concept of solubility, surface tension, various states of matter, buffers complexation , determination physicochemical properties
16	CO16	PH. MICROBIOLOGY (T&P)	To gain the knowledge about morphology of micro organisms (bacteria, fungi, viruses etc) their physical, chemical requirements, identification, methods of controlling MOs, evaluation of sterilization methods etc. With the above knowledge it is able to assess the existing and new antibiotics for the better treatment of diseases and maintain stringent aseptic conditions during manufacturing of pharmaceutical products.



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17	CO17	PH. ENG (T&P)	To know various unit operations used in Pharmaceutical industries, material handling techniques. Pharmaceutical manufacturing process and preventive methods used for corrosion control in Pharmaceutical industries.
18	CO18	PH.ORG CHEMISTRY III (T)	Basic understanding of heterocyclic compounds and their importance in medicinal chemistry. Choose the reagents depending on their application. Write the mechanisms of named reactions and apply while synthesizing new chemical entities. Discuss the concept of Stereochemistry and its importance in medicine.
19	CO19	MEDICINAL CHEMISTRY I (T&P)	Upon completion of course students shall be able to understand the chemistry of drugs with respect to their pharmacologic activity, drug metabolic pathways, adverse effect and therapeutic value of drugs, Structure activity relationship studies (SAR) of different classes of drugs and chemical synthesis of some drugs.
20	CO20	PHYSICAL PHARMACEUTICS II (T&P)	Gain knowledge of physico-chemical properties of drug molecules, principles of chemical kinetics and stability testing
21	CO21	PHARMACOLOGY I (T&P)	Understand the basic principles of drug action, pharmacology of drugs, prevention and treatment of various diseases
22	CO22	PHARMACOLOGY & PHYTOCHEMISTRY I (T&P)	Understand the fundamentals of Pharmacognosy like scope, history, classification evaluation of crude drugs used in Indigenous systems of medicine.
23	CO23	MEDICINAL CHEMISTRY II (T)	Upon completion of course students are able to summarize the chemistry of drugs with their pharmacological action, drug metabolism, adverse drug interactions and therapeutic value of drugs, Structure activity relationship studies (SAR) of different classes of drugs and chemical synthesis of some drugs.
24	CO24	INDUSTRIAL PHARMACY I (T&P)	Able to learn the role of preformulation studies, product formulation and quality control tests for different dosage forms and knowledge of packaging materials



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25	CO25	PHARMACOLOGY II (T&P)	Understand the pharmacodynamics and their application in the pharmacotherapy of various drugs used in the treatment of cardiovascular, endocrine disorders. know the experimental techniques and models used for the pharmacological study of drugs
26	CO26	PH.COGNOSY & PHYTOCHEMISTRY II (T&P)	Gain knowledge of how the secondary metabolites are produced in the crude drugs, how to isolate and identify and produce them industrially, producing the plants and phytochemicals through plant tissue culture, drug interactions and basic principles of traditional system of medicine
27	CO27	PHARMACEUTICAL JURISPRUDENCE (T)	Gain the knowledge of Drugs and Cosmetic Act and Rules, Pharmacy Act, Narcotic Drugs and Psychotropic Substances Act, practice of professional ethics, Pharmaceutical Legislation of India, magic remedies act, prevention of cruelty to animals and pricing of dosage forms,
28	CO28	MEDICINAL CHEMISTRY III (T&P)	Able to summarize the importance of drug design and different approaches of drug design, chemistry of drugs with respect to their biological activity, metabolism, adverse effects and therapeutic value of drugs, SAR and QSAR of drugs
29	CO29	PHARMACOLOGY III (T&P)	understand the pharmacodynamics and their application in the pharmacotherapy of various drugs used in the treatment of infectious, respiratory and GIT diseases and also the management of poisoning with drugs
30	CO30	HERBAL DRUG TECHNOLOGY (T&P)	gain knowledge of herbal drug industry, the quality of raw material, guidelines for quality of herbal drugs, herbal cosmetics, natural sweeteners, nutraceutical etc. and Good Manufacturing Practices (GMP), patenting and regulatory issues of herbal drugs
31	CO31	BIOPHARMACEUTICS & PHARMACOKINETICS (T)	Able to understand the factors influencing the absorption, disposition of drugs and to optimize for safer and efficacious treatment. Pharmacokinetic modeling and non linear pharmacokinetics.



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32	CO32	PHARMACEUTICAL BIOTECHNOLOGY (T)	Upon completion of course student shall be able to apply Scientific knowledge of biotechnology in the field of genetic engineering medicine and fermentation technology
33	CO33	QUALITY ASSURANCE (T)	Gain knowledge of quality assurance systems, in process quality control, quality systems, audits, documentation, calibration & validation in pharmaceutical industry.
34	CO34	INSTRUMENTAL METHOD OF ANALYSIS (T&P)	Able to explain the instrumentation, principles, procedures of UV-Visible fluorescence and IR spectroscopic techniques and chromatographic techniques for qualitative and quantitative analysis of pharmaceutical compounds. Students also able to demonstrate and use flame photometry, nepheloturbidometry and electrophoresis techniques and their applications in pharmaceutical industry.
35	CO35	INDUSTRIAL PHARMACY II (T)	Able to understand the process of technology transfer from lab scale to commercial batch, regulations and approval process in pharmaceutical industry.
36	CO36	PHARMACY PRACTICE (T)	Shall know the organization of hospital and hospital pharmacy, significance, role of hospital and clinical pharmacist in providing better patient care.
37	CO37	NOVEL DRUG DELIVERY SYSTEM (T)	To understand criteria for selection of drugs, polymers, development and evaluation of novel drug delivery systems.
38	CO38	PRACTICE SCHOOL	Application of knowledge gained in isolation, identification, standardization, formulation, manufacturing & evaluation of pharmaceuticals.
39	CO39	BIostatistics & RESEARCH METHODOLOGY	learn the concepts and able to use various statistical tests, software tools for validation of pharmaceutical research data



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40	CO40	SOCIAL AND PREVENTIVE PHARMACY	understand the importance of community health, know about national and international community health programs , role of pharmacist in creating awareness and improving the community health
41	CO41	PHARMA MARKETING MANAGEMENT	Able to implement the marketing principles, concepts, techniques in pharmaceutical industry.
42	CO42	PHARMACEUTICAL REGULATORY SCIENCE	Able to understand regulatory concepts, regulatory approval process, regulatory authorities and registration of pharmaceuticals in international markets.
43	CO43	PHARMACOVIGILANCE	Gain knowledge on history, importance, detection, methods of reporting, coding, evaluation and guidelines of pharmacovigilance of drugs
44	CO44	QUALITY CONTROL AND STANDARDISATION OF HERBALS	Gain knowledge of various methods and guidelines for evaluation and standardization of herbs and herbal drugs, cGMP, GAP and GLP in traditional system of medicines.
45	CO45	COMPUTER AIDED DRUG DESIGN	The student shall be able to apply the concepts of QSAR, Cheminformatics and bioinformatics in designing the drugs.
46	CO46	CELL AND MOLECULAR BIOLOGY	To learn detailed cell biology including cell structure, nuclear structures, protein synthesis and its regulation, cell signalling mechanisms. able to apply this knowledge in drug discovery and genetical research
47	CO47	COSMETIC SCIENCE	Able to understand the regulations, building blocks, manufacturing and evaluation of cosmetics for skin, hair, nail and teeth. Also the use of herbs in cosmetic preparations and knowledge of cosmeceuticals.



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48	CO48	PHARMACOLOGICAL SCREENING METHODS	To learn about experimental animals used in pharmacological research for screening of various categories of drugs, guidelines for use and maintenance of experimental animals. also learn about statistical handling of preclinical data
49	CO49	ADVANCED INSTRUMENTATION TECHNIQUES	Shall be able to interpret the spectras of NMR, IR, Mass Spectroscopy. Should calibrate and validate various spectrophotometers. Should have knowledge on hyphenated techniques.
50	CO50	DIETARY SUPPLEMENTS AND NUTRACEUTICALS	Able to understand the need and requirements of dietary supplements among different groups in the population to maintain healthy life



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PO CO MAPPING								
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8
CO1	X							
CO2	X							
CO3	X							
CO4	X							
CO5	X							
CO6	X							
CO7	X							
CO8		X						
CO9		X						
CO10		X						
CO11		X						
CO12		X						
CO13		X						
CO14			X					
CO15			X					
CO16			X					
CO17			X					



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C018				X				
C019				X				
C020				X				
C021				X				
C022				X				
C023					X			
C024					X			
C025					X			
C026					X			
C027					X			
C028						X		
C029						X		
C030						X		
C031						X		
C032						X		
C033						X		
C034							X	
C035							X	
C036							X	
C037							X	



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CO38							X	
CO39								X
CO40								X
CO41								X
CO42								X
CO43								X
CO44								X
CO45								X
CO46								X
CO47								X
CO48								X
CO49								X
CO50								X

B.PHARM- SPECIFIC LEARNING OUTCOMES (SLO)- SEMESTER I (PCI)



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SPECIFIC LEARNING OUTCOMES (SLO) SEMESTER I (PCI)			
S.NO	NAME	UNIT/TITLE	SPECIFIC LEARNING OUTCOMES
HAP-I (T&P)			
	SLO1/1	Introduction to human body	Understand scope of anatomy and physiology, levels of structural organization, homeostasis, ,Structure and functions of cell, ,General principles of cell communication
	SLO2/1	Integumentary system, Skeletal system, joints	Understand Structure and functions of skin, bones of axial and appendicular skeletal system, types of joints movements and its articulation
	SLO3/1	Body fluids and blood, Lymphatic system	Understand Body fluids, composition and functions of blood, mechanisms of coagulation, Lymphatic organs and tissues and functions of lymphatic system
	SLO4/1	Peripheral nervous system, Special senses	Understand Structure and functions of sympathetic and parasympathetic nervous system, functions of spinal and cranial nerves. Structure and functions of eye, ear, nose, tongue and their disorders
	SLO5/1	Cardiovascular system	Understand anatomy of heart, blood circulation, conduction system of heart, Regulation of blood pressure and disorders of heart.
	SLO6/1	Practical	able to Identify the various tissues and organs, perform haematological experiments and measure cardiovascular parameters.
PH.ANALYSIS I (T&P)			
	SLO7/1	Pharmaceutical analysis and Errors	Understand the fundamentals of analytical chemistry, and prepare different strength of solutions and predict the sources of mistakes and errors
	SLO8/1	Acid base titration and Non aqueous titration	Understand the principles of volumetric analytical skills
	SLO9/1	Precipitation titration, Complexometric titration and Gravimetry	Ability to understand the basic principles of volumetric analytical skills



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	SLO10/1	Redox titrations	It helps to develop the fundamentals of volumetric analytical skills & understand the knowledge about assay of pharmaceutical substances
	SLO11/1	Electrochemical methods of analysis	Understand the basic principles of electrochemical analytical techniques
	SLO12/1	Practical	Ability to gain the fundamentals of volumetric analytical skills & electrochemical analytical techniques in lab and understand the knowledge about assay of pharmaceutical substances
	PH. CEUTICS-I (T&P)		
	SLO13/1	history of pharmacy profession, prescription, posology, dosage forms	Knowledge of pharmacy history, pharmacopoeias, dosage forms, prescription handling and posology.
	SLO14/1	calculations, powders, liquid dosage forms	Able to calculate doses, domestic conversions & other pharmaceutical calculations. know what are powders and liquid dosage forms
	SLO15/1	monophasic, biphasic liquid dosage forms	Knowledge of monophasic & biphasic liquid dosage forms, their preparation and stability.
	SLO16/1	suppositories, incompatibilities	Knowledge of suppositories preparation, displacement value calculations and incompatibilities in preparations.
	SLO17/1	semi solid dosage forms	Knowledge of preparation & evaluation of semi solid dosage forms.
	SLO18/1	practical	Able to do percentage calculations and prepare different dosage forms.
	PH. INORGANIC CHEMISTRY (T&P)		
	SLO19/1	Impurities in pharmaceutical substances	To gain knowledge of various sources of impurities and methods to determine impurities in inorganic drugs and pharmaceuticals
	SLO20/1	Acids, bases, buffers, major extra and intracellular electrolytes and dental products	To learn knowledge of acids, bases, buffers, methods of adjusting isotonicity and preparation, assay, properties and medicinal uses of various electrolytes and dental products
	SLO21/1	Gastrointestinal agents	Knowledge of various gastrointestinal agents like acidifiers, antacids, cathartics, antimicrobials and preparation, assay, properties and medicinal



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			uses of some inorganic compounds of these classes
SLO22/1	Expectorants, emetics, haematinics, poison and antidotes, astringents		Knowledge of expectorants, emetics, haematinics, poison and antidotes, astringents and preparation, assay, properties and medicinal uses of some inorganic compounds of these classes
SLO23/1	Radiopharmaceuticals		Able to understand basics of radioactive compounds, pharmaceutical applications of radioactive substances
SLO24/1	Practical		Able to determine various impurities in inorganic drugs and pharmaceuticals, identify and determine test for purity of some compounds and preparation of some inorganic compounds.
COMMUNICATION SKILLS (T&P)			
SLO25/1	Communication process		Able to understand communication process, barriers and perspectives.
SLO26/1	Elements of communication		Able to understand the elements and styles of communication.
SLO27/1	Listening skills		Able to understand listening skills and written communication.
SLO28/1	Interview skills		Able to grasp interview skills and how to give a presentation.
SLO29/1	Effective communication		Able to communicate effectively in group discussion.
SLO30/1	practical		Able to use words worth English language lab software.
REMEDIAL BIOLOGY (T&P)			
SLO31/1	Morphology of flowering plants		Understand the diversity and five kingdoms of life in living world. Morphology of flowering plants.
SLO32/1	Anatomy & physiology of human body and animals.		Understand the anatomy & physiology of circulatory system, digestive system & respiratory system in human body and animals.
SLO33/1	Anatomy & physiology of human body and animals.		Understand the anatomy & physiology of excretory system, nervous system, endocrine system & reproductive system in human body and animals.
SLO34/1	Nutrition from plants & minerals		Understand importance of nutrition from plants & minerals, photosynthesis in



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			plants.
SLO35/1	Cell		Understand cell, respiration, growth & tissues in plants.
SLO36/1	practical		Able to perform section cutting, microscopic studies and determine blood group, blood pressure & tidal volume parameters.
MATHS			
SLO37/1	I		Able to solve problems using partial fraction, logarithms, function, limits and continuity.
SLO38/1	II		Able to solve problems related to matrices & determinants.
SLO39/1	III		Able to solve calculus & differentiation problems.
SLO40/1	IV		Understand the concepts of analytical geometry in problem solving.
SLO41/1	V		Understand differential equation, Laplace transform and apply in solving chemical kinetics & pharmacokinetics problems.



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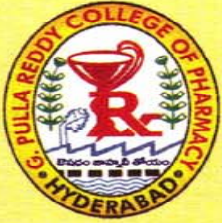
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B.PHARM (PCI) FIRST SEMESTER CO AND SLO MAPPING

B.PHARM (PCI) FIRST SEMESTER CO AND SLO MAPPING							
	CO1	CO2	CO3	CO4	CO5	CO6	CO7
SLO1/1	X						
SLO2/1	X						
SLO3/1	X						
SLO4/1	X						
SLO5/1	X						
SLO6/1	X						
SLO7/1		X					
SLO8/1		X					
SLO9/1		X					
SLO10/1		X					
SLO11/1		X					
SLO12/1		X					
SLO13/1			X				
SLO14/1			X				
SLO15/1			X				
SLO16/1			X				
SLO17/1			X				
SLO18/1			X				
SLO19/1				X			
SLO20/1				X			
SLO21/1				X			



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SLO22/1				X			
SLO23/1				X			
SLO24/1				X			
SLO25/1					X		
SLO26/1					X		
SLO27/1					X		
SLO28/1					X		
SLO29/1					X		
SLO30/1					X		
SLO31/1						X	
SLO32/1						X	
SLO33/1						X	
SLO34/1						X	
SLO35/1						X	
SLO36/1						X	
SLO37/1							X
SLO38/1							X
SLO39/1							X
SLO40/1							X
SLO41/1							X



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SPECIFIC LEARNING OUTCOMES (SLO)- SEMESTER II (PCI)

SPECIFIC LEARNING OUTCOMES (SLO)- SEMESTER II (PCI)

S.NO	NAME	UNIT/TITLE	SPECIFIC LEARNING OUTCOMES
HAP-II (T&P)			
	SLO1/2	Nervous system	Understand Organization of nervous system, action potential, functions of brain and spinal cord
	SLO2/2	Digestive system	Know the anatomy and physiology of GIT, digestion absorption of nutrients and disorders of GIT.
	SLO3/2	Respiratory system Urinary system	Understand Anatomy of respiratory system, mechanism of respirations, anatomy of kidney and nephrons, physiology of urine formation
	SLO4/2	Endocrine system	able to know structure and functions of pituitary gland, thyroid gland, parathyroid gland, adrenal gland, pancreas, pineal gland, thymus and their disorders
	SLO5/2	Reproductive system, Introduction to genetics	understand anatomy and physiology of male and female reproductive system, DNA, protein synthesis, genetic pattern of inheritance
	SLO6/2	Practical	able to Perform experiments like recording body temperature, body mass index, respiratory parameters, know anatomy and physiology of various organs
PH.ORG CHEMISTRY I (T&P)			
	SLO7/2	Classification, nomenclature and isomerism	Able to write the structure, IUPAC name and isomerism of organic compounds
	SLO8/2	Alkanes, Alkenes and conjugated dienes	Ability to understand mechanism involved in various reactions & understand the stability of compounds
	SLO9/2	Alkyl halides & Alcohols	Understand the reactions with mechanism, orientation of reaction and identification of organic compounds by qualitative tests



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	SLO10/2	Carbonyl compounds	Understand the reaction, name the reaction and conformation tests for functional group
	SLO11/2	Carboxylic acids & Aliphatic amines	Gain knowledge to understand acidity and basicity of compounds & qualitative tests for functional groups
	SLO12/2	Practical	Acquire knowledge to identify the unknown organic compounds by a systemic qualitative analysis
BIO CHEMISTRY (T&P)			
	SLO13/2	Biomolecules and bioenergetics	Understand chemical nature and biological role of nutrient molecules, concept of free energy and biological significance of energy rich compounds.
	SLO14/2	carbohydrate metabolism & biological oxidation	Understand the carbohydrate metabolism, related pathological conditions and their hormonal regulation. Biological oxidation, mechanism of phosphorylations and their inhibitors.
	SLO15/2	Lipid & amino acid metabolism	Understand the metabolism of lipids and study the related disorders. General reactions of amino acid metabolism and the metabolic disorders.
	SLO16/2	Nucleic acid metabolism & genetic information transfer	Understand the genetic organisation of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
	SLO17/2	Enzymology	Understand the catalytic role of enzymes, importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
	SLO18/2	Practicals	Analysis of biochemical constituents of blood and urine.
PATHOPHYSIOLOGY			
	SLO19/2	Basic principles of cell injury & inflammation	Acquire knowledge of cell injury, adaptations, types & mechanisms of inflammation and wound healing
	SLO20/2	Infectious diseases	Understand the characteristics of microorganisms, mode of transmission, etiopathogenesis, signs, symptoms, complications & diagnosis of infectious diseases



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	SLO21/2	Cardiovascular, renal, respiratory & endocrine diseases	Understand the etiology, pathogenesis, signs, symptoms, complications & diagnosis of cardiovascular, renal, respiratory & endocrine diseases
	SLO22/2	Neuronal, Gastrointestinal & hepatic diseases	Understand the etiology, pathogenesis, signs, symptoms, complications & diagnosis of neuronal, gastrointestinal and hepatic diseases
	SLO23/2	Cancer, haematological & bone diseases	Understand the etiology, pathogenesis, signs, symptoms, complications & diagnosis of cancer, haematological and bone diseases
COMPUTER APPLICATIONS (T&P)			
	SLO24/2	Number system, Concept of Information systems and software	To understand the number systems and information systems and soft wares
	SLO25/2	Web technologies, Databases	Introduction to HTML, XML, CCS and Databases and Pharmaceutical databases
	SLO26/2	Application of computers in Pharmacy	Electronic Prescription, barcode medicine identification and automated dispensing of drugs, Diagnostic System, Lab-diagnostic System, Patient Monitoring System and Pharma Information System
	SLO27/2	Bioinformatics and Computers as data analysis in Preclinical development	Objective of Bioinformatics, Bioinformatics Databases, Impact of Bioinformatics in Vaccine Discovery and CDS
	SLO28/2	Practicals	HTML, MS-Office- Word and Access etc.,
ENVIRONMENTAL SCIENCES			
	SLO29/2	I	Knowledge of the natural resources present in the environment
	SLO30/2	II	Knowledge of the ecosystems present in the environment
	SLO31/2	III	Knowledge of sources of pollution



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B.PHARM (PCI) SECOND SEMESTER CO AND SLO MAPPING

B.PHARM (PCI) SECOND SEMESTER CO AND SLO MAPPING						
	CO8	CO9	CO10	CO11	CO12	CO13
SLO1/2	X					
SLO2/2	X					
SLO3/2	X					
SLO4/2	X					
SLO5/2	X					
SLO6/2	X					
SLO7/2		X				
SLO8/2		X				
SLO9/2		X				
SLO10/2		X				
SLO11/2		X				
SLO12/2		X				
SLO13/2			X			
SLO14/2			X			
SLO15/2			X			
SLO16/2			X			
SLO17/2			X			
SLO18/2			X			
SLO19/2				X		
SLO20/2				X		



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SLO21/2				X		
SLO22/2				X		
SLO23/2				X		
SLO24/2					X	
SLO25/2					X	
SLO26/2					X	
SLO27/2					X	
SLO28/2					X	
SLO29/2						X
SLO30/2						X
SLO31/2						X

SPECIFIC LEARNING OUTCOMES (SLO)- SEMESTER III (PCI)

SPECIFIC LEARNING OUTCOMES (SLO)- SEMESTER III (PCI)			
S.NO	NAME	UNIT/TITLE	SPECIFIC LEARNING OUTCOMES
PH.ORG CHEMISTRY II (T&P)			
	SLO1/3	I	Discuss the structure, Nomenclature, Aromaticity, properties and reactions of Benzene and its derivatives
	SLO2/3	II	Write the Structure, Nomenclature, preparation and reactions of phenols, amines, polynuclear hydrocarbons
	SLO3/3	III	Explain the importance of fats and oils and their analytical constants
	SLO4/3	IV	Preparation, reactions and medicinal uses of polynuclear hydrocarbons.
	SLO5/3	V	Stability and reactions of cycloalkanes,
	SLO6/3	P	Determine analytical constants of fats and oils and prepare aromatic compounds.



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PHYSICAL PH CEUTICS I (T&P)			
	SLO7/3	Solubility of drugs	Know about Basic principles of solubility, solubility expressions, factors affecting solubility of drugs and concept of distribution law
	SLO8/3	States of Matter and properties of matter & Physicochemical properties of drug molecules	Understand different State of matter and their properties, to differentiate amorphous & polymorphic forms, determination and applications of various physicochemical properties of drug molecules:
	SLO9/3	Surface and interfacial phenomenon	Gain knowledge in differentiating Surface and interfacial tension, Use of HLB scale, Concept of surfactants and their applications
	SLO10/3	Complexation and protein binding	Understand the Classification of Complexation, Applications, methods of analysis, protein binding, Complexation and drug action,
	SLO11/3	pH, buffers and Isotonic solutions	Know the use pH scale, pH determination, buffer equations, buffers in pharmaceutical and biological systems
	SLO12/3	Practical	Perform the determination of physicochemical properties of drugs like Partition coefficient, solubility, Surface tension and stability constants
PH. MICROBIOLOGY (T&P)			
	SLO13/3	Cultivation and collection	to understand methods of identification, cultivation and preservation of various microorganisms
	SLO14/3	Sterilization of pharmaceutical products	To understand the importance and implementation of sterilization in pharmaceutical processing and industry
	SLO15/3	Control of microorganism	To learn importance of disinfectants, bactericides in controlling MOs and their evaluation methods according to IP, BP and USP
	SLO16/3	Implementation of aseptic conditions	To understand the importance and implementation of aseptic conditions in pharmaceutical industries and to carry out microbiological standardization of pharmaceutical products
	SLO17/3	Cell culture technology	To gain knowledge in cell culture technology and its applications in pharmaceutical



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			industries
	SLO18/3	Practicals	To gain the practical knowledge of isolation, identification, cultivation, preservation of various MOs and to carry out microbiological standardization of pharmaceutical products
PH. ENG (T&P)			
	SLO19/3	Flow of fluids, Size reduction and Size Separation	Understand the types of manometers, Reynolds number, Bernoulli's theorem, various flow meters, principles, mechanisms, working and applications of various instruments used in size reduction, size separation
	SLO20/3	Heat Transfer, Evaporation and Distillation	Understand the objectives, applications & Heat transfer mechanisms. Fourier's law, principles, mechanisms, working and applications of various instruments used in evaporation, distillation
	SLO21/3	Drying and Mixing	Understand the objectives, applications & mechanism of drying process, equilibrium Moisture content, rate of drying curve. principles, construction, working, uses, merits and demerits of various drying and mixing instruments
	SLO22/3	Filtration and Centrifugation	Understand the objectives, applications and mechanism of filtration & centrifugation, Construction, Working, Uses, Merits and demerits of filters and centrifuges
	SLO23/3	Materials of pharmaceutical plant construction, Corrosion and its prevention	Gain knowledge on materials selected for Pharmaceutical plant construction, Theories of corrosion, types of corrosion and there prevention and material handling systems.
	SLO24/3	Practical	To know the radiation constant of various metals, working of various mills, determination of particle size by sieve analysis, effects of various factors on evaporation, filtration and drying rate curves



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B.PHARM (PCI) THIRD SEMESTER CO AND SLO MAPPING

B.PHARM (PCI) THIRD SEMESTER CO AND SLO MAPPING

	CO14	CO15	CO16	CO17
SLO1/3	X			
SLO2/3	X			
SLO3/3	X			
SLO4/3	X			
SLO5/3	X			
SLO6/3	X			
SLO7/3		X		
SLO8/3		X		
SLO9/3		X		
SLO10/3		X		
SLO11/3		X		
SLO12/3		X		
SLO13/3			X	
SLO14/3			X	
SLO15/3			X	
SLO16/3			X	
SLO17/3			X	
SLO18/3			X	
SLO19/3				X
SLO20/3				X
SLO21/3				X



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SLO22/3				X
SLO23/3				X
SLO24/3				X

SPECIFIC LEARNING OUTCOMES (SLO)- SEMESTER IV (PCI)

SPECIFIC LEARNING OUTCOMES (SLO)- SEMESTER IV (PCI)

S.No	NAME	UNIT/TITLE	SPECIFIC LEARNING OUTCOMES
PH.ORG CHEMISRTY III			
	SLO1/4	Optical isomers	Discuss the concept of Stereochemistry and sequence rules of optical isomers.
	SLO2/4	Nomenclature	cis-trans isomerism and its nomenclature.
	SLO3/4	Heterocyclic compounds	Write the Structure, Nomenclature, preparation and reactions of five membered heterocyclic compounds.
	SLO4/4	Nomenclature of fused ring system	Structure, Nomenclature, preparation and reactions of five, six and fused ring systems.
	SLO5/4	Reaction mechanisms	Reactions mechanisms and applications of named reactions and synthetic reagents.
MEDICINAL CHEMISTRY I (T&P)			
	SLO6/4	History & development of drugs	Able to understand the history & development of drugs, metabolism and physicochemical properties in relation to biological activity
	SLO7/4	Drugs of sympathetic nervous system	Able to understand the classification, mechanism of action SAR Studies , synthesis of drugs belongs to sympathetic nervous system
	SLO8/4	Drugs of parasympathetic nervous system	Able to understand the classification, mechanism of action SAR Studies and synthesis of drugs belongs to parasympathetic nervous system
	SLO9/4	Drugs of central nervous system	Able to understand the classification, mechanism of action SAR Studies and synthesis of drugs belongs to central nervous system
	SLO10/4	Anti-inflammatory agents,	Able to understand the classification, mechanism of action SAR Studies & synthesis of



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		narcotic analgesics	general anaesthetics, anti-inflammatory agents, narcotic analgesics
	SLO11/4	Practical	able to synthesize some drugs and determine percentage purity of some drugs
PHYSICAL PH CEUTICS II (T&P)			
	SLO12/4	Disperse systems	Knowledge of dispersed systems, physico-chemical properties of colloids.
	SLO13/4	Rheology	Knowledge of Newtonian and non-Newtonian systems, deformation of solids.
	SLO14/4	Coarse dispersions	Knowledge of coarse dispersions, their formulation and stability.
	SLO15/4	Micromeritics	knowledge of influence of particle size, determination and derived properties of powders
	SLO16/4	Stability	Knowledge of chemical kinetics, factors influencing, stability testing and determination of expiry date.
	SLO17/4	Practical	Able to determine particle size, flow properties and stability.
PH.COLOGY I (T&P)			
	SLO18/4	General Pharmacology	Understand basic principles of drug action such as routes of administration, and pharmacokinetic concepts of drugs
	SLO19/4	General Pharmacology	Understand the Pharmacodynamic aspects of the drugs, ADRs, Drug Interactions and Drug Discovery
	SLO20/4	Pharmacology of drugs acting on peripheral nervous system	Understand the Organization and function of ANS, role of various neurotransmitters and pharmacology of drugs modulating the ANS.
	SLO21/4	Pharmacology of drugs acting on central nervous system	Understand the neurohumoral transmission in the CNS and pharmacology of anaesthetics, Sedatives, hypnotics, centrally acting muscle relaxants, and Anti-epileptics
	SLO22/4	Pharmacology of drugs acting on central nervous system	Understand the effects of psychopharmacological agents, CNS stimulants and pharmacology of drugs used in the treatment of Parkinson's disease and Alzheimer's disease
	SLO23/4	Practical	Observe the effect of drugs on animals by simulated experiments and correlation with in vivo data
PH.COOG & PHYTO CHE I (T&P)			



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	SLO24/4	Introduction to Pharmacognosy	Learn the definitions, scope, history, classification and evaluation of crude drugs
	SLO25/4	Cultivation and collection	Understand the cultivation techniques and post harvesting techniques.
	SLO26/4	Plant tissue culture	Learn the types of culture and applications.
	SLO27/4	Indigenous systems of medicines	Learn the basic principles and concepts of various systems of AYUSH. Earn the definition and chemical test for secondary metabolites.
	SLO28/4	Plant products	Learn the sources, chemical nature and uses of plant fibers, primary metabolites and marine products.
	SLO29/4	Practical	Learn the Phytochemical screening of primary metabolites, Microscopic evaluation techniques etc.,

B.PHARM (PCI) FOURTH SEMESTER CO AND SLO MAPPING

	CO18	CO19	CO20	CO21	CO22
SLO1/4	X				
SLO2/4	X				
SLO3/4	X				
SLO4/4	X				
SLO5/4	X				
SLO6/4		X			
SLO7/4		X			
SLO8/4		X			
SLO9/4		X			
SLO10/4		X			
SLO11/4		X			
SLO12/4			X		
SLO13/4			X		



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SLO14/4			X		
SLO15/4			X		
SLO16/4			X		
SLO17/4			X		
SLO18/4				X	
SLO19/4				X	
SLO20/4				X	
SLO21/4				X	
SLO22/4				X	
SLO23/4				X	
SLO24/4					X
SLO25/4					X
SLO26/4					X
SLO27/4					X
SLO28/4					X
SLO29/4					X



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SPECIFIC LEARNING OUTCOMES (SLO) SEMESTER V (PCI)			
S.NO	NAME	UNIT/TITLE	SPECIFIC LEARNING OUTCOMES
MEDICINAL CHEMISTRY II (T)			
	SLO1/5	Antihistaminic and anticancer agents	able to understand the classification, mechanism of action, SAR Studies and synthesis of drugs belongs to antihistaminic agents and anticancer agents
	SLO2/5	Antianginal, Diuretics and antihypertensive agents	able to understand the classification, mechanism of action SAR Studies & synthesis of antianginal agent, Diuretics and antihypertensive agents
	SLO3/5	Antiarrhythmic, antihyperlipidemic, coagulants and anticoagulants and drugs used in CHF	able to understand the classification, mechanism of action, SAR Studies and synthesis of drugs belongs to antiarrhythmic agents, antihyperlipidemic agents, coagulants and anticoagulants and drugs acting on CHF
	SLO4/5	Drugs acting on endocrine system, Thyroid and antithyroid agents	gain the knowledge of the drugs acting on endocrine system and thyroid and antithyroid agents
	SLO5/5	Antidiabetic agents and Local anaesthetics	able to understand the classification, mechanism of action SAR Studies & synthesis of antidiabetic agents and Local anaesthetics
INDUSTRIAL PHARMACY I (T&P)			
	SLO6/5	Preformulation Studies	To Study the Physical Properties of Drug, Powder characteristics and Chemical characteristics of drugs
	SLO7/5	Tablets, Tablet coating, Liquid orals	able to understand the formulation, manufacturing techniques and quality control of uncoated, coated tablets, liquid orals & to understand types of coating, tableting and coating problems



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	SLO8/5	Capsules, Pellets	Able to understand the role and significance of excipients in formulations. formulation and quality control of both hard and soft gelatin capsules, pellets
	SLO9/5	Parenteral Products, Ophthalmic Preparations	gain the knowledge about manufacturing, evaluation of injectables and ophthalmics, sterilization procedures, packaging
	SLO10/5	Cosmetics, Pharmaceutical Aerosols, Packaging Materials Science	Able to understand the preparation, filling and evaluation of aerosols, types of packaging materials and their influence on dosage forms
	SLO11/5	Practicals	able to manufacture some dosage forms and perform the quality control tests according to pharmacopoeia
PHARMACOLOGY II (T&P)			
	SLO12/5	drugs acting on CVS	Understand the pharmacodynamics and pharmacokinetics of drugs for CVS and their relevance in various diseases
	SLO13/5	drugs acting on CVS and diuretics	Understand the pharmacodynamics and pharmacokinetics of drugs for CVS and their relevance in various diseases
	SLO14/5	Pharmacology of Autocoids	Understand the pathophysiological role, pharmacodynamics and pharmacokinetics of autocoids and their relevance in various diseases
	SLO15/5	Pharmacology of drugs acting on Endocrine System	know about Pituitary Hormones, Pharmacology of thyroid, Anti- thyroid drugs, Insulin, Oral hypoglycemics and adrenocorticoids
	SLO16/5	Endocrine System and Bioassay Of Some Selective Drugs	understand Principles of Bioethics, and basic principles of biological assays
	SLO17/5	Pharmacology Practical	Able to perform various biological assay, Screening of drugs for analgesic, locomotor, mydriatic, miotic, ciliary movements activities in animals
PH.COGNOSY & PHYTOCHEMISTRY II (T&P)			



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	SLO18/5	Metabolic pathways in higher plants and their determination	able to understand basic metabolic pathways and formation of different secondary metabolites through these pathways and gain knowledge on utilization of radioactive isotopes in the investigation of Biogenetic studies
	SLO19/5	General introduction, composition, chemistry & chemical classes, biosources, therapeutic uses and commercial applications of secondary metabolites:	Gain knowledge on chemistry, biosources, therapeutic uses and commercial applications of secondary metabolites
	SLO20/5	Isolation, Identification and Analysis of Phytoconstituents	knowlegde on Isolation, Identification and Analysis of some terpenoids, glycosides,alkaloids and resins
	SLO21/5	Industrial production, estimation and utilization of the phytoconstituents	able to understand Industrial production, estimation and utilization of some of the phytoconstituents.
	SLO22/5	Basics of Phytochemistry	gain knowledge on Modern methods of extraction, application of latest techniques like Spectroscopy, chromatography and electrophoresis in the isolation, purification and identification of crude drugs.
	SLO23/5	Practicals	able to understand the extraction techniques, isolation, characterization and identification of the herbal drugs and phytoconstituents.
PHARMACEUTICAL JURISPRUDENCE (T)			
	SLO24/5	UNIT I	Understand regulations for import, manufacture, sale, labelling and packing according to drugs and cosmetics act 1940



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	SLO25/5	UNIT II	knowledge on administration bodies and schedules of drugs and cosmetics act 1940.
	SLO26/5	UNIT III	gain knowledge regarding Pharmacy Act, Medicinal and toilet preparation act, Narcotic drugs and psychotropic substances act
	SLO27/5	UNIT IV	gain knowledge regarding drug and magic remedies act, prevention of cruelty to animals act, national pharmaceutical pricing authority.
	SLO28/5	UNIT V	gain knowledge on pharmaceutical legislations, pharmaceutical ethics, pregnancy act, right to information act, intellectual property rights.

B.PHARM (CBCS) FIFTH SEMESTER CO AND SLO MAPPING

	CO23	CO24	CO25	CO26	CO27
SLO1/5	X				
SLO2/5	X				
SLO3/5	X				
SLO4/5	X				
SLO5/5	X				
SLO6/5	X				
SLO7/5		X			
SLO8/5		X			



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SLO9/5		X			
SLO10/5		X			
SLO11/5		X			
SLO12/5		X			
SLO13/5			X		
SLO14/5			X		
SLO15/5			X		
SLO16/5			X		
SLO17/5			X		
SLO18/5				X	
SLO19/5				X	
SLO20/5				X	
SLO21/5				X	
SLO22/5				X	
SLO23/5				X	
SLO24/5					X
SLO25/5					X
SLO26/5					X
SLO27/5					X
SLO28/5					X



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SEMESTER VI (PCI)		
NAME	UNIT/TITLE	SPECIFIC LEARNING OUTCOMES
MEDICINAL CHEMISTRY III (T&P)		
SLO1/6	Antibiotics	Able to understand the history, background Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the β -Lactam antibiotics, Aminoglycosides and Tetracycline.
SLO2/6	Antibiotics, prodrugs and anti malarial agents	Historical background, Nomenclature, Stereochemistry, Structure activity relationship, Chemical degradation classification and important products of the Macrolide, Miscellaneous, Prodrugs Antimalarials
SLO3/6	Anti-tubercular Agents, UTI agents and Antiviral agents	Able to understand synthetic classification, mechanism of action, SAR and synthesis of some prescribed drugs
SLO4/6	Antifungal agents, Anti-protozoal Agents, Anthelmintic and Sulphonamides and Sulfones	Students should be able to understand synthetic classification, mechanism of action, SAR and synthesis of some prescribed drugs
SLO5/6	Introduction to Drug Design	Able to understand Various approaches used in drug design, various Physicochemical parameters used in quantitative structure activity relationship (QSAR), concept and applications of combinatorial chemistry
SLO6/6	Practical	Preparation of some drugs and intermediates, Assay of prescribed drugs, preparation of medicinally important compounds or intermediates by Microwave irradiation technique and Drawing structures and reactions using chemdraw



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PH.COLOGY III (T&P)		
SLO7/6	Pharmacology of drugs acting on Respiratory system	Understand the mechanism of drug action and its relevance in the treatment of Asthma, COPD, Cough and Nasal congestion.
SLO8/6	Pharmacology of drugs acting on Gastrointestinal system	Students should be able to understand the mechanism of drug action and its relevance in the treatment of Peptic Ulcer, constipation, diarrhoea and Vomiting.
SLO9/6	Chemotherapy	Able to understand the concepts of principles of chemotherapy, Pharmacological aspects of Sulfonamides and cotrimoxazole and different types of Antibiotics and resistance developed by microorganisms.
SLO10/6	Chemotherapy	Understand Pharmacological aspects of Antitubercular agents, Antileprotic agents, Antifungal agents, Antiviral drugs, Anthelmintics, Antimalarial drugs and Antiamoebic agents.
SLO11/6	Chemotherapy and Immunopharmacology	Students should be able to understand the pharmacological role of Urinary tract infections and sexually transmitted diseases, principles of Chemotherapy of malignancy and concepts of immunopharmacology, monoclonal antibodies, target drugs to antigen, biosimilars.
SLO12/6	Principles of toxicology and Chronopharmacology	Students should be able to comprehend the principles of toxicology and treatment of various poisonings and importance of biological clock and their significance in chronotherapy.
HERBAL DRUG TECHNOLOGY (T&P)		
SLO13/6	Herbs as raw materials; Biodynamic Agriculture; Indian system of Medicine	Students will understand the agricultural practices. Learn the principles and concepts of traditional systems of medicine like Ayurveda, Unani and Sidha etc.,
SLO14/6	Nutraceuticals; Herbal-Drug and Herb-Food Interaction	Learn the advantages of Nutraceuticals in management of chronic diseases and applications of nutraceuticals. Understand the Interaction of Herbs on drugs and foods.
SLO15/6	Herbal Cosmetics ;Herbal excipients: Herbal	Understand the process of manufacturing of formulations and cosmetics and role of excipients and their applications in manufacturing process of drugs.



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	formulations	
SLO16/6	Evaluation of Drug; Patenting and Regulatory requirements of natural product; Regulatory Issues	Learn the regulatory aspects of AYUSH drugs manufacturing. Understand the importance and precepts of patent system and standardization of natural drugs.
SLO17/6	General Introduction to Herbal Industry; Schedule T	Understand the scope and prospects of Herbal Industry. Regulatory aspects of Herbal Industry and GMP of Herbal Industry
SLO18/6	PRACTICALS	able to practically do phytochemical screening and determination of phytochemical constituents
BIOPHARMACEUTICS & PHARMACOKINETICS (T)		
SLO19/6	UNIT I	To understand the GI Absorption Mechanisms and factors affecting the absorption, Distribution of drugs and factors affecting the distribution, apparent volume of distribution and protein binding of drugs
SLO20/6	UNIT II	To understand the Drug Metabolic Pathways, Renal Excretion of Drugs and factors affecting Renal Excretion, Renal Clearance, Non Renal excretion. To understand the Bioavailability measurement, Dissolution studies, methods to enhance the dissolution rates and bioavailability of poorly soluble drugs, In-Vitro In-Vivo Correlations, and Bioequivalence studies.
SLO21/6	UNIT III	To understand the different Pharmacokinetic Models, Application of One compartment open model to different routes of administration and estimation of different pharmacokinetic parameters
SLO22/6	UNIT IV	To understand the Two compartment open model IV Bolus, Kinetics of Multiple Dosing, steady state drug concentration, calculation of loading and maintenance doses and their significance.



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SLO23/6	UNIT V	To understand the concept of Non Linear Pharmacokinetics, causes of non linearity, Michaelis-Menton Equation and estimation of Km and Vmax parameters
PHARMACEUTICAL BIOTECHNOLOGY (T)		
SLO24/6	UNIT I	Introduction of various fields of Biotechnology like Immobilization, Protein Engineering, Biosensors and Enzyme Biotechnology.
SLO25/6	UNIT II	To Understand the basics of Genetic engineering in the field of Biotechnology
SLO26/6	UNIT III	To Understand the application of Genetic engineering in the field of Vaccine production and basics of Human Immunology
SLO27/6	UNIT IV	To Learn the principles and Procedures of various Diagnostic tests and Microbial Biotransformation and their Pharmaceutical applications.
SLO28/6	UNIT V	To Study the methods and applications of Fermentation Technology in the production of various Pharmaceutical products
QUALITY ASSURANCE (T)		
SLO29/6	UNIT I	To gain knowledge about TQM of Pharma Industry, Significance of ICH guidelines, ISO, QbD, NABL and protocol to get them.
SLO30/6	UNIT II	To understand different departments of Pharma industry starting from construction to functioning in proper manner as per guidelines of regulatory bodies.
SLO31/6	UNIT III	To get knowledge about analysis of packing materials and all details of GLP
SLO32/6	UNIT IV	To learn the complaint procedures of pharma products, recalling drugs n drug products, related record maintenance.
SLO33/6	UNIT V	To know the importance of calibration of instruments & equipments, procedure of calibration of few instruments.



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B.PHARM (CBCS) SIXTH SEMESTER CO AND SLO MAPPING

	CO28	CO29	CO30	CO31	CO32	CO33
SLO1/6	X					
SLO2/6	X					
SLO3/6	X					
SLO4/6	X					
SLO5/6	X					
SLO6/6	X					
SLO7/6		X				
SLO8/6		X				
SLO9/6		X				
SLO10/6		X				
SLO11/6		X				
SLO12/6		X				
SLO13/6			X			
SLO14/6			X			
SLO15/6			X			
SLO16/6			X			
SLO17/6			X			



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SLO18/6			X			
SLO19/6				X		
SLO20/6				X		
SLO21/6				X		
SLO22/6				X		
SLO23/6				X		
SLO24/6					X	
SLO25/6					X	
SLO26/6					X	
SLO27/6					X	
SLO28/6					X	
SLO29/6						X
SLO30/6						X
SLO31/6						X
SLO32/6						X
SLO33/6						X



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SPECIFIC LEARNING OUTCOMES (SLO)			
SEMESTER VII (PCI)			
S.NO	NAME	UNIT/TITLE	SPECIFIC LEARNING OUTCOMES
INSTRUMENTAL METHODS OF ANALYSIS (T&P)			
	SLO1/7	Unit-I	Student's ability to gain knowledge on instrumentation, principles, procedures of UV-Visible and Fluorimetry spectroscopic techniques and their applications in pharmaceutical industry.
	SLO2/7	Unit-II	Students ability to gain knowledge on instrumentation, principles, procedures IR spectroscopic techniques, flame photometry, nepheloturbidometry and Atomic absorption spectroscopy and their applications in pharmaceutical industry.
	SLO3/7	Unit-III	Gain knowledge on chromatographic techniques for qualitative and quantitative analysis of pharmaceutical compounds. Students also their applications in pharmaceutical industry.
	SLO4/7	Unit-IV	To understand the instrumentation, principles, procedures of Gas chromatography and HPLC chromatographic techniques for qualitative and quantitative analysis of pharmaceutical compounds. Students also learn their applications in pharmaceutical industry.
	SLO5/7	Unit-V	To learn the instrumentation, principles, procedures of Ion exchange chromatography, gel chromatography and Affinity chromatography techniques for qualitative and quantitative analysis of pharmaceutical compounds.
	SLO6/7	Practical	Gain knowledge by Perform quantitative & qualitative analysis of drugs using various analytical instruments like estimation of drugs, assay of drugs and determination of ions, chromatographic separation and analysis of drugs by paper and TLC. Demonstration of GC and HPLC.



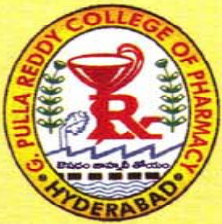
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INDUSTRIAL PHARMACY II (T)			
	SLO7/7	Unit-I	Pilot plant scale up techniques, General and significance of personnel requirements, Pilot plant and scaleup for solids, Liquid orals and Parenterals, SUPAC guidelines
	SLO8/7	Unit-II	Technology Development and Transfer (TT) as per WHO Guidelines, Approved regulatory bodies and agencies, TT Agencies.
	SLO9/7	Unit-III	Roles and responsibilities of Regulatory affairs department and Professionals; Regulatory requirements for drug approval (IND, NDA, ANDA)
	SLO10/7	Unit-IV	Quality management systems, Quality by Design (QbD), Introduction to ISO 9000 series of quality systems standards, ISO 14000, NABL, GLP
	SLO11/7	Unit-V	Indian Regulatory Requirements (CDSCO) and State Licensing Authority Regulatory requirements and approval procedures for New Drugs
PHARMACY PRACTICE (T)			
	SLO12/7	Unit 1	To learn hospital, hospital pharmacy and its organization. To understand ADR , drug interactions and working of community pharmacy
	SLO13/7	Unit 2	To understand drug distribution and hospital formulary system. To understand the need of medication history interview ,TDM and medication adherence
	SLO14/7	Unit 3	To understand the policies of drug information center, DTC and provision of patient counseling. To learn role of pharmacist in the education and training program & need for communication skills
	SLO15/7	Unit 4	To understand the role of clinical pharmacy program, hospital budget preparation and importance of learning OTC medication counseling
	SLO16/7	Unit 5	To learn the concepts of inventory management, investigational drugs and interpretation of laboratory tests



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NOVEL DRUG DELIVERY SYSTEM (T)			
	SLO17/7	Unit-I	Introduction Controlled drug delivery systems; Physicochemical and biological properties of drugs relevant to controlled release formulations; Application of polymers in formulation of controlled release drug delivery systems.
	SLO18/7	Unit-II	Microencapsulation, Mucosal Drug delivery systems, Implantable Drug Delivery Systems- advantages and disadvantages
	SLO19/7	Unit-III	Transdermal Drug Delivery Systems, Gastroretentive drug delivery systems, Nasopulmonary drug delivery system- formulation approaches
	SLO20/7	Unit-IV	Targeted drug Delivery: Concepts and approaches advantages and disadvantages of liposomes, niosomes, nanoparticles, monoclonal antibodies and their applications
	SLO21/7	Unit-V	Ocular Drug Delivery Systems- ocular formulations and Intrauterine Drug Delivery Systems- development and applications
PRACTICE SCHOOL			
	SLO22/7	I	Able to apply the knowledge gained in isolation, identification, standardization, formulation, manufacturing & evaluation of pharmaceuticals.

B.PHARM (CBCS) SEVENTH SEMESTER CO AND SLO MAPPING					
	CO34	CO35	CO36	CO37	CO38
SLO1/7	X				
SLO2/7	X				
SLO3/7	X				
SLO4/7	X				



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SLO5/7	X				
SLO6/7	X				
SLO7/7		X			
SLO8/7		X			
SLO9/7		X			
SLO10/7		X			
SLO11/7		X			
SLO12/7			X		
SLO13/7			X		
SLO14/7			X		
SLO15/7			X		
SLO16/7			X		
SLO17/7				X	
SLO18/7				X	
SLO19/7				X	
SLO20/7				X	
SLO21/7				X	
SLO22/7					X



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SPECIFIC LEARNING OUTCOMES (SLO)			
SEMESTER VIII (PCI)			
S.NO	NAME	UNIT/TITLE	SPECIFIC LEARNING OUTCOMES
BIOSTATISTICS & RESEARCH METHODOLOGY			
	SLO1/8	UNIT I	know the basic concepts of statistics like frequency distribution, measures of dispersion and central tendency, correlation and their application statistical analysis of data
	SLO2/8	UNIT II	Understand the application of probability, regression and use of parametric tests in statistical interpretation of data
	SLO3/8	UNIT III	Understand the application of non-parametric tests in statistical interpretation of data. Know graphical representation of data. Also learn need and designs used in research.
	SLO4/8	UNIT IV	Understand the regression modeling. Learn various statistical tools and software's
	SLO5/8	UNIT V	Learn about design and analysis of experiments
SOCIAL & PREVENTIVE PHARMACY			
	SLO6/8	UNIT I	understand the concept of health, social health, socio cultural factors, personal hygiene and prevention of disease
	SLO7/8	UNIT II	gain knowledge on prevention and control of specific diseases
	SLO8/8	UNIT III	understand national health programs, its objectives, functioning and outcomes with regard to specific diseases
	SLO9/8	UNIT IV	understand national programmes for family welfare, tobacco control etc and WHO role in national program



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	SLO10/8	UNIT V	gain knowledge on community services, functions of primary health centres, education in school.
PHARMA MARKETING MANAGEMENT			
	SLO11/8	UNIT I	Distinguish between marketing and selling. Analyse consumer buying behavior and industrial buying behavior, qualitative and quantitative aspects of market.
	SLO12/8	UNIT II	Able to analyze product portfolio, take decisions on product branding, packing, and labeling.
	SLO13/8	UNIT III	Plan promotion techniques for OTC drugs.
	SLO14/8	UNIT IV	Design and select appropriate marketing channels. Summarize the duties of personal sales representative, their selection, training, supervising, motivating, evaluating etc.,
	SLO15/8	UNIT V	Explain the concepts of pricing, Vertical and horizontal marketing, rural marketing, Industrial and global marketing.
PHARMACEUTICAL REGULATORY SCIENCE			
	SLO16/8	UNIT I	gain knowledge on steps for drug discovery, drug development, generic drug product development
	SLO17/8	UNIT II	able to understand regulatory approval process for new drug and generic drug and different regulators in world
	SLO18/8	UNIT III	Knowledge on procedures for registration of Indian drug products in overseas market, CTD.
	SLO19/8	UNIT IV	Knowledge on developing clinical trial protocols, ethics committee, monitoring clinical trials and pharmacovigilance



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	SLO20/8	UNIT V	knowledge on terminology in regulatory concepts, orange book, code of federal regulatory etc.
PHARMACOVIGILANCE			
	SLO21/8	UNIT I	Understand history, definitions, detection, management, analysis, reporting and regulatory terminologies of pharmacovigilance
	SLO22/8	UNIT II	Know about standard dictionaries and resources used for classification of diseases, coding of ADR'S, establishing pharmacovigilance programs
	SLO23/8	UNIT III	Know the methods of pharmacovigilance and safety surveillance of vaccines
	SLO24/8	UNIT IV	Understand how to generate and report safety data, ICH guidelines and GCP requirements of pharmacovigilance
	SLO25/8	UNIT V	Know the effect of genetics and physiological variation on ADR'S , global reporting organizations, Indian and global regulatory requirements of pharmacovigilance
QUALITY CONTROL AND STANDARDIZATION OF HERBALS			
	SLO26/8	UNIT I	know the WHO guidelines for quality control of herbal drugs, Evaluation of commercial crude drugs, basic tests for drugs – Pharmaceutical substances, Medicinal plants materials and dosage forms
	SLO27/8	UNIT II	able to understand quality assurance in herbal drug industry of cGMP, GAP, GMP and GLP in traditional system of medicine, WHO Guidelines on current good manufacturing Practices (cGMP) for Herbal Medicines and WHO Guidelines on GACP for Medicinal Plants.



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	SLO28/8	UNIT III	Know the EU and ICH guidelines for quality control of herbal drugs.
	SLO29/8	UNIT IV	Able to understand Stability testing of herbal medicines, application of various chromatographic techniques in standardization of herbal products, Preparation of documents for new drug application and export registration GMP requirements and Drugs & Cosmetics Act provisions.
	SLO30/8	UNIT V	able to understand the Regulatory requirements for herbal medicines. WHO guidelines on safety monitoring of herbal medicines in pharmacovigilance systems Comparison of various Herbal Pharmacopoeias. Role of chemical and biological markers in standardization of herbal products
COMPUTER AIDED DRUG DESIGN			
	SLO31/8	UNIT I	able to explain about various stages of drug discovery and development and approaches to lead discovery and analog design.
	SLO32/8	UNIT II	differentiate between SAR and QSAR, determine physico chemical parameters using Hansch analysis, free wilson method, COMFA, COMSIA.
	SLO33/8	UNIT III	Apply the concept of docking and pharmacophore mapping. Able to calculate docking/binding score of designed molecules.
	SLO34/8	UNIT IV	Able to apply cheminformatics, bioinformatics on the designed molecules.
	SLO35/8	UNIT V	Discuss about various energy minimisation techniques.
CELL AND MOLECULAR BIOLOGY			
	SLO36/8	UNIT I	know about different cellular types, cellular reproduction and reactions
	SLO37/8	UNIT II	learn about cellular genetic material and its functions
	SLO38/8	UNIT III	learn about structure, regulation of synthesis and functions of proteins



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	SLO39/8	UNIT IV	learn about mechanisms of cell division and its regulation
	SLO40/8	UNIT V	understand about communication between cells via signals and missignalling
COSMETIC SCIENCE			
	SLO41/8	UNIT I	Knowledge of skin structure, regulatory provisions and raw materials used in cosmetic preparations.
	SLO42/8	UNIT II	Knowledge of cosmetic preparations used for face, skin, tooth & hair. Their formulation, preparation and evaluation.
	SLO43/8	UNIT III	Knowledge of herbs for skin, hair & oral care. analytical cosmetics
	SLO44/8	UNIT IV	Knowledge of cosmetic evaluation principles.
	SLO45/8	UNIT V	Knowledge of cosmetic problems of skin, hair and body.
PHARMACOLOGICAL SCREENING METHODS			
	SLO46/8	UNIT I	Learn and able to breed and maintain animals as per regulatory guidelines. know the applications of various commonly used laboratory animals
	SLO47/8	UNIT II	Learn, able to design and screen for pharmacological activity of drugs acting on ANS
	SLO48/8	UNIT III	Learn, able to design and screen for pharmacological activity of drugs acting on CNS
	SLO49/8	UNIT IV	Learn, able to design and screen for pharmacological activity of drugs acting on CVS
	SLO50/8	UNIT V	Understand the importance of biostatistics and research methodology. able to design and execute a research hypothesis independently



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ADVANCED INSTRUMENTATION TECHNIQUES			
	SLO51/8	UNIT I	Interpret NMR and Mass spectras of unknown drugs.
	SLO52/8	UNIT II	Differentiate and compare between DTA, DSC and TGA. Explain the concept of x-ray diffraction methods.
	SLO53/8	UNIT III	Able to calibrate and validate UV- Visible Spectrometer, IR Spectrometer, Flame photometer, Fluorimeter, HPLC,GC.
	SLO54/8	UNIT IV	Discuss the concepts of Radio immuno assays and extraction techniques.
	SLO55/8	UNIT V	Explain the Hyphenated techniques of LC-MS,GC-MS,HPTLC-MS.
DIETARY SUPPLEMENTS AND NUTRACEUTICALS			
	SLO56/8	UNIT I	Gain knowledge on chemical nature, Medicinal uses and health benefits of nutraceuticals/functional foods , understand the need of supplements by the different group of people to maintain healthy life
	SLO57/8	UNIT II	Know the chemical nature and medicinal benefits of some Phytochemicals as nutraceuticals
	SLO58/8	UNIT III	Able to understand the damaging reactions of free radicals on lipids, proteins, Carbohydrates, nucleic acids , gain knowledge on Dietary fibres and complex carbohydrates as functional food ingredients
	SLO59/8	UNIT IV	Able to understand the involvement of free radicals in various disorders, gain knowledge on antioxidants and Functional foods for chronic disease prevention
	SLO60/8	UNIT V	Able to understand the Effect of processing, storage and interactions of various environmental factors on the potential of nutraceuticals, Regulatory



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			Aspects; FSSAI, FDA, FPO, MPO, AGMARK. HACCP and GMPs on Food Safety, Pharmacopoeial Specifications for dietary supplements and nutraceuticals.
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B.PHARM (CBCS) EIGHTH SEMESTER CO AND SLO MAPPING												
	CO39	CO40	CO41	CO42	CO43	CO44	CO45	CO46	CO47	CO48	CO49	CO50
SLO1/8	X											
SLO2/8	X											
SLO3/8	X											
SLO4/8	X											
SLO5/8	X											
SLO6/8		X										
SLO7/8		X										
SLO8/8		X										
SLO9/8		X										
SLO10/8		X										
SLO11/8			X									
SLO12/8			X									
SLO13/8			X									
SLO14/8			X									



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SLO35/8							X					
SLO36/8								X				
SLO37/8								X				
SLO38/8								X				
SLO39/8								X				
SLO40/8								X				
SLO41/8									X			
SLO42/8									X			
SLO43/8									X			
SLO44/8									X			
SLO45/8									X			
SLO46/8										X		
SLO47/8										X		
SLO48/8										X		
SLO49/8										X		
SLO50/8										X		
SLO51/8											X	
SLO52/8											X	
SLO53/8											X	
SLO54/8											X	



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SLO55/8												X	
SLO56/8													X
SLO57/8													X
SLO58/8													X
SLO59/8													X
SLO60/8													X