



G. Pulla Reddy College of Pharmacy

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2.6.1. The Institution has stated the learning outcomes (generic and programme-specific) and graduate attributes as per the provisions of the Regulatory bodies and the University; which are communicated to the students and teachers through the website and other documents

Provide details of the stated learning outcomes for each programme / course as stipulated by the appropriate Regulatory bodies and the University and the methods followed by the Institution for assessment of the same within 500 words.

Provide Weblink to: Relevant documents pertaining to learning outcomes and graduate attributes

- Methods of the assessment of learning outcomes and graduate attributes
- Upload Course Outcomes for all courses (exemplars from Glossary)

Any other relevant information

PROGRAM OUTCOMES- PHARM. D

PO1	Understand the basics of biology, structure and function of various systems of human body, basic organic chemistry, preparation of different dosage forms, monographs of inorganic drugs, metabolic process of bio molecules, and problems solving in pharmacy.
PO2	Able to understand the pathophysiology, diagnosis, pharmacology of drugs and pharmacotherapy of diseases, pharmaceutical applications of microbiology, source, active constituents and uses of crude drugs, and healthcare services to the patients through community pharmacy services.
PO3	Able to understand the mechanism, SAR and synthesis of medicinal compounds, analysis of drugs by various instrumentation techniques. Design & formulation of dosage forms, understand the legislation regarding manufacture, sale and distribution of drugs & cosmetics and other laws relating to pharmacy and pharmacotherapy of diseases.
PO4	Gain the knowledge on principles and application of biopharmaceutics & pharmacokinetics in the treatment of various disease conditions. To understand the basic principles of statistics and apply in various research outcomes with respect to treatment of toxicological effects. To learn, understand and provide health care services to the patients through clinical and hospital pharmacy services.



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PO5	To understand the principles and methods of pharmaco-epidemiology pharmaco-economics, application of pharmacokinetics principles to various disease conditions for better treatment outcome. To understand the various regulatory guidelines to develop & obtain approvals for drugs.
PO6	To gain experience in clinical services in various departments of the hospital.

COURSE OUTCOMES

Course Outcomes PCI (SEM I,II,III,IV) CBCS (SEM V,VI,VII,VIII)			
S.No	Name	Subject name	Course outcomes
PHARMD I YEAR			
1	CO1	Human Anatomy and Physiology (T&P)	Describe the structure (gross and histology) and functions of various organs of the human body; To perform the hematological tests and also record blood pressure, heart rate, pulse and respiratory volumes; to appreciate coordinated working pattern of different organs of each system. Describe the structure (gross and histology) and functions of various organs of the human body; To perform the hematological tests and also record blood pressure, heart rate, pulse and respiratory volumes; to appreciate coordinated working pattern of different organs of each system.
2	CO2	Pharmaceutics (T&P)	Students should be able to understand the formulation aspects of different dosage forms; Do different pharmaceutical calculation and formulate different types of dosage forms



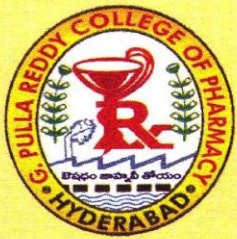
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3	CO3	Medicinal Biochemistry (T&P)	Able to understand basic cellular functions, concepts of enzyme, biological oxidation, metabolism of carbohydrates, proteins, fatty acids, nucleotides & their abnormalities, transcription, translation, mutations, importance of clinical chemistry & able to perform qualitative & quantitative analysis of various clinical chemistry parameters
4	CO4	Pharmaceutical Organic Chemistry (T&P)	Able to understand IUPAC system, Physical properties of organic compounds, Organic reaction synthesis and mechanisms, Qualitative analysis of different compounds, Purity and medicinal uses of some important medicinal compounds.
5	CO5	Pharmaceutical Inorganic Chemistry (T&P)	Understand the fundamentals of analytical chemistry, principles and procedures of analysis of drugs, monographs of inorganic pharmaceuticals, importance of inorganic pharmaceuticals in preventing and curing the disease.
6	CO6	Remedial Mathematics	Able to Know Trigonometry, Analytical geometry, Matrices, Determinant, Integration, Differential equation, Laplace transform and their applications in pharmacy
7	CO7	Remedial Biology (T&P)	Understand the various naturally occurring drugs and its history, sources, classification, distribution and the characters of the plants and animals
PHARMD II YEAR			
8	CO8	Pathophysiology	Understand the etiology, signs and symptoms, and pathogenesis and complications of the selected disease states
9	CO9	Pharmaceutical 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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10	CO10	Pharmacognosy & Phytopharmaceuticals (T&P)	Understand the scope of pharmacognosy for various purposes and the basic principles of cultivation, collection, storage and to evaluate adulteration of crude drugs.
11	CO11	Pharmacology-I	Upon completion of the course students shall be able to understand basic principles of drug action, pharmacology of drugs for different diseases and correlate and apply knowledge therapeutically.
12	CO12	Community Pharmacy	Understand the handling of prescriptions, manage the community pharmacies, deliver the pharmaceutical care services, health education and rational drug therapy
13	CO13	Pharmacotherapeutics-I (T&P)	To understand pathophysiology, diagnosis, pharmacotherapy, monitoring and non pharmacological treatment of various disease conditions. To analyse various blood indices and cardiac tests in lab
PHARMD III YEAR			
14	CO14	Pharmacology-II (T&P)	Understand the pharmacological aspects of drugs and carry out the animal experiments confidently
15	CO15	Pharmaceutical Analysis (T&P)	Able to understand fundamentals of analytical chemistry, understand the importance of analysis in pharmaceutical industry, develop basic practical skills using instrumentals techniques and understand the knowledge about assay of pharmaceutical substance and Understand the basic principles of electrochemical analytical techniques
16	CO16	Pharmacotherapeutics-II (T&P)	Understand the etiopathogenesis, clinical presentations, therapeutic approach to management of the diseases based on diagnosis and monitoring therapy
17	CO17	Pharmaceutical Jurisprudence	Gain the knowledge of practice of professional ethics, Pharmaceutical Legislation of India, Drugs and Cosmetic Act and Rules, Drug Policy, Patent and Design Act, Labelling and Packaging requirements of drugs and cosmetics, Pharmacy Act, Excise duties act,



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			Narcotic Drugs and Psychotropic Substances Act, Prevention of Food Adultration Act, Factories Act, PCI rules and International rules.
18	CO18	Medicinal Chemistry (T&P)	To gain the knowledge in the medicinal chemistry of various classes of drugs , structures, mechanism of actions , understand the SAR and perform drugs and intermediate synthesis and analysis
19	CO19	Pharmaceutical Formulations (T&P)	To understand the principles involved in formulation of various pharmaceutical dosage forms; Preparation of various pharmaceutical formulations; Evaluation of pharmaceutical dosage forms; and Concept of bioavailability and bioequivalence, their role in clinical situations.
PHARMD IV YEAR			
20	CO20	Pharmacotherapeutics-III (T&P)	Understand the etiopathogenesis, clinical presentations, therapeutic approach to management of the diseases based on diagnosis and monitoring therapy
21	CO21	Hospital Pharmacy (T&P)	understand the concept of pharmaceutical care services, business and professional practice management skills, management of storing and provide appropriate medication and radio pharmaceuticals and also inventory control
22	CO22	Clinical Pharmacy (T&P)	Understand and learn clinical pharmacy skills including medication history interview, patient counselling, medication chart review, identification of DRPs, responding to DIQs and ADR assessment, monitoring and reporting
23	CO23	Biostatistics & Research Methodology	Upon completion of the course students shall able understand basic concept in research methodology and able to analyse the data by using suitable bio statistical test.
24	CO24	Biopharmaceutics & Pharmacokinetics (T&P)	Upon completion of course the students shall be able to understand the principles of drug absorption, distribution, elimination & able to determine bioavailability, bioequivalence, pharmacokinetic parameters using one, two, non compartmental, non linear models & in



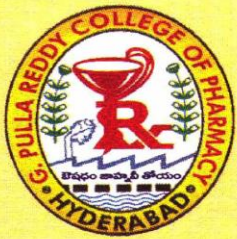
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			multiple dosage regimens
25	CO25	Clinical Toxicology	Understand general principles of management, sources, toxic dose levels, clinical symptoms, diagnosis and treatment acute & chronic poisoning with various poisonous substances
PHARMD V YEAR			
26	CO26	Clinical Research	Able to understand clinical trial protocols and regulatory guidelines for drug approval process
27	CO27	Pharmacoepidemiology and Pharmacoeconomics	Able to understand pharmacoepidemiology of various disease conditions and understand the concepts of pharmacoeconomics.
28	CO28	Clinical Pharmacokinetics & Pharmacotherapeutic Drug Monitoring	Able to understand the principles and concepts of clinical pharmacokinetics and pharmacotherapeutic drug monitoring
29	CO29	Clerkship & Projectwork	Able to understand the clinical pharmacy services and pharmacotherapy of various diseases and perform a research project
30	CO30	Internship	To perform a clinical pharmacy related services in various departments of hospital



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PHARM D PROGRAM OUTCOME AND COURSE OUTCOME MAP

PHARM D PROGRAM OUTCOME AND COURSE OUTCOME MAP

	PO1	PO2	PO3	PO4	PO5	PO6
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			
CO18			x			
CO19			x			
CO20				x		
CO21				x		
CO22				x		



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CO23				X		
CO24				X		
CO25				X		
CO26					X	
CO27					X	
CO28					X	
CO29						X

SPECIFIC LEARNING OUTCOMES (SLO)- Pharm D I Year

Sub. Code	NAME	UNIT/TITLE	SPECIFIC LEARNING OUTCOMES
1.1 Human Anatomy and Physiology (T&P)			
	SLO1/1	Introduction,	<ul style="list-style-type: none"> Understand the basic terminology involved in the study of Anatomy and Physiology Define cytology and have an understanding cell activity, structure and reproduction Define, classify and understand locations and functions of different types of tissues
	SLO2/1	The Structure of cell – its components and their functions,	<ul style="list-style-type: none"> Describe the general structure of a bone and list the functions of its parts. Locate and identify the bones and the major features of the bones that comprise the skull, vertebral column, thoracic cage, pectoral girdle, upper limb, pelvic girdle, and lower limb.



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			<ul style="list-style-type: none"> List types of joints, describe their characteristics, and name an example of each. Components of blood, development of blood cells and Review the major steps in blood coagulation, blood typing and how it is used to avoid adverse reactions following blood transfusions.
	SLO3/1	The Elementary tissues of the human body,	<ul style="list-style-type: none"> Name and describe the organs and functions of lymphatics system and understand its role in immunity Name and describe the location of the major parts of the Cardiovascular system and discuss the function of each part, Discuss the cardiac cycle, parts of a normal ECG pattern, structures and functions of the major types of blood vessels, how BP is regulated Name and describe the location of the organs and general functions of the respiratory system of the respiratory system, Explain how oxygen and carbon dioxide are transported in the blood.
	SLO4/1		<ul style="list-style-type: none"> Name and describe the organs and functions of lymphatics system, Nervous system, the urinary system, GFR and how this rate is regulated, role of tubular reabsorption in the formation of urine, tubular secretion and explain its role in urine formation.
	SLO5/1	The Osseous system	<ul style="list-style-type: none"> Name and describe the organs and functions of the endocrine system, reproductive system, understand pregnancy and parturition Name and describe the organs and functions of the eye, ear, nose, tongue and skin, skeletal muscles Understand the effect of sports and physical activity on all organ systems
	SLO6/1	The Joints	Perform study of various organ systems, tests to evaluate and assess Blood parameters, BP, Pulse, study of bones
1.2 Pharmaceutics (T&P) - The Skeletal muscles & Sports physiology			



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	SLO7/1	History and development; introduction to dosage forms prescription and posology	Obtain knowledge of history and development of pharmacy profession and pharmacopoeias, definition and classification of dosage forms, prescription handling and should be able to calculate the doses for children and infants considering various factors
	SLO8/1	Pharmaceutical calculations; Powders and Granules	Should be able to perform various calculations related to dosage forms; obtain the knowledge of formulation aspects involved in preparation of various powders and granules
	SLO9/1	Monophasic and biphasic liquid dosage forms	Gain knowledge of formulation aspects involved in preparation of monophasic and biphasic dosage forms, their stability and evaluation
	SLO10/1	Suppositories, pessaries and Galenicals	Gain Knowledge of preparation and evaluation of suppositories and pessaries and calculation of displacement value; learn procedures for different extraction processes and methods of preparation for spirits, tinctures and extracts
	SLO11/1	Surgical aids and incompatibilities	Gain knowledge and role of different types of surgical dressings, sutures and ligatures; able to identify incompatibilities in prescription and overcome the incompatibilities
	SLO12/1	Practicals	Learn the art and science of formulating different dosage forms applying the basic knowledge learned in theory; Identify the type of incompatibility and provide remedies for the same;
1.3 Medicinal Biochemistry (T&P)			
	SLO13/1	Introduction to biochemistry	Understand the cellular organization, functions of cell organelles, transport across cell membrane, body water, physiological buffers, high energy molecules, oxidative phosphorylation
	SLO14/1	Enzymes	Understand the principles of enzymatic catalysis, kinetics, inhibition, their diagnostic importance, isoenzymes
	SLO15/1	Metabolism of biomolecules	Understand the concepts of carbohydrate, protein, fatty acid, nucleotide metabolism



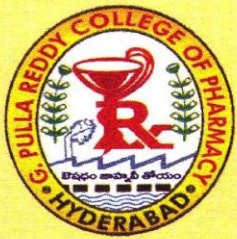
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			& their associated abnormalities
	SLO16/1	Protein synthesis	Understand genetic code, mechanisms of DNA replication, mutations, DNA repair, transcription & translation
	SLO17/1	Clinical chemistry	Understand importance, basic principles involved in clinical chemistry tests such as liver function, kidney function tests
	SLO18/1	Practical	Able to perform qualitative analysis of urine for normal, abnormal constituents, quantitative analysis of serum glucose, electrolytes, other biochemical parameters, determine effect of temperature and pH on activity of enzyme, to prepare buffers and measure pH
1.4 Pharmaceutical Organic Chemistry (T&P)			
	SLO19/1	Structure and Physical Properties	Some important physical properties of organic compounds
	SLO20/1	Nomenclature of different compounds	IUPAC/Common system of nomenclature of simple organic compounds belonging to different classes of organic compounds
	SLO21/1	Different substitution, addition and elimination reactions	Free radical/ nucleophilic [alkyl/ acyl/ aryl] /electrophilic substitution, free radical/ nucleophilic / electrophilic addition, elimination, oxidation and reduction reactions with mechanism, orientation of the reaction, order of reactivity, stability of compounds;
	SLO22/1	Named reactions	Some named organic reactions with mechanisms
	SLO23/1	Medicinal compounds	Methods of preparation, test for purity, principle involved in the assay, important medicinal uses of some important organic compounds
	SLO24/1	Practical	Able to setup the refluxing and distillation setups, synthesis of different compounds and to perform qualitative analysis of different compounds.
1.5 Pharmaceutical Inorganic Chemistry (T&P)			
	SLO25/1	Errors, volumetric analysis	Able to understand the basics of analytical chemistry
	SLO26/1	Limit tests, essential trace	Gain knowledge of sources of impurities and methods to determine the impurities in



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		elements	inorganic drugs; Gain knowledge of essential trace elements
	SLO27/1	Acid-base titrations, redox titration, complexometric titration, non aqueous titrations, Precipitation titration, gravimetry	Able to understand basic principles and applications of various titrations
	SLO28/1	Acidifiers, antacids and cathartics, Pharmaceutical aids, electrolyte replenishers, antimicrobials, dental products, miscellaneous compounds	Gain knowledge of various classes of inorganic pharmaceuticals regarding their study of monographs and medicinal importance
	SLO29/1	Medicinal gases, radiopharmaceuticals,	Gain knowledge of medicinal gases, basics of radioactive compounds and their pharmaceutical applications
	SLO30/1	Practicals	Able to understand the fundamentals of volumetric analysis, assay of various inorganic pharmaceuticals; 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.
1.6 Remedial Mathematics			
	SLO31/1	Algebra	Able to know Algebra and its application in pharmacy
	SLO32/1	Trigonometry	Able to know Trigonometry and its application in pharmacy
	SLO33/1	Analytical Geometry	Able to know Analytical Geometry and its application in Pharmacy
	SLO34/1	Differential and Integral Calculus	Able to know Differential and Integral Calculus and its application in pharmacy
	SLO35/1	Differential equations and Laplace transform	Able to know Differential equations and Laplace transform and its application in pharmacy
1.7 Remedial Biology (T&P)			
	SLO36/1	Plant tissues, kingdom and its	Understand the plant tissues, kingdom and its classification, morphology of plants



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		classification, Morphology	
	SLO37/1	Root, Stem, Leaf and Its modifications, Inflorescence and Pollination of flowers	Understand the root, stem, leaf and Its modifications, Inflorescence and Pollination of flowers
	SLO38/1	Morphology of fruits and seeds	Understand the morphology of fruits and seeds
	SLO39/1	Plant physiology, Taxonomy, Study of Fungi, Yeast, Penicillin and Bacteria	Understand the Plant physiology, Taxonomy, Study of Fungi, Yeast, Penicillin and Bacteria
	SLO40/1	Study of Animal cell and animal tissues	Understand the animal cell and tissues

SPECIFIC LEARNING OUTCOMES (SLO)- Pharm D II Year

Sub. Code	NAME	UNIT/TITLE	SPECIFIC LEARNING OUTCOMES
2.1 Pathophysiology			
	SLO1/2	Basic principles of cell injury, Adaptation & Inflammation	Understand Causes, Pathogenesis and morphology of cell injury, adaptation, types of inflammation and Chemical mediators of inflammation
	SLO2/2	Diseases of Immunity	Ability to understand T and B cells, immune tolerance and autoimmunity
	SLO3/2	Cancer	Understand and Gain the knowledge of diagnosis, types, tumour spread, growth , etiology and pathogenesis of cancer
	SLO4/2	Shock	Understand types of shock, mechanisms, stages and management
	SLO5/2	Biological effects of radiation & Environmental and nutritional diseases	Understand the effects of radiation, air pollution and smoking, protein calorie malnutrition, vitamins, starvation and obesity



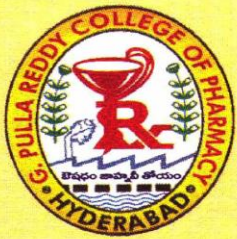
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	SLO6/2	Pathophysiology of common and Infectious diseases	Understand the etiology, signs and symptoms, and pathophysiology of common and infectious diseases
2.2 Pharmaceutical Microbiology (T&P)			
	SLO7/2	UNIT 1 & 2	To gain the knowledge in classification, morphology, maintenance of MOs
	SLO8/2	UNIT 3 & 4	To gain the knowledge in nutrition, cultivation, identification and maintenance of MOs
	SLO9/2	UNIT 5 & 6	To know about sterilization of pharmaceutical products and to learn importance of disinfectants, bactericides in controlling MOs and their evaluation methods according to IP, BP and USP.
	SLO10/2	UNIT 7 & 8	To understand in detail about anatomy and functions of human defence mechanism and different diagnostic tests to identify the diseases
	SLO11/2	UNIT 9 & 10	To understand the evaluation of antibiotics used to treat diseases and to know the mode of transmission of disease causing MOs, symptoms and treatment
	SLO12/2	PRACTICALS	To gain the practical knowledge of isolation, identification, cultivation, preservation of various MOs and to carry out microbiological standardization of pharmaceutical products
2.3 Pharmacognosy & Phytopharmaceuticals (T&P)			
	SLO13/2	Definition, history, scope of pharmacognosy and classification, cultivation, collection, processing, and storage of crude drugs	Understand the scope of pharmacognosy for various purposes and basic principles of cultivation, collection and storage of crude drugs
	SLO14/2	Study of cell wall constituents & cell inclusions and micro, Macro and powder microscopy of	Understand the source, active constituents crude drugs & uses of crude drugs and applications of primary and secondary metabolites of the plant



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		different plant parts (crude drugs)	
	SLO15/2	Detailed study of carbohydrates and related products. study of biological source, methods of production, chemical constituents, uses, specific chemical tests and adulterants	Understand the various plant parts and its constituents and their medicinal and other uses
	SLO16/2	Definition , sources, method of extraction, chemistry, and method of analysis of lipid, proteins	Understand the concept of method of extraction and analysis of lipids
	SLO17/2	Detailed study of oils and definition, classification, chemistry & method of analysis of Proteins.	Understand the method of extraction of oils and its characteristics and evaluation of oils
	SLO18/2	Study of plant fibres used in surgical dressings, and related products: Cotton, Jute, Cellulose etc., Different methods of adulteration of crude drugs and methods of evaluation.	Understand the concept of plant fibres used in surgical dressings, sutures method to evaluate adulteration of crude drugs and differentiate the adulterated drugs
2.4 Pharmacology-I			
	SLO19/2	General pharmacology	Understand basic principles of drug action such as routes of administration, Pharmacodynamics and pharmacokinetic concepts and dose response relationship and preclinical evaluation of drugs
	SLO20/2	pharmacology of drugs acting on	understand physiological and pathological role of neurotransmitters in the ANS,



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		ANS	pharmacology of drugs modulating the ANS system and its relevance to the pathophysiology and treatment of various diseases
	SLO21/2	pharmacology of drugs acting on CNS	understand physiological and pathological role of neurotransmitters in the CNS, pharmacology of drugs acting on CNS system and its relevance to the pathophysiology and treatment of various diseases
	SLO22/2	pharmacology of drugs acting on CVS & Resp.system	Understand pathophysiology and pharmacology of drugs used in the treatment of CVS and Respiratory diseases
	SLO23/2	hormones and their antagonists, autocooids	Understand pathophysiology and pharmacology of drugs used in the treatment of endocrine abnormalities and inflammatory mediators
2.5 Community Pharmacy			
	SLO24/2	Definition and scope of community pharmacy Roles and responsibilities of Community pharmacist, Community Pharmacy Management	Understand the scope, roles and responsibilities, and community pharmacy management
	SLO25/2	Prescriptions	Understand and Learn the parts of prescription, legality & identification of medication related problems
	SLO26/2	Inventory control in community pharmacy	Understand the various inventory control methods in community pharmacy
	SLO27/2	Pharmaceutical care, Patient counselling, Patient medication adherence, OTC Medications	Understand the steps involved in pharmaceutical care, patient counselling, various methods of patient medication adherence and OTC medications list
	SLO28/2	Health screening services, Health Education, Minor ailments and	Understand the various health screening services, health education programs, and causative agents, Clinical presentations and prevention of communicable diseases



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		communicable diseases	and Minor ailments
	SLO29/2	Essential Drugs concept and Rational Drug Therapy, Code of ethics for community pharmacists	Understand the essential drugs concept, rational drug therapy and code of ethics for community pharmacists
2.6 Pharmacotherapeutics-I			
	SLO30/2	Pathophysiology of selected disease states	Able to know electrophysiology of heart;
	SLO31/2	Therapeutic approach to management of these diseases	Able to know pulmonary function test, non pharmacological therapy, pharmacotherapy of various pulmonary disease conditions
	SLO32/2	Therapeutic plans based on diagnosis	Able to understand diagnosis, pharmacotherapy, non pharmacological methods of endocrine disorders
	SLO33/2	Based on diagnosis	Able to understand drug usage in special population
	SLO34/2	Diagnosis, pharmacotherapy and non pharmacological methods	Able to know diagnosis, pharmacotherapy and non pharmacological methods of ocular disease conditions. Able to understand rational use of drugs
	SLO35/2	Drug therapy assessment, monitoring	Able to describe a process to perform drug therapy assessment, monitoring, and documenting recommendations; Interpret and use patient case summaries, patient databases, and medical abbreviations and terminology. To create and present SOAP notes.



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SPECIFIC LEARNING OUTCOMES (SLO)- Pharm D III Year

Sub. Code	NAME	UNIT/TITLE	SPECIFIC LEARNING OUTCOMES
3.1 Pharmacology-II (T&P)			
	SLO1/3	Pharmacology of drugs acting on Blood and blood forming agents	Understand the pharmacology of different drugs used in the treatment of Blood disorders
	SLO2/3	Pharmacology of drugs acting on Renal System	Understand the pharmacology of different drugs used in the treatment of Oedema and hypertension
	SLO3/3	Chemotherapy	Understand the mechanisms of various infectious diseases, malignancy and their treatment
	SLO4/3	Immunopharmacology	Understand immune mechanisms and pharmacology of different drugs used for the treatment of autoimmune diseases
	SLO5/3	Principles of Animal toxicology	Know the toxic effects various drugs and chemicals using animal models
	SLO6/3	The dynamic cell: The structures and functions of the components of the cell & The Gene: Genome structure and function	Understand the structures and functions of cell, gene, chromosome, DNA, protein synthesis, etc
3.2 Pharmaceutical Analysis (T&P)			
	SLO7/3	Quality Assurance	Understand the importance of analysis in pharmaceutical industry
	SLO8/3	Chromatography	Develop the practical skills using instrumental techniques and gain knowledge on instrumental techniques for analysis of pharmaceuticals
	SLO9/3	Electrometric methods	Know the basic principles of electrochemical analytical techniques
	SLO10/3	Spectroscopy	Understand the basic principles of spectroscopy, develop the practical skills using instrumental techniques, understand the knowledge about assay of pharmaceutical



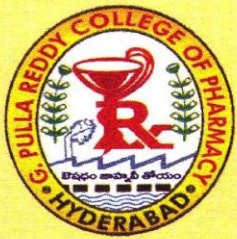
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			substances
	SLO11/3	Practical	Develop basic practical skills using instrumentals techniques and understand the knowledge about assay of pharmaceutical substances
3.3 Pharmacotherapeutics-II (T&P)			
	SLO13/3	Infectious diseases	Understand the etiopathogenesis, clinical presentations, diagnosis and interpret the pharmacotherapy of Tuberculosis, Meningitis, Respiratory tract infections, Gastroenteritis, Endocarditis, Septicemia, Urinary tract infections, Protozoal infections, Viral infections, Gonorrhoea and Syphilis
	SLO14/3	Musculoskeletal disorders	Understand the etiopathogenesis, clinical presentations, diagnosis and interpret the pharmacotherapy of Rheumatoid arthritis, Osteoarthritis, Gout, Spondylitis, Systemic lupus erythematosus
	SLO15/3	Renal system	Understand the etiopathogenesis, clinical presentations, diagnosis and interpret the pharmacotherapy of Acute Renal Failure, Chronic Renal Failure and other renal disorders
	SLO16/3	Oncology	Understand the etiopathogenesis, clinical presentations, diagnosis, basic principles of cancer therapy and interpret the pharmacotherapy of various cancers
	SLO17/3	Dermatology	Understand the etiopathogenesis, clinical presentations, diagnosis and interpret the pharmacotherapy of Psoriasis, Scabies, Eczema and Impetigo
	SLO18/3	Monitoring and Therapy	Identify the patient-specific parameters relevant in initiating drug therapy, and monitoring therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects)
3.4 Pharmaceutical Jurisprudence			
	SLO19/3	Pharmaceutical Legislations	Able to understand the concepts and practice of professional ethics, Pharmaceutical Legislation of India, educational regulations, constitution of PCI and State Pharmacy Councils, cultivation, sale and manufacture of opium and other Narcotic Drugs and



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			Psychotropic Substances
	SLO20/3	Drugs and Cosmetics Act	Understand the constitution and functions of administrative bodies as per Drugs and Cosmetics Act, Import, manufacturing, sale and distribution of drugs and cosmetics as per Drugs and Cosmetics Act, Labelling and Packaging requirements of drugs and cosmetics, GMP, maintenance of records as per Schedule U, concepts of Schedule Y
	SLO21/3	Medicinal and Toilet preparations Act	Gain knowledge on manufacturing of alcohol containing drugs and cosmetics in bonded and nonbonded laboratory, warehousing,
	SLO22/3	Drugs and Magic remedies act	Able to know about objectionable advertisements, Prevention of cruelty to animals, Importance of Commodities.
	SLO23/3	Patents Act	Understand the concept of IPR, inventions and noninventions, Patent filling, as per Indian Patents Act, fixing of prices for drugs and cosmetics as per DPCO, pharmaceutical policy objectives.
3.5 Medicinal Chemistry (T&P)			
	SLO24/3	Modern concept of rational drug design	Able to understand the concept of advanced techniques in the drug discovery, CADD, QSAR and combinatorial chemistry, to gain knowledge in the medicinal chemistry of Anti-infective agents
	SLO25/3	Anti-infective agents	to acquire knowledge in the classification, structures, SAR, therapeutic uses and synthesis of anti-malarial, antibacterial and antibiotics
	SLO26/3	Sulphonamides and sulphones	to acquire knowledge in the biology of cancer, targets of cancer, classification, structures, SAR, therapeutic uses and synthesis of anti-cancer agents
	SLO27/3	CVS drugs	To understand the etiology of various cardiac diseases and identify targets to treat them and gain knowledge on medicinal chemistry of drugs acting on cardiovascular system
	SLO28/3	Hypoglycemic agents, Thyroid and Antithyroid agents, steroids	To gain knowledge in the medicinal chemistry of steroidal hormones, their analogues, antithyroid drugs, antidiabetics and understand the importance of various



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			diagnostic aids.
	SLO29/3	Practicals	Able to carry out the synthesis of various organic intrmediates containing heterocyclic rings, drugs and analyze the purity of API and intermediates, and able to understand the methodolgy to perform QSAR
3.6 Pharmaceutical Formulations (T&P)			
	SLO30/3	Pharmaceutical dosage form- concept and classification and Tablet dosage form	Concept and classification and Tablets-Mfg., and evaluation; Tablet coating and evaluation
	SLO31/3	Capsules	Production and filling of hard gelatin capsules and soft gelatin capsules and evaluation
	SLO32/3	Liquid Orals	Formulation and evaluation of suspensions, emulsions and solutions and their stability
	SLO33/3	Parenterals, Ophthalmics and Semisolid dosage forms	Formulation of large and small volume Parenterals Sterilization; Types of Ointment Base Preparation of ointment; Suppositories and Packaging materials
	SLO34/3	Concept of Controlled and novel Drug delivery systems	Controlled and novel Drug delivery systems with available examples; parenteral, trans dermal, buccal, rectal, nasal, implants, ocular DDS
	SLO35/3	Practicals	Solid, Liquid orals, Semisolid, parenterals and Cosmetic preparations; Evaluation of tablets, capsules and parenterals



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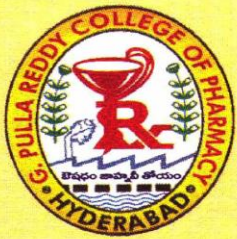
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SPECIFIC LEARNING OUTCOMES (SLO)- Pharm D IV Year

Sub. Code	NAME	UNIT/TITLE	SPECIFIC LEARNING OUTCOMES
4.1 Pharmacotherapeutics-III (T&P)			
	SLO1/4	Gastrointestinal system	Understand the etiopathogenesis, clinical presentations, diagnosis and interpret the pharmacotherapy of Peptic ulcer disease, Gastro Esophageal Reflux Disease, Inflammatory bowel disease and Liver disorders
	SLO2/4	Haematological system	Understand the etiopathogenesis, clinical presentations, diagnosis and interpret the pharmacotherapy of Anaemias and Venous thromboembolism
	SLO3/4	Nervous system	Understand the etiopathogenesis, clinical presentations, diagnosis and interpret the pharmacotherapy of Epilepsy, Parkinsonism, Stroke, and Alzheimer's disease
	SLO4/4	Psychiatry disorders	Understand the etiopathogenesis, clinical presentations, diagnosis and interpret the pharmacotherapy of Schizophrenia, Affective disorders, Anxiety disorders, Sleep disorders and Obsessive Compulsive disorders
	SLO5/4	Pain management including Pain pathways, neuralgias, headaches	Understand the etiopathogenesis, clinical presentations, diagnosis and interpret the pharmacotherapy of Pain, neuralgias and headaches
	SLO6/4	Evidence Based Medicine	Understand and Learn various principles and levels of evidence based medicine
4.2 Hospital Pharmacy (T&P)			
	SLO7	Hospital pharmacy -its organisation and functions, management, organizational structure, staff, workload, management of materials, finance and roles & responsibilities of	Understand the pharmaceutical care services, know the business and professional management skills in hospital pharmacy



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		hospital pharmacist	
	SLO8	The Budget - preparation and implementation, Hospital drug policy, PTC, hospital formulary	Understand the Drug policy and implementation of formulary and planning and maintaining the budget in a hospital pharmacy
	SLO9	Hospital pharmacy -committees, Infection committee, research and ethical committee, developing therapeutic guidelines, Hospital pharmacy communication - Newsletter	Understand the different committees in hospital and also its policies and developing guidelines for various committees.
	SLO10	Hospital pharmacy services, procurement & warehousing of drugs & pharmaceuticals , inventory control and its methods ,drug distribution in hospital, prescription method, floor stock method ,distribution of narcotic substances and central sterile supply services	Understand the management of storing and distribution of drugs to various departments and wards, floors and providing appropriate medication, drug distribution to patients.
	SLO11	Manufacture of pharmaceutical preparations, sterile formulations, ointments, liquids, creams, tablets, granules, capsules, powders, total parenteral nutrition	Understand the manufacturing of various pharmaceutical products and methods of preparation, evaluation, package and storage and handling of various pharmaceutical formulations.



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	SLO12	Continuing professional development programs, education and training, Radiopharmaceuticals-handling and packaging, professional relations and practices of hospital pharmacist	Understand the concept of inventory control and Handling and packaging and storing and disposal of radio pharmaceuticals and developing the professional skills
4.3 Clinical Pharmacy (T&P)			
	SLO13	Development and scope of Clinical Pharmacy and Introduction to daily activities	Obtain knowledge of development and scope of Clinical Pharmacy; Learn monitoring drug therapy through medication chart review and clinical review; identify and resolve drug therapy problems; understand the importance of ward round participation and other activities
	SLO14	Patient Data Analysis and Clinical Laboratory investigation	Understand the structure and evaluation of Patient's case history; should be able to interpret laboratory results for specific disease states as monitoring parameters in therapeutics
	SLO15	Drug and Poison Information	Obtain knowledge of organization and information resources required for Drug and Poison information centre; Should be able to retrieve, analyse, interpret and formulate drug and poison information;
	SLO16	Pharmacovigilance	Understand the role of clinical pharmacist in Pharmacovigilance and Should be able to detect, assess (causality), report, evaluate, monitor and manage ADRs.
	SLO17	Communication skills Pharmaceutical care literature evaluation and medication errors	Should be able to obtain medication history interview and counsel the patients; learn critical evaluation of different types of literature available and do a journal club; should be able to identify and prevent medication errors;
	SLO18	Practical	Answer drug information queries following systematic approach; Obtain medication history interview and counsel the patient; Interpret the laboratory investigations in



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			given cases; Perform critical appraisal of literature; carry out medication chart reviews to identify and resolve drug therapy problems;
4.4 Biostatistics & Research Methodology			
	SLO19	Research Methodology	To understand the basic concept in clinical study design, report writing and presentation of data
	SLO20	Biostatistics	Able to perform the measurement of central tendency and spread of data
	SLO21	Data graph	Able to perform the construction and labelling of graphs, histogram, pie chart and other plots
	SLO22	Basics of testing hypothesis	Able to perform the parametric tests, nonparametric tests, correlation and regression analysis
	SLO23	Statistical methods in epidemiology	Able to understand the importance of statistical softwares
	SLO24	Computer applications in pharmacy	Able to understand the applications of computers in hospital pharmacy, community pharmacy and drug information storage.
4.5 Biopharmaceutics & Pharmacokinetics (T&P)			
	SLO19	Biopharmaceutics	Understand the concepts, factors affecting absorption, distribution, metabolism and excretion
	SLO20	Compartmental & Non compartmental modelling	Understand the principles of compartment modelling
	SLO21	Non linear pharmacokinetics	Understand the factors responsible for non linearity of pharmacokinetics, ability to differentiate linear, non linear pharmacokinetics & determine pharmacokinetic parameters
	SLO22	Multiple dosage regimen	Understand accumulation index & able to determine steady state plasma concentration after IV bolus, infusion & extra vascular multiple drug administrations
	SLO23	Bioavailability & bioequivalence	Acquire knowledge of bioavailability, bioequivalence- basics, methods & protocols



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			involved in studies
	SLO24	Practical	Able to perform experiments to enhance solubility of poorly soluble agents, study the solubility characteristics of drugs & determine pharmacokinetic parameters, bioavailability, bioequivalence from plasma, urinary concentration time data
4.6 Clinical Toxicology			
	SLO25	Chapter 1-6	Understand general principles and methods used in the treatment of poisoning, toxicokinetics
	SLO26	Chapter 7	Understand toxic dose levels, sources of poisoning, clinical symptoms, diagnosis and treatment of poisoning of various poisonous substances
	SLO27	Chapter 8	Understand toxic dose levels, sources of poisoning, clinical symptoms, diagnosis and treatment of chronic poisoning with heavy metals
	SLO28	Chapter 10 & 11	Understand sources of poisoning, clinical symptoms, diagnosis and treatment poisoning with plants & food
	SLO29	Chapter 9 & 12	Understand clinical symptoms, diagnosis and treatment poisoning with snake, arthropod bites and stings



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SPECIFIC LEARNING OUTCOMES (SLO)- Pharm D V Year

Sub. Code	NAME	UNIT/TITLE	SPECIFIC LEARNING OUTCOMES
5.1 Clinical Research			
	SLO1/5	Drug development process	Understand the various approaches to drug discovery
	SLO2	Clinical development of drug	Understand and conduct the various phases of clinical trials in accordance to regulatory and ethical requirements
	SLO3	Clinical trial protocol	Understand the various regulatory and ethical requirements to conduct the clinical trials
	SLO4	GCP	Understand the roles and responsibilities of clinical trial personnel as per ICH GCP
	SLO5	Roles and responsibilities in clinical trial	Understand and Design of clinical study documents (protocol, CRF, ICF, PIC with assignment)
5.2 Pharmacoepidemiology and Pharmacoeconomics			
	SLO6	Pharmacoepidemiology	Understand the scope, aims, study designs, applications of Pharmacoepidemiology, drug use and outcome measures
	SLO7	pharmacoepidemiology	Understand the sources of data and concept of risk in pharmacoepidemiology
	SLO8	Pharmacoeconomics	Identify and determine relevant cost and consequences associated with pharmacy products and services
	SLO9	Pharmacoeconomics	Understand and analyse the pharmacoeconomic analysis methods (Cost – minimization, cost- benefit, cost – effectiveness and cost utility)
	SLO10	Applications of Pharmacoeconomics	Understand the applications software in pharmacoeconomics and case studies
5.3 Clinical Pharmacokinetics & Pharmacotherapeutic Drug Monitoring			
	SLO11	Introduction to Clinical	Design the drug therapy regimen for individual patient



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		pharmacokinetics, Design of dosage regimens	
	SLO12	Pharmacokinetics of Drug Interaction, Therapeutic Drug monitoring	Detect and manage drug-drug interactions and Interpret and correlate the plasma drug concentration with patient's therapeutic outcome
	SLO13	Dosage adjustment in Renal and hepatic Disease	Recommend dosage adjustment for patients with renal/ hepatic impairment
	SLO14	Population Pharmacokinetics	Understand the concepts and applications of Population Pharmacokinetics
	SLO15	Pharmacogenetics	Understand the Pharmacogenetics and Pharmacokinetics / Pharmacodynamic considerations
5.4 Clerkship			
	SLO16	To perform a clinical pharmacy related services in various departments	
5.5 Project work			
	SLO 17	To perform a research project on community, hospital and/or clinical pharmacy project of six months duration	

Pharm.D Course outcome and Specific Learning Outcome Map							
I YEAR							
Sub. Code	CO1	CO2	CO3	CO4	CO5	CO6	CO7
1.1 Human Anatomy and Physiology (T&P)							
SLO1/1	X						
SLO2/1	X						
SLO3/1	X						
SLO4/1	X						



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	SLO5/1	X						
	SLO6/1	X						
1.2 Pharmaceutics (T&P)								
	SLO7/1		X					
	SLO8/1		X					
	SLO9/1		X					
	SLO10/1		X					
	SLO11/1		X					
	SLO12/1		X					
1.3 Medicinal Biochemistry (T&P)								
	SLO13/1			X				
	SLO14/1			X				
	SLO15/1			X				
	SLO16/1			X				
	SLO17/1			X				
	SLO18/1			X				
1.4 Pharmaceutical Organic Chemistry (T&P)								
	SLO19/1				X			
	SLO20/1				X			
	SLO21/1				X			
	SLO22/1				X			
	SLO23/1				X			
	SLO24/1				X			
1.5 Pharmaceutical Inorganic Chemistry (T&P)								



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	SLO25/1							X	
	SLO26/1							X	
	SLO27/1							X	
	SLO28/1							X	
	SLO29/1							X	
	SLO30/1							X	
1.6 Remedial Mathematics									
	SLO31/1								X
	SLO32/1								X
	SLO33/1								X
	SLO34/1								X
	SLO35/1								X
1.7 Remedial Biology (T&P)									
	SLO36/1								X
	SLO37/1								X
	SLO38/1								X
	SLO39/1								X
	SLO40/1								X

Pharm.D Course outcome and Specific Learning Outcome Map							
II YEAR							
Sub. Code	CO8	CO9	CO10	CO11	CO12	CO13	
2.1 Pathophysiology							
SLO1/2	X						



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	SLO2/2	X					
	SLO3/2	X					
	SLO4/2	X					
	SLO5/2	X					
	SLO6/2	X					
2.2 Pharmaceutical Microbiology (T&P)							
	SLO7/2		X				
	SLO8/2		X				
	SLO9/2		X				
	SLO10/2		X				
	SLO11/2		X				
	SLO12/2		X				
2.3 Pharmacognosy & Phytopharmaceuticals (T&P)							
	SLO13/2			X			
	SLO14/2			X			
	SLO15/2			X			
	SLO16/2			X			
	SLO17/2			X			
	SLO18/2			X			
2.4 Pharmacology-I							
	SLO19/2				X		
	SLO20/2				X		
	SLO21/2				X		
	SLO22/2				X		



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	SLO23/2				X		
2.5	Community Pharmacy						
	SLO24/2					X	
	SLO25/2					X	
	SLO26/2					X	
	SLO27/2					X	
	SLO28/2					X	
	SLO29/2					X	
2.6 Pharmacotherapeutics-I							
	SLO30/2						X
	SLO31/2						X
	SLO32/2						X
	SLO33/2						X
	SLO34/2						X
	SLO35/2						X

Pharm.D Course outcome and Specific Learning Outcome Map							
III YEAR							
Sub. Code	CO14	CO15	CO16	CO17	CO18	CO19	
3.1 Pharmacology-II (T&P)							
	SLO1/3	X					
	SLO2/3	X					
	SLO3/3	X					
	SLO4/3	X					



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	SLO5/3	X					
	SLO6/3	X					
3.2	Pharmaceutical Analysis (T&P)						
	SLO7/3		X				
	SLO8/3		X				
	SLO9/3		X				
	SLO10/3		X				
	SLO11/3		X				
3.3 Pharmacotherapeutics-II (T&P)							
	SLO13/3			X			
	SLO14/3			X			
	SLO15/3			X			
	SLO16/3			X			
	SLO17/3			X			
	SLO18/3			X			
3.4 Pharmaceutical Jurisprudence							
	SLO19/3				X		
	SLO20/3				X		
	SLO21/3				X		
	SLO22/3				X		
	SLO23/3				X		
3.5 Medicinal Chemistry (T&P)							
	SLO24/3					X	
	SLO25/3					X	



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	SLO26/3						X	
	SLO27/3						X	
	SLO28/3						X	
	SLO29/3						X	
3.6 Pharmaceutical Formulations (T&P)								
	SLO30/3							X
	SLO31/3							X
	SLO32/3							X
	SLO33/3							X
	SLO34/3							X
	SLO35/3							X

Pharm.D Course outcome and Specific Learning Outcome Map						
IV YEAR						
Sub. Code	CO20	CO21	CO22	CO23	CO24	CO25
4.1 Pharmacotherapeutics-III (T&P)						
	SLO1/4	X				
	SLO2/4	X				
	SLO3/4	X				
	SLO4/4	X				
	SLO5/4	X				
	SLO6/4	X				
4.2 Hospital Pharmacy (T&P)						
	SLO7		X			



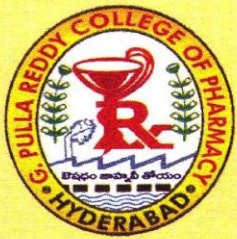
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	SLO8		X				
	SLO9		X				
	SLO10		X				
	SLO11		X				
	SLO12		X				
4.3 Clinical Pharmacy (T&P)							
	SLO13			X			
	SLO14			X			
	SLO15			X			
	SLO16			X			
	SLO17			X			
	SLO18			X			
4.4 Biostatistics & Research Methodology							
	SLO19				X		
	SLO20				X		
	SLO21				X		
	SLO22				X		
	SLO23				X		
	SLO24				X		
4.5 Biopharmaceutics & Pharmacokinetics (T&P)							
	SLO19					X	
	SLO20					X	
	SLO21					X	
	SLO22					X	



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	SLO23					X	
	SLO24					X	
4.6 Clinical Toxicology							
	SLO25						X
	SLO26						X
	SLO27						X
	SLO28						X
	SLO29						X

Pharm.D Course outcome and Specific Learning Outcome Map						
V YEAR						
Sub. Code	CO26	CO27	CO28	CO29	CO30	
5.1 Clinical Research						
	SLO1/5	X				
	SLO2	X				
	SLO3	X				
	SLO4	X				
	SLO5	X				
5.2 Pharmacoepidemiology and Pharmacoeconomics						
	SLO6		X			
	SLO7		X			
	SLO8		X			
	SLO9		X			
	SLO10		X			



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5.3 Clinical Pharmacokinetics & Pharmacotherapeutic Drug Monitoring						
	SLO11				X	
	SLO12				X	
	SLO13				X	
	SLO14				X	
	SLO15					
5.4 Clerkship & Project work						
	SLO16					X
5.5 Internship						
	SLO 17					X