

Koneru Lakshmaiah Education Foundation

(Category -1, Deemed to be University estd. u/s. 3 of the UGC Act, 1956)

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KL College of Pharmacy

Program: Pharm. D

Academic Year: 2023-2024

Course Code	Course Title	CO. No	Description of the course Outcome
		CO1	Understand the anatomy and physiology of Elementary tissues and to study about basic terminologies used in HAP, detail About hemopoietic and Lymphatic system
22PY6101T	Human Anatomy and Physiology	CO2	Understand the in detail about Cardiovascular and Respiratory system
22. 10.01.	Filyslology	CO3	Understand the in detail about Digestive and Nervous system
		CO4	Understand the in detail about Urinary and Endocrine system.
		CO5	Understand the in detail about anatomy and functions of sense organs, and process of reproduction
		CO6	Understanding the skeletal system of humans and sports physiology
22PY6101P	22PY6101P Human Anatomy and Physiology	CO1	Application of gross morphology of body organs using microscope and Determining blood cell coun Determining ESR, Blood Haemoglobin and Bleeding time
		CO2	Determination of Blood pressure and Blood group Identifying various Parts of Skeletal, Cardiovascular Respiratory, Digestive, Urinary systems with models charts & Specimens
		CO3	Identifying various Parts of Nervous, Special senses Reproductive systems with models, charts & Specimens Recording the muscle curves in different conditions using sciatic nerve preparation
	Pharmaceutics	CO1	To gain knowledge on different dosage forms History of Pharmacy, and pharmacopoeias
22PY6102T		CO2	To Understand the Pharmaceutical Calculations involved in formulation and preparation of powder dosage forms
		CO3	To understand the preparation of Monophasic liquid dosage forms
		CO4	To understand the biphasic liquid dosage forms

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		CO5	To understand the concepts of suppositories and Gelanicals
		CO6	To gain the knowledge on Surgical aids and incompatibilities
22PY6102P	Pharmaceutics	CO1	Preparation of liquid orals
		CO2	Preparation of lotions, emulsions Powders as Suppositories
		CO3	Preparation of Incompatibilities, ear drops and past
22PY6103T	Medicinal Biochemistry		Understand the catalytic activity of enzymes as importance of isoenzymes in diagnosis of disease as role of carbohydrates and their metabolic disorders
		CO2	Understand the role of carbohydrates and the metabolic disorders and biological oxidation proce in body.
		CO3	Understand the concepts of proteins, amino acid and genetic organization in mammalians.
		CO4	Analyse the clinical chemistry of cell and kidne function tests.
		CO5	Analyse the liver and lipid profile tests.
		CO6	Analyse the role of Immunochemical tests for diagnosis of various pathological conditions in body
22PY6103P	Medicinal Biochemistry	CO1	Qualitative analysis of urine and blood
		CO2	Estimation of Liver and kidney parameters
		CO3	Experiments on lipid profile parameters and enzym activities and electrolyte estimations
22PY6104T	Pharmaceutical Organic Chemistry	CO1	Understand the IUPAC/Common system of nomenclature of simple organic compounds
•		CO2	To understand the organic reactions, reactivity, stability, mechanisms involved in aliphatic and alicyclic compounds
		CO3	To understand the free radical addition and the theory of resonance
		CO4	To understand the nucleophile & electrophilic aromatic substitution reactions, reactivity and orientation
		CO5	To understand the named organic reactions with mechanisms and Interpret oxidation and reduction reactions
		CO6	To understand the preparation, test for purity, assay and medicinal uses of official compounds
Pharmaceutical Organic Chemistry		CO1	Applying the knowledge to Synthesize organic compounds by acetylation, benzoylation bromination, condensation, diazotisation and coupling and hydrolysis methods.
		CO2	Applying the knowledge to Synthesize organic compounds by nitration reactions, oxidation, reduction and miscellaneous reactions methods.
	CO3	Acquiring knowledge to Identify Phenols, amides, carbohydrates, amines, Carboxylic acids, aldehyde, ketones, alcohols, Carboxylic acids, aldehyde, ketones and alcohols Esters, hydrocarbons, anilides and nitro compounds	

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22PY61105T		CO1	Make Use of Analytical knowledge in identifying
	Inorganic Chemistry		errors and concepts of indicators in volumetric
		CO2	Application of principles and procedures of analysis of drugs
		CO3	Application of principle of limit tests in identifying the impurities
		CO4	Understand the role of medicinal gases and drugs used to treat gastrointestinal diseases.
		CO5	Understand the role of electrolyte replenishers and essential trace elements to maintain physiological balance & MOA of antimicrobials
		CO6	Understand the importance of inorganic pharmaceuticals in preventing and curing the diseases.
22PY611Q5P	Pharmaceutical Inorganic Chemistry	CO1	Test for identification of impurities and selected inorganic compounds
		CO2	Analyze the purity of selected inorganic compounds
		CO3	Estimation of mixtures and preparation of selected organic compounds
22PY610B6T	Remedial Biology	CO1	Understand the classification and salient features of plant kingdoms
		CO2	Understand the plants morphology and salient features of the plants.
		CO3	Understand the taxonomy of plants, fruits and seeds
		CO4	Understand the plant physiology and study of different microorganisms
		CO5	Understanding the anatomy of frog
		CO6	To gain the knowledge on general organization of
22PY610M6T	Remedial Mathematics	CO1	Algebra: Determinants, Matrices Trigonometry: Sides and angles of a triangle, solution of triangles
-		CO2	Analytical Geometry: Points, Straight line, circle, parabola
		CO3	Differential calculus and Partial differentiation
		CO4	Integral Calculus
		CO5	Differential equations
		CO6	Laplace transform
22PY610B6P	Remedial Biology	CO1	Generalize the Organisation of plants, plant tissues and plant kingdom and application of biological
		CO2	Application of biological principles in studying
	CO3	morphology and plant physiology. Application of biological principles in study of taxonomy, microorganisms, animals and other poisonous animals.	
22PY6201T	Pathophysiology	CO1	To understand the basic principles of cell injury, adaptations and inflammation
		CO2	To understand the pathophysiology of diseases related to immunity
-		CO3	To understand the detailed pathogenesis of cancer

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			Environmental and nutritional diseases
		CO5	To understand pathophysiology of common diseas
		CO6	To understand pathogenesis of Infectious diseases
22PY6202T	Pharmaceutical Microbiology	CO1	Understand methods of identification, classificati and relationship among various microorganisms
		CO2	Understand nutritional requirements, cultivation a preservation of various microorganisms
		CO3	Understand the importance and implementation sterilization in pharmaceutical processing arindustry
		CO4	Understand and learn disinfectants, procedures disinfection for pharmaceutical products.
		CO5	Understand the immune system, Antigen-Antibod reactions, immunization programs, and diagnost tests for parasites
		CO6	Understand the microbial assays and differe infectious diseases
Pharmaceutical Microbiology	CO1	Understand various equipment's used experimental microbiology; Apply knowledge perform the preparation of culture media an sterilization of glassware, identification of bacter by staining methods	
		CO2	Understand and apply the knowledge for isolation cultivation and preservation of various microorganisms, testing for sterility for pharmaceuticals
	CO3	To apply and perform microbial assays, perform bacterial microbial assays for vitamins an antibiotics. To perform the relative cellular volume assays of microbes, diagnostic tests of typhoid an malaria.	
22PY6203T	Pharmacognosy and Phytopharmaceuticals	CO1	To know the history and scope of Pharmacognos and Classification of crude drugs
		CO2	Know about the cultivation, collection, an processing of crude drugs and study of ce constituents and natural pesticides
		CO3	To understand about the organic farming an different methods of pest control
		CO4	To know about the detailed study carbohydrate containing drugs.
		CO5	Understand the different methods of extraction chemistry and analysis of lipids and oils and protein based natural drugs
		CO6	To know different types of plants fibres used is surgical dressings and related products and understand different methods of adulteration of crud drugs
2PY6203P	Pharmacognosy and Phytopharmaceuticals	CO1	To perform macroscopy, microscopy, and powder characteristics of natural drugs.
		CO2	To perform macroscopy, microscopy, and powder characteristics of natural drugs.
		CO3	To apply and perform the different chemical tests

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22PY6204T	Pharmacology-I	CO1	Understanding the pharmacological actions of different categories of drugs
		CO2	Understand the pharmacology of drugs acting or
		CO3	Autonomic nervous system Understand the pharmacology of drugs acting or
		CO4	cardio vascular system Understand the pharmacology of drugs acting or central nervous system
		CO5	Understand the pharmacology of drugs acting or Respiratory system
		CO6	Understand the pharmacology of hormonal and antihistaminic drugs
22PY6205T	Community Pharmacy	CO1	Understand the roles and responsibilities of community pharmacist
		CO2	Understand the layout and infrastructure requirements for community pharmacy
		CO3	Recognise the need of inventory control and understand the various methods
		CO4	Understand the factors affecting medication adherence
		CO5	Application of pharmacy practice principles to Perform general patient counselling
		CO6	Apply health screening services in community pharmacy
22PY6206T Pharmac	Pharmacotherapeutics-I	CO1	To understand etiopathogenesis and Pharmacotherapy of CVS diseases (Hypertension Congestive cardiac failure, Angina Pectoris)
		CO2	To understand etiopathogenesis and Pharmacotherapy of CVS diseases (Myocardial infarction Hyperlipidaemias, Cardiac Arrhythmia
		CO3	To understand etiopathogenesis and Pharmacotherapy of Respiratory system diseases
		CO4	To understand etiopathogenesis and Pharmacotherapy of Endocrine system diseases
		CO5	To understand the general prescribing guidelines for Pediatric, Geriatric, Pregnancy and Breastfeeding To understand etiopathogenesis and Pharmacotherapy of ophthalmology diseases
		CO6	To understand the rationale for drug use
22PY6206P	Pharmacotherapeutics-I	CO1	To apply the knowledge and present the recorded cases in Cardiology department and Pulmonology
		CO2	To apply the knowledge and present the recorded cases in Endocrinology department and to understand the prescribing guidelines
		CO3	To apply the knowledge and present the recorded cases in Ophthalmology department and the guidelines in the rational of drug use
22PY6301T	Pharmacology-II	CO1	To understand the pharmacology of drugs acting on blood and blood forming agents and Renal system
		CO2	To understand the pharmacology of chemotherapy
		CO3	To understand the immuno pharmacology and principles of animal toxicology

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		CO4	cell signalling, DNA replication and cell cycle.
		CO5	To understand the iimportance of gene and i structure, genome, gene expression, recombina DNA technology and other associated aspects
		CO6	To understand the iimportance of RNA and other associated aspects
22PY6301F	Pharmacology-II	COI	To understand the laboratory animals and the handling, To know the importance of solutions an laboratory appliances used in experiments pharmacology, Understand the anaesthetics used is laboratory animals,
		CO2	Application of bioassays Ach
		CO3	Applications of bioassays of histamine, to understant the demonstrate intraperitoneal and intramuscular outes of administration of drugs in animals and describe different anaesthetics used in laborator animals
22PY6302T	Pharmaceutical Analysis	CO1	To understand the importance of variou documentation practices followed in pharmaceutica industry
		CO2	To understand the knowledge about assay o pharmaceutical substance and product
		CO3	To develop basic practical skills using instrumenta techniques
		CO4	To inculcate theoretical knowledge on various instrumental techniques adopted for analysis of pharmaceuticals
		CO5	To understand various methodologies for assay of drugs and pharmaceuticals with the skills and knowledge gained
		CO6	To understand and gain knowledge on trouble shooting in adopting various methodologies using instrumental techniques
22PY6302P	Pharmaceutical Analysis	CO1	To separate and identification of compounds by chromatography and spectroscopy
		CO2	Conduction of experiments using electro titrimetric methods and analysis of drugs by absorption spectroscopy
		CO3	To demonstrate the various analytical techniques and determination of concentrations by flame photometry
22PY6303T P	Pharmacotherapeutics-II	CO1	To understand basic guidelines of antibiotics, surgical prophylaxis and respiratory tract infectious diseases.
		CO2	To understand the etiopathogenesis and pharmacotherapy of infectious diseases
		CO3	To understand the etiopathogenesis and pharmacotherapy of musculoskeletal diseases
		CO4	To understand the etiopathogenesis and pharmacotherapy of Renal system
		CO5	To understand the etiopathogenesis and pharmacotherapy of Oncology

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		CO6	To understand the etiopathogenesis and pharmacotherapy of Dermatology
22PY6303P	Pharmacotherapeutics-II	CO1	To analyse Case studies on Infectious diseases Respiratory diseases, Reproductive diseases.
		CO2	To analyse Case studies on Musculoskeletal disease and renal diseases
		CO3	To analyse Case studies on cancer and dermatological diseases
22PY6304T	Pharmaceutical Jurisprudence	CO1	To Understand the importance of code of pharmaceutical ethics
		CO2	To understand in detail about various sections of Drugs and Cosmetics Act
		CO3	To understand the various provisions of Pharmacy Act 1948
		CO4	To understand the various provisions of Medicinal and Toilet Preparation Act 1955
		CO5	To understand the various provisions of NDPS Act 1985
2201/22057		CO6	To understand the various Indian pharmaceutical Acts and Laws
22PY6305T	Medicinal Chemistry	CO1	To understand the different modern techniques of drug design and their importance
		CO2	To know the metabolism, adverse effect, and therapeutic activity of anti-infective, anti-fungal agents
		CO3	To understand the concept of chemotherapy for cancer and microbial diseases and different anti-viral agents
		CO4	To explore the mechanisms involved in the cardiac diseases
		CO5	To understand the chemistry involved in anti-diabetic and thyroid drugs
		CO6	To understand the chemistry involved in steroids and some diagnostic agents
22PY6305P	Medicinal Chemistry	CO1	Synthesis compounds of medicinal interest and conduct monograph analysis of pharmaceutical compounds
		CO2	Determine the amount of drug present in an unknown solution and estimate the purity of drugs
		CO3	Determine partition coefficient and dissociation constant of a given compound
22PY6306T	Formulations	CO1	To understand the significance of formulation, preparation and evaluation of tablets
		CO2	To understand the significance of formulation, preparation and evaluation of capsules
		CO3	To understand the significance of formulation, preparation and evaluation of liquid orals
		CO4	To understand the significance of formulation, preparation and evaluation of parenteral preparations
		CO5	To understand the manufacturing methods of semisolid, and ophthalmic products
		CO6	To understand the concepts of Novel Local drug delivery system

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22PY6306P	Pharmaceutical Formulations	CO1	Prepare formulations of tablets and capsules, coating of the tablets.
		CO2	To prepare various parenteral products, different dosage forms by performing quality control tests a per the batch formula
		CO3	Prepare and evaluate various semi-solid preparations cosmetics such as lipstick, cold cream and shampoo
22PY6401T	Pharmacotherapeutics- III	CO1	To understand the Etiopathogenesis and pharmacotherapy of diseases associated with gastrointestinal system
		CO2	To understand the Etiopathogenesis and pharmacotherapy of diseases associated with gastrointestinal system: Liver
		CO3	To understand the Etiopathogenesis and pharmacotherapy of diseases associated with haematological system
		CO4	To understand the Etiopathogenesis and pharmacotherapy of diseases associated with nervous system
		CO5	To understand the Etiopathogenesis and pharmacotherapy of Psychiatry disorders
	CO6	To understand the concepts of diseases associated with pain and evidence-based medicine	
22PY6401P	Pharmacotherapeutics- III	CO1	To analyse Case studies on gastrointestinal system.
		CO2	To analyse Case studies on the haematological system and nervous system.
		CO3	To analyse Case studies on Psychiatry disorders and evidence-based medicine.
22PY6402T	Hospital Pharmacy	CO1	To know the organizational structure and functions of a hospital
		CO2	To gain the knowledge on hospital drug policy
		CO3	To understand the hospital pharmacy services
		CO4	To know the manufacturing practices of various formulations in hospital set up
		CO5	To understand the professional development programs
		CO6	To understand the practice-based research methods
22PY6402P	Hospital Pharmacy	CO1	To analyse and report different drug interactions in a given case study and to perform inventory analysis
		CO2	To prepare various parenteral preparations and powders
		CO3	To analyse the case and answer the related drug information queries posted by healthcare professionals and patients

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22PY6403T	Clinical Pharmacy	CO1	To understand the role of a clinical pharmacist in a
			pharmacy
		CO2	To understand the process of obtaining patients
			history and evaluation of drug therapy based on the
			history
		CO3	To gain the knowledge about various clinical
			laboratory tests to diagnose diseases.
		CO4	To understand the working of drug and poison
			information center.
		CO5	To understand the role of pharmacovigilance in ADR
			monitoring
		CO6	To gain the knowledge on communication skills for
			better interaction with patients
22PY6403P	Clinical Pharmacy	CO1	To analyse the case and answer the related drug
			information queries posted by healthcare
			professionals and patients.
		CO2	To analyse medication counselling of patients and
		CO2	laboratory investigations.
		CO3	
		COS	To analyse conduct interview to elicit the patient past
22PY6404T	Dissiplied 0 D	001	medication history and ADR analysis.
22P Y 04U41	Biostatistics & Research	COI	To understand the concept of clinical study designs
	Methodology		and case studies
		CO2	To understand the methods used to determine the
			sample size for a study.
		CO3	To understand the basic concepts of biostatistics
		CO4	To understand the basics of hypothesis testing
		CO5	To understand the statistical methods used in
			epidemiology
		CO6	
S Edward of		000	pharmacy
22PY6405T	Biopharmaceutics &	CO1	Understand the concepts of biopharmaceutics
221 104031	Pharmacokinetics		The state of the s
	r narmacokinetics	CO2	Understand the process of metabolism and excretion
		CO3	Understand the concept of pharmacokinetics with
To the last to the			the use of one compartment open model.
100 M		CO4	Understand the concept of pharmacokinetics with the
			use of multi compartment analysis
		CO5	To understand the Non-linear and non-
			compartmental kinetics
		CO6	Understand the concepts of bioavailability and
		000	bioequivalence
22PY6405P	Biopharmaceutics &	CO1	Compare the in-vitro drug release profile of different
221 101001		COI	
	Pharmacokinetics		
			enhancement techniques for improvement of drug
		COA	release of poorly water-soluble drugs.
		CO2	Estimate the bioavailability (absolute and relative)
		000	and bioequivalence from the given clinical data
		CO3	Calculate the drug content in blood sample using
			Area Under Curve approach, various
			pharmacokinetic parameters from the given clinical
			data, Conduct planned experiments and prepare
			laboratory report in a standard format

22PY6406T Clinical Toxicolog	Clinical Toxicology	CO1	Understand the mechanism of action of common poisons and antidotes
		CO2	Understand the concepts of Toxicokinetics
		CO3	To understand the etiology of acute poisoning and its management by various therapeutic agents
		CO4	To understand the etiology of chronic poisoning and
		CO5	its management by various therapeutic agents To understand the poisoning caused by plant and animal sources
		CO6	To understand the etiology and management of substance abuse
22PY6501T	Clinical Research	CO1	To understand the various approaches for a new drug discovery
		CO2	To understand the principles and phases in clinical trial of drug
		CO3	To understand the various guidelines associated with clinical trials
		CO4	To understand the various regulatory requirements in India and other countries to conduct clinical trials
		CO5	Recognise differing roles and obligations of the Investigator, Sponsor and Institutional Review Board
		CO6	To understand the various documents associated with clinical trials
22PY6502T	Pharmacoepidemiology and	CO1	Understand the scope, need, origin and evaluation of Pharmacoepidemiology
	Pharmacoeconomics	CO2	To understand the importance of Measurement of outcomes in Pharmacoepidemiology
		CO3	Recommend suitable method for measuring the outcome of Pharmacoepidemiology for a disease
		CO4	Suggest an appropriate Pharmacoepidemiological method for a given drug and address the risks associated with Pharmacoepidemiological study
		CO5	Understand the basic principles, role and relevance of Pharmacoeconomics in the development of a new drug
		CO6	Identify and justify an appropriate evaluation method for Pharmacoeconomics study of a disease
22PY6503T	Clinical Pharmacokinetics	C01	Discuss the pharmacokinetic principles to individualize drug therapy in patient care situations
	&Pharmacotherapeutic	CO2	To understand the methods to calculate various dosage regimens
	Drug Monitoring	CO3	To understand the principles of pharmacokinetics to analyse and predict drug interactions
		CO4	To understand the concepts of therapeutic drug monitoring
		CO5	To understand the dose adjustment in renal and hepatic disorders
		CO6	To understand the concepts of population pharmacokinetics
22PY650N4	Clerkship	COI	Understand the role of Pharmacist in clinical pharmacy services
		CO2	Demonstrate the skills of a clinical Pharmacist
		CO3	Understand the available therapeutic options in the

PRINCIPAL
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			management of diseases
		CO4	Prepare a pharmaceutical care plan for a given case
		CO5	Detect, Interpret and report medication errors
		CO6	Detect, Interpret and report drug interactions
22PY650E5	Project (Six months)	CO1	Address a problem related to Pharmacy practice in hospital, community service or clinical set up with a wider perspective and generality
		CO2	Address and translate the problem into a statement of aim,
		CO3	Objectives, scope and plan for the project
		CO4	Preparation of report an information survey and take account of findings in executing project
		CO5	Evaluate, select and apply relevant theories and techniques from the full range of courses studied using conceptual models and frameworks to enhance depth of understanding
	CO6	Select appropriate methodology for investigative work, taking into account the pros and cons of the alternatives available and develop solution proposals based on reasoned judgement	
22PY660N1	Internship	CO1	Understand the pathophysiology of disease states and the rationale for drug therapy
		CO2	Acquire the knowledge on available therapeutic options to provide patient care in co-operation with patients, prescribers, and other members of an interprofessional health care team
		CO3	Identify, manage and use resources of the health care system, in cooperation with patients,
		CO4	Prescribers, other health care providers
		CO5	Analyse the therapeutic approaches to promote health improvement, wellness, and disease prevention
		CO6	Develop leadership qualities to function effectively as a member of the health care team

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Academic Professor I/C

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