

Koneru Lakshmaiah Education Foundation

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

Accredited by NAAC as 'A++' ◆Approved by AICTE ◆ ISO 21001:2018 Certified Campus: Green Fields, Vaddeswaram - 522 302, Guntur District, Andhra Pradesh, INDIA. Phone No. +91 8645 - 350 200; www.klef.ac.in; www.klef.edu.in; www.kluniversity.in Admin Off: 29-36-38, Museum Road, Governorpet, Vijayawada - 520 002 Ph; +91 - 866 - 3500122, 2576129

KL College of Pharmacy

Program: Pharm. D

Academic Year: 2024-2025

Course Code	Course Title	CO.	Description of the course Outcome
Code		COI	Understand the anatomy and physiology o Elementary tissues and to study about basic terminologies used in HAP, detail About hemopoietic and Lymphatic system
22PY6101T	Human Anatomy and	CO2	Understand the in detail about Cardiovascular and Respiratory system
221 101011	Physiology	CO3	Understand the in detail about Digestive and Nervousystem
		CO4	Understand the in detail about Urinary and Endocrine system.
		CO5	Understand the in detail about anatomy and function of sense organs, and process of reproduction
		CO6	Understanding the skeletal system of humans and sports physiology
22PY6101P Human Anatomy and Physiology	50	COI	Application of gross morphology of body organ using microscope and Determining blood cell coun Determining ESR, Blood Haemoglobin and Bleeding time
		CO2	Determination of Blood pressure and Blood grou 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	
		COI	To gain knowledge on different dosage forms History of Pharmacy, and pharmacopoeias
22PY6102T	Pharmaceutics	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

S. francen

		CO5	To understand the concepts of suppositories and Gelanicals
		CO6	To gain the knowledge on Surgical aids and incompatibilities
22PY6102P	Pharmaceutics	COI	Preparation of liquid orals
		CO2	Preparation of lotions, emulsions Powders and
		1000000	Suppositories
		CO3	Preparation of Incompatibilities, ear drops and paste
22PY6103T	Medicinal Biochemistry	COI	Understand the catalytic activity of enzymes and importance of isoenzymes in diagnosis of disease and role of carbohydrates and their metabolic disorders
		CO2	Understand the role of carbohydrates and their metabolic disorders and biological oxidation process in body.
		CO3	Understand the concepts of proteins, amino acids and genetic organization in mammalians.
		CO4	Analyse the clinical chemistry of cell and kidney 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
22PV6103P	Medicinal Biochemistry	COI	Qualitative analysis of urine and blood
221 101051	Wedleman Broenemistry	CO2	Estimation of Liver and kidney parameters
		47/2010/00	Experiments on lipid profile parameters and enzyme
		CO3	activities and electrolyte estimations
22PY6104T	Pharmaceutical Organic Chemistry	CO1	Understand the IUPAC/Common system of nomenclature of simple organic compounds
	Chemistry	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
THE PART OF STREET, ST	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, anilide and nitro compounds

S. Promeen

		CO3	To understand the detailed pathogenesis of cancer
-		1000000000	related to immunity
		CO2	adaptations and inflammation To understand the pathophysiology of diseases
22PY6201T	Pathophysiology	COI	poisonous animals. To understand the basic principles of cell injury.
		CO3	morphology and plant physiology. Application of biological principles in study of taxonomy, microorganisms, animals and other
	/ 1	CO2	Application of biological principles in studying
22PY610B6P	Remedial Biology	CO1	Generalize the Organisation of plants, plant tissues and plant kingdom and application of biological principles in study of plant kingdom.
		CO6	Laplace transform
		CO5	Differential equations
		CO4	Integral Calculus
		CO3	Differential calculus and Partial differentiation
		CO2	Analytical Geometry: Points, Straight line, circle, parabola
22PY610M6T	Remedial Mathematics	COI	mammals Algebra: Determinants, Matrices Trigonometry: Sides and angles of a triangle, solution of triangles
		CO6	To gain the knowledge on general organization of
		CO5	Understanding the anatomy of frog
		CO4	Understand the plant physiology and study of different microorganisms
		CO3	Understand the taxonomy of plants, fruits and seeds
	7		features of the plants.
		CO2	Understand the plants morphology and salient
22PY610B6T	Remedial Biology	COI	Understand the classification and salient features of plant kingdoms
		CO3	Estimation of mixtures and preparation of selected organic compounds
	Inorganic Chemistry	CO2	Analyze the purity of selected inorganic compounds
22PY61105P	Pharmaceutical	COI	Test for identification of impurities and selected inorganic compounds
		CO6	Understand the importance of inorganic pharmaceuticals in preventing and curing the diseases.
		CO5	Understand the role of electrolyte replenishers and essential trace elements to maintain physiological balance & MOA of antimicrobials
		CO4	Understand the role of medicinal gases and drugs used to treat gastrointestinal diseases.
		CO3	Application of principle of limit tests in identifying the impurities
	Inorganic Chemistry	CO2	Application of principles and procedures of analysis of drugs
			errors and concepts of indicators in volumetric
22PY61105T	Pharmaceutical	COL	Make Use of Analytical knowledge in identifying

S. Romeen

		CO4	To Understand the Biological effects of radiation Environmental and nutritional diseases
		CO5	To understand pathophysiology of common diseases
		CO6	To understand pathogenesis of Infectious diseases
22PY6202T	Pharmaceutical	COL	Understand methods of identification, classification and relationship among various microorganisms
	Microbiology	CO2	Understand nutritional requirements, cultivation and preservation of various microorganisms
		CO3	Understand the importance and implementation of sterilization in pharmaceutical processing and industry
		CO4	Understand and learn disinfectants, procedures o disinfection for pharmaceutical products.
		CO5	Understand the immune system, Antigen-Antibody reactions, immunization programs, and diagnostic tests for parasites
		CO6	Understand the microbial assays and differen infectious diseases
22PY6202P	Pharmaceutical Microbiology	COI	Understand various equipment's used in experimental microbiology; Apply knowledge to perform the preparation of culture media and sterilization of glassware, identification of bacteria by staining methods
		CO2	Understand and apply the knowledge for isolation cultivation and preservation of variou microorganisms, testing for sterility fo pharmaceuticals
		CO3	To apply and perform microbial assays, perform bacterial microbial assays for vitamins and antibiotics. To perform the relative cellular volum assays of microbes, diagnostic tests of typhoid and malaria.
22PY6203T	Pharmacognosy and Phytopharmaceuticals	COI	To know the history and scope of Pharmacognos
		CO2	Know about the cultivation, collection, and processing of crude drugs and study of cel 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 an understand different methods of adulteration of crud drugs
22PY6203P	Pharmacognosy and Phytopharmaceuticals	COI	To perform macroscopy, microscopy, and powde characteristics of natural drugs.
	- ny reprintinged treats	CO2	To perform macroscopy, microscopy, and powder characteristics of natural drugs.
		CO3	To apply and perform the different chemical tests

S. Prancen

22PY6204T	Pharmacology-I	COI	Understanding the pharmacological actions of different categories of drugs
		CO2	Understand the pharmacology of drugs acting or Autonomic nervous system
		CO3	Understand the pharmacology of drugs acting or cardio vascular system
		CO4	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	COI	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	Pharmacotherapeutics-I	COI	To understand etiopathogenesis and Pharmacotherapy of CVS diseases (Hypertension Congestive cardiac failure, Angina Pectoris)
		CO2	To understand etiopathogenesis and Pharmacotherapy of CVS diseases (Myocardia 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	COI	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	COI	To understand the pharmacology of drugs acting of blood and blood forming agents and Renal system
		CO2	To understand the pharmacology of chemotherapy

S. Prancen

		CO4	To acquire the knowledge on cell, macromolecules, cell signalling, DNA replication and cell cycle.
		CO5	To understand the iimportance of gene and its structure, genome, gene expression, recombinant DNA technology and other associated aspects
	J 1	CO6	To understand the iimportance of RNA and other associated aspects
22PY6301P	Pharmacology-II	COI	To understand the laboratory animals and their handling, To know the importance of solutions and laboratory appliances used in experimental pharmacology, Understand the anaesthetics used in laboratory animals,
		CO2	Application of bioassays Ach
		CO3	Applications of bioassays of histamine, to understand the demonstrate intraperitoneal and intramuscular routes of administration of drugs in animals and describe different anaesthetics used in laboratory animals
22PY6302T	Pharmaceutical Analysis	COI	To understand the importance of various documentation practices followed in pharmaceutical industry
		CO2	To understand the knowledge about assay of pharmaceutical substance and product
		CO3	To develop basic practical skills using instrumental 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	COI	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	Pharmacotherapeutics-II	COI	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
		CO6	To understand the etiopathogenesis and

S. francen

			pharmacotherapy of Dermatology
22PY6303P	Pharmacotherapeutics-II	COI	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	COI	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 Pharmac Act 1948
		CO4	To understand the various provisions of Medicina and Toilet Preparation Act 1955
		CO5	To understand the various provisions of NDPS Ac 1985
222242		CO6	To understand the various Indian pharmaceutica Acts and Laws
22PY6305T	Medicinal Chemistry	CO1	To understand the different modern techniques o drug design and their importance
		CO2	To know the metabolism, adverse effect, and therapeutic activity of anti-infective, anti-funga agents
		CO3	To understand the concept of chemotherapy fo cancer and microbial diseases and different anti-vira agents
		CO4	To explore the mechanisms involved in the cardiad 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 pharmaceutica 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	Pharmaceutical Formulations	COI	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 preparation
		CO5	To understand the manufacturing methods of semisolid, and ophthalmic products
		CO6	To understand the concepts of Novel Local drug delivery system

S. Jeansen

22PY6306P	Pharmaceutical Formulations	COI	Prepare formulations of tablets and capsules, coating of the tablets.
		CO2	To prepare various parenteral products, different dosage forms by performing quality control tests as per the batch formula
		CO3	Prepare and evaluate various semi-solid preparations cosmetics such as lipstick, cold cream and shampoo
22PY6401T	Pharmacotherapeutics- III	COI	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-	COI	To analyse Case studies on gastrointestinal system.
	III	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	COI	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

S. Premer

22PY6403T	Clinical Pharmacy	COI	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	COI	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 laboratory investigations.
		CO3	To analyse conduct interview to elicit the patient past medication history and ADR analysis.
22PY6404T	Biostatistics & Research Methodology	CO1	To understand the concept of clinical study designs 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	To understand the computer applications in pharmacy
22PY6405T	Biopharmaceutics & Pharmacokinetics	COI	Understand the concepts of biopharmaceutics
		CO2	Understand the process of metabolism and excretion
		CO3	Understand the concept of pharmacokinetics with the use of one compartment open model.
		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 bioequivalence
22PY6405P	Biopharmaceutics & Pharmacokinetics	COI	Compare the in-vitro drug release profile of different marketed products, Perform the solubility enhancement techniques for improvement of drug release of poorly water-soluble drugs.
		CO2	Estimate the bioavailability (absolute and relative) 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

S. Promeen

22PY6406T	Clinical Toxicology	COI	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
			its management by various therapeutic agents
		CO5	To understand the poisoning caused by plant and animal sources
		CO6	To understand the etiology and management of
			substance abuse
22PY6501T	Clinical Research	COI	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
2201// 5225			clinical trials
22PY6502T	Pharmacoepidemiology and	COI	Understand the scope, need, origin and evaluation of Pharmacoepidemiology
	Pharmacoeconomics	CO2	To understand the importance of Measurement of
	Filarmacoeconomics		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
		001	drug
		CO6	Identify and justify an appropriate evaluation method
22PY6503T	Clinical	COI	for Pharmacoeconomics study of a disease Discuss the pharmacokinetic principles to
221 103031	Pharmacokinetics	COI	individualize drug therapy in patient care situations
	Contraction to a contract to the contract to t	CO2	To understand the methods to calculate various
	&Pharmacotherapeutic Drug Monitoring	COZ	dosage regimens
		CO3	To understand the principles of pharmacokinetics to
		08080350	analyse and predict drug interactions
		CO4	To understand the concepts of therapeutic drug
		COS	monitoring
		CO5	To understand the dose adjustment in renal and
		CO6	hepatic disorders To understand the concepts of population
		000	To understand the concepts of population pharmacokinetics
22PY650N4	Clerkship	COI	Understand the role of Pharmacist in clinical
	Cicinomp	201	pharmacy services
		CO2	Demonstrate the skills of a clinical Pharmacist
		CO3	
		COS	Understand the available therapeutic options in the

L. Premeen

			management of diseases
		CO4	Prepare a pharmaceutical care plan for a given case
		COS	Detect, Interpret and report medication errors
		CO6	Detect, Interpret and report drug interactions
22PY650E5	Project (Six months)	COI	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 o aim,
		CO3	Objectives, scope and plan for the project
, 1		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 proposal based on reasoned judgement
22PY660N1	Internship	COI	Understand the pathophysiology of disease states and
		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

L. Seaveer
Academic Professor I/C

Principal
PRINCIPAL
KL College of Pharmacy
(Deemed to be University)
Green Feilds, Vaddeswaram-522502
Guntur District, Andhra Pradesh.