

COURSE OUTCOMES
DOCTOR OF PHARMACY

Course:	Code: 1.1T Human Anatomy and Physiology
CO1	Describe the structure (gross and histology) and functions of various organs of the human body
CO2	Describe the various homeostatic mechanisms and their imbalances of various systems
CO3	Identify the various tissues and organs of the different systems of the body
CO4	Perform the hematological tests and record BP, heart rate, pulse and respiratory volumes
CO5	Appreciate coordinated working patterns of different organs of each system and interlinked mechanisms in the maintenance of normal functioning of the human body
Course:	Code: 1.2T Pharmaceutics
CO1	Know the formulation aspects of different dosage forms
CO2	Understand the professional way of handling the prescription, development of pharmacy profession and its history
CO3	Do different pharmaceutical calculation involved in formulation
CO4	Formulate different types of dosage forms
CO5	Appreciate the importance of good formulation for effectiveness, use of surgical aids in pharmaceuticals and pharmaceutical incompatibilities.
Course:	Code: 1.3T Medicinal Biochemistry
CO1	Describe the function of cell, electrolytes, concepts of biological oxidation & bioenergetics
CO2	To understand the catalytic activity of enzymes and importance of isoenzymes and its diagnostic applications
CO3	To know the metabolic process of biomolecules in health and illness
CO4	To understand the genetic organization of mammalian genome, protein synthesis, replication, mutation and repair mechanism.
CO5	To know the biochemical principles of organ function test of kidney, liver & endocrine gland

Course:	Code: 1.4T Pharmaceutical Organic Chemistry
CO1	IUPAC/ common system of nomenclature of simple organic compounds belonging to different classes of organic compounds
CO2	Achieve an understanding of aliphatic reactions, mechanism of organic compounds and to establish a foundation for studies into natural and synthetic products of pharmaceutical interest and also to acquire the knowledge of reactivity/stability and orientation of organic compounds
CO3	Achieve an understanding of aromatic reactions, mechanism of organic compounds and to establish a foundation for studies into natural and synthetic products of pharmaceutical interest and also to acquire the knowledge of reactivity/stability and orientation of organic compounds.
CO4	Some named organic reactions with mechanisms and oxidation reduction reaction
CO5	Methods of preparation, test for purity, principle involved in the assay, important medicinal uses of some important organic compounds
Course:	Code: 1.5T Pharmaceutical Inorganic Chemistry
CO1	Explain the definition and description of errors, commonly developed during drug analysis and methods to minimize
CO2	Explain the basic concepts of principle and methods involved in volumetric analysis and gravimetric analysis to estimate the drugs
CO3	Able to explain the definition, source of impurities, principle and methods of limit test to control common impurities in pharmaceuticals
CO4	Understand to get knowledge about extra and intra cellular electrolytes, medicinal gases and radio pharmaceuticals
CO5	Complete knowledge on preparation, principle, medicinal importance and methodology of different assays of inorganic compounds
Course:	Code: 2.1T Pathophysiology
CO1	Define the basic pathogenesis of human disease
CO2	Define and explore the most common etiologies and predisposing factors associated with human disease
CO3	Understand the basics for some laboratory tests and other diagnostic procedures
CO4	Correlate between pathophysiology and clinical skills they are learning in their allied health science programs
CO5	Understand how the various organ systems are interrelated, and use this understanding to promote a holistic approach towards the evaluation and treatment of patients

Course:	Code: 2.2T Pharmaceutical Microbiology
CO1	Understand the world of microbiology, identify the microorganism based on the morphology and structure and growth and nutritional requirements of the organism
CO2	To learn the cultivation and identification of the microorganisms in the laboratory
CO3	To know the sterilization types, disinfectants, antibiotics, vitamins it's evaluation and sterility testing of pharmaceutical products
CO4	Learn the types of immunity, Antigen-Antibody reactions, bacterial vaccines and toxoids
CO5	Understand the infectious diseases, its history, pathogenesis, diagnostic tests, treatment and control
Course:	Code: 2.3T Pharmacognosy and Phytopharmaceuticals
CO1	History and scope of pharmacognosy, classification of crude drugs, cultivation, collection, processing and storage of crude drugs
CO2	Cell wall constituents and cell inclusions, microscopical and powder microscopical study of crude drugs, study of natural pesticides
CO3	Carbohydrates and related products, detailed study of oils
CO4	Study of plant fibers used in surgical dressings and related products
CO5	Different methods of adulteration of crude drugs
Course:	Code: 2.4T Pharmacology I
CO1	Students will know the pharmacology of drugs acting on different systems
CO2	A complete knowledge about stages of drug development both preclinical and clinical studies will be gained
CO3	The ability to correlate and apply the pharmacological knowledge to therapeutics will be acquired
CO4	Gain the knowledge about pharmacokinetics and mechanics of drug action at organ system or sub cellular or macromolecular level
CO5	Increased knowledge about drug mechanisms and their relevance to the treatment of diseases of various systems
Course:	Code: 2.5T Community Pharmacy
CO1	Students will be proficient in delineating the multifaceted roles and responsibilities of community pharmacists in pharmaceutical care and adept at dispensing
CO2	Outline the layout and requirements of community pharmacy. Study of prescription including drug interactions
CO3	Recognize need of inventory control and study of concepts of code of ethics
CO4	Discuss the factors affecting medication adherence and patient counseling. Discuss the drugs for minor ailments
CO5	Apply health screening services in community pharmacy. Role of pharmacist in health education and rationality of drugs

Course:	Code: 2.6T Pharmacotherapeutics I
CO1	Students will be able to describe the pathophysiology and management of cardiovascular, respiratory and endocrine diseases
CO2	Students will be developing patient case-based assessment skills
CO3	Students will be able to describe the quality use of medicines issues surrounding the therapeutic agents in the treatment of these diseases
CO4	Students will have developed clinical skills in the therapeutic management of these conditions
CO5	Students will provide patient-centered care to diverse patients using the evidence-based medicine
Course:	Code: 3.1T Pharmacology II
CO1	To learn about medicines used for cancer, inflammation, respiratory system, GIT, immune system and hormones
CO2	To understand the Pharmacological aspects of drugs acting on blood and renal system
CO3	To understand the importance of animal toxicology and fundamental aspects of cellular and molecular pharmacology
CO4	Know the pharmacological and therapeutic aspects of antimicrobial agents
CO5	To know about genome and its function
Course:	Code: 3.2T Pharmaceutical Analysis
CO1	Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
CO2	Describe the instrumentation of spectroscopy techniques
CO3	Understand the chromatographic separation and analysis of drugs
CO4	Discuss the applications of analytical techniques
CO5	Perform quantitative and qualitative analysis of drugs using various analytical instruments
Course:	Code: 3.3T Pharmacotherapeutics II
CO1	Know the pathophysiology of selected disease states and the rationale for drug therapy
CO2	Know the therapeutic approach to management of these diseases and the controversies in drug therapy
CO3	Preparation of individualized therapeutic plans based on diagnosis
CO4	Appreciate the needs to 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).
CO5	Role of pharmacist in essential and rational drug use

Course:	Code: 3.4T Pharmaceutical Jurisprudence
CO1	To practice the professional ethics and understand the various concepts of the pharmaceutical legislation in India
CO2	To know the various parameters in the drug and cosmetic act and rules and the drug policy, DPCO, patient and design act
CO3	To understand the labeling requirements and packaging guidelines for drugs and cosmetics
CO4	Able to understand the concepts of dangerous drugs act, pharmacy act and excise duties act
CO5	Know other laws as prescribed by the pharmacy council of India from time to time including international laws
Course:	Code: 3.5T Medicinal Chemistry
CO1	To understand the chemistry of drugs (mechanism of action) with respect to their pharmacological activity
CO2	To understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
CO3	To know the structural activity relationship (SAR) of different classes of drugs
CO4	Apply the principles of synthetic chemistry to predict the synthesis of drugs
CO5	Write the chemical classification and structure of drugs and understand the various concepts of drug design
Course:	Code: 3.6T Pharmaceutical Formulations
CO1	Understand the principle involved in formulation of various pharmaceutical dosage forms
CO2	Prepare various pharmaceutical formulation
CO3	Perform evaluation of pharmaceutical dosage forms
CO4	Understand and appreciate the concept of bioavailability and bioequivalence, their role in clinical situations
CO5	Appreciate the concept of bioavailability and bioequivalence, their role in clinical situations
Course:	Code: 4.1T Pharmacotherapeutics III
CO1	Know the effective use of non-pharmacological therapeutic interventions in the treatment of specific diseases, conditions and symptoms
CO2	Ability to answer the drug queries based on best available evidence, clinical expertise on the preparation and process of EBM and decision making on patient management
CO3	Initiate drug therapy and the anticipated therapeutic goals by therapeutic intervention
CO4	Gain knowledge regarding the etiology, pathogenesis, signs and symptoms, diagnosis and management of various pathological disease conditions
CO5	Understanding the treatment preference to special population such as pediatrics, geriatrics, immune compromised patients

Course:	Code: 4.2T Hospital Pharmacy
CO1	Get knowledge on hospital pharmacy, drug committees and policies of hospital
CO2	To know the various inventory control techniques and drug distribution methods
CO3	To know the manufacturing practices of pharmaceutical formulations in hospital set up and handling radiopharmaceuticals
CO4	To know the professional practice management skills of hospital pharmacists
CO5	Understand role of pharmacist in education & training programs
Course:	Code: 4.3T Clinical Pharmacy
CO1	Monitor drug therapy of patient through medication chart review and clinical review; ward round participation, pharmaceutical care
CO2	Obtain medication history interview and counsel the patients
CO3	Identify and resolve drug-related problems like assessing and monitoring adverse drug reactions and drug interactions etc.
CO4	Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states
CO5	Retrieve, analyze, interpret and formulate drug or medicine information
Course:	Code: 4.4T Biostatistics and Research Methodology
CO1	Recognize the importance of biostatistics in pharmacy
CO2	Explain the importance of research methods and pharmacoepidemiological Study
CO3	Discuss the methods of collection data and its statistical calculation and interpretation
CO4	Discuss and evaluate various software and computer applications for statistical analysis of data
CO5	Explain the various methods of testing hypotheses
Course:	Code: 4.5T Biopharmaceutics and Pharmacokinetics
CO1	To understand the concepts related to biopharmaceutics, absorption, distribution, metabolism and elimination
CO2	To select the pharmacokinetic model based on plasma level or urinary excretion data
CO3	Complete understanding on the models related to multicompartement models and design on dosage regimens
CO4	Detect potential clinical pharmacokinetic problems and solve them based on kinetics of drug following non -linearity and non-compartmental pharmacokinetics
CO5	Design bioavailability and bioequivalence studies of new drugs or dosage forms

Course:	Code: 4.6T Clinical Toxicology
CO1	To understand the basic Toxicological knowledge in the general principles involved in the management of poisoning, prevention and treatment of various poisoning
CO2	Ability to detect and differentiate acute and chronic poisoning by its clinical symptom
CO3	Ability to recognize and manage acute poisoning symptoms associated with various agents
CO4	Recognize the clinical symptoms and management of envenomation, food poisoning and poisoning by various plants
CO5	Detect signs and symptoms of drug abuse and suggest suitable remedial measures
Course:	Code: 5.1T Clinical Research
CO1	Know the new drug development process
CO2	Understand the regulatory and ethical requirements
CO3	Appreciate and conduct the clinical trials activities
CO4	Know safety monitoring and reporting in clinical trials
CO5	Manage the trial coordination process
Course:	Code: 5.2T Pharmacoepidemiology and Pharmacoeconomics
CO1	Discuss the scope, need, origin and recommend suitable measurement of outcomes in pharmacoepidemiology
CO2	Explain and address the risks associated with pharmacoepidemiological study
CO3	Describe and suggest an appropriate pharmacoepidemiological method for a given drug
CO4	Explain the sources of data and special applications of pharmacoepidemiology
CO5	Discuss the basic principles, role and relevance of pharmacoeconomics in the development of a new drug
Course:	Code: 5.3T Clinical Pharmacokinetics and Pharmacotherapeutics Drug Monitoring
CO1	Describe and apply the pharmacokinetic principles in dosing of drugs to specific population
CO2	Analyze the dosage regimen of drugs and predict drug interaction issues in the clinical setting
CO3	Recognize the clinical areas where implementation of TDM will have a positive effect on patient care
CO4	Gain knowledge on estimating the population pharmacokinetics parameters by various method
CO5	Discuss the concept of genetic polymorphism in metabolism, transport and target of drug
Course:	Code: 1.1P Human Anatomy and Physiology
CO1	Demonstrate the principle and working of various instruments
CO2	Identify of microscopical features of various types of cells and tissues
CO3	Identify gross anatomy and physiology of various bones
CO4	Appreciate coordinated working pattern of different organs of each system

Course:	Code: 1.2P Pharmaceutics
CO1	Able to understand principles involved in the preparation of different types of dosage forms
CO2	Able to formulate and evaluate the types of liquid dosage forms
CO3	Able to prepare the solid powder dosage forms
CO4	Reproduce the overview of the dosage forms and Viva voice
Course:	Code: 1.3P Medicinal Biochemistry
CO1	Able to understand principles and reaction involved in the determination of biomolecules in the body fluids
CO2	Able to analyze, determine and estimate normal and abnormal constituents of urine and blood samples sample
CO3	Able to do qualitative and quantitative determination of biomolecules in the body fluids
CO4	Study the enzymatic hydrolysis and factor affecting enzyme activity and viva voce
Course:	Code: 1.4P Pharmaceutical Organic Chemistry
CO1	Understand principles and reactions used in the detection of the extra elements present in organic compounds and know the principle for the preparation of suitable solid derivatives from organic compounds. Can determine the boiling/melting point of organic compounds
CO2	Detect the extra elements present in organic compounds and identify unknown organic compounds by systematic qualitative analysis
CO3	Preparation of suitable solid derivatives of organic compounds
CO4	To answer principles and procedures
Course:	Code: 1.5P Pharmaceutical Inorganic Chemistry
CO1	Capable of articulating the underlying principles governing limit tests, ion identification, purity tests, and various types of volumetric analysis, including assay principles
CO2	Utilize volumetric analysis for both quantitative estimation of drugs and mixtures
CO3	Conduct limit tests to detect impurities and perform identification tests to assess purity within the provided compounds
CO4	Acquire basic knowledge regarding general methods of preparation of inorganic compounds of pharmaceutical importance
Course:	Code: 2.2P Pharmaceutical Microbiology
CO1	Able to identify specific organism by using morphological, cultural and biochemical test
CO2	Study and practically apply the importance of aseptic techniques while handling materials in microbiological laboratory
CO3	Know microorganism growth multiplication and their industrial usage
CO4	To learn about microbial sensitivity testing and minimum inhibitory concentration and viva voce

Course:	Code: 2.3P Pharmacognosy and Phytopharmaceuticals
CO1	To identify morphology of crude drugs
CO2	To perform the powder and microscopic of crude drugs
CO3	Analyze the crude drugs by chemical test
CO4	To carry out the transverse section of plant parts to understand the arrangement of cells and tissues
Course:	Code: 2.6P Pharmacotherapeutics I
CO1	Able to understand the pharmacotherapy of the disease
CO2	Able to analyze and interpret case studies of various diseases
CO3	Students will develop effective communication skills by preparing and delivering case presentations on different diseases
CO4	Students will demonstrate proficiency in pharmacotherapy by engaging in viva sessions focused on the management of various diseases
Course:	Code: 3.1P Pharmacology II
CO1	To study the various animal models for experimental purposes
CO2	Explain about various drugs action on in- vitro Experimental animals (computer stipulated models)
CO3	Explain about various drugs action on in in-vivo Experimental animals (computer stipulated models)
CO4	Identify the commonly used laboratory animals and apparatus in pharmacology
Course:	Code: 3.2P Pharmaceutical Analysis
CO1	To recall the principle involved in spectroscopy and importance of absorption maximum in the estimation of organic compounds
CO2	To experiment with selected drugs by UV, Visible spectroscopy and fluorimetry
CO3	To characterize and quantify the organic compounds/amino acids/plant pigments by using various chromatographic and spectroscopic techniques
CO4	To maximize the knowledge on integration and interpretation of chromatograms and spectra. and viva- voce

Course:	Code: 3.3P Pharmacotherapeutics II
CO1	Analyze and interpret various diseases, integrating knowledge from multiple disciplines such as pathology, pharmacology, and clinical medicine to understand the etiology, pathophysiology, clinical manifestations, and management strategies for each condition
CO2	Able to articulate complex medical information clearly and concisely, utilizing appropriate terminology and evidence-based guidelines to support the case presentations
CO3	Enhancement of critical thinking and problem-solving abilities through the analysis of complex clinical scenarios and therapeutic dilemmas encountered in the management of diseases
CO4	Critical evaluation of treatment options, including drug selection, dosing regimens, and monitoring parameters, while considering factors such as patient characteristics, comorbidities, and drug interactions
Course:	Code: 3.5 P Medicinal Chemistry
CO1	Know about the principle of preparations, assay and ChemDraw, drug design
CO2	Analyze the purity and estimate medicinal compounds and standardization of solutions by different titrimetric analyses
CO3	Synthesize medicinal compounds by different chemical reactions and purify using recrystallization, calculating percentage yield
CO4	Understand diseases drugs, and the classification used for treatment (viva voice)
Course:	Code: 3.6P Pharmaceutical Formulations
CO1	Understand the principle involved in formulation of various pharmaceutical dosage forms
CO2	Prepare various pharmaceutical formulation
CO3	Perform evaluation of pharmaceutical dosage forms
CO4	Understand and appreciate the concept of bioavailability and bioequivalence, their role in clinical situations
Course:	Code: 4.1P Pharmacotherapeutics III
CO1	Able to understand the pharmacotherapy of all diseases
CO2	Capable of examining and deciphering case studies encompassing a range of illnesses.
CO3	Students can able to develop the patient case-based assessment Skills
CO4	Continue to develop communication skills

Course:	Code: 4.2P Hospital Pharmacy
CO1	Students can able to execute professional responsibilities of hospital pharmacist and identify drug related problems
CO2	The professional practice management skills in hospital pharmacies
CO3	Provide professional services like patient counseling and technical inputs for parenteral nutritional support
CO4	The manufacturing practices of various information in hospital setup
Course:	Code: 4.3P Clinical Pharmacy
CO1	Analyze and interpret various diseases, integrating knowledge from multiple activities such as counseling, ward round participation, history interview, drug information, and adverse drug reaction monitoring and management strategies for each condition
CO2	Able to articulate complex medical information clearly and concisely, utilizing appropriate terminology and evidence-based guidelines to support the case presentations
CO3	Enhancement of critical thinking and problem-solving abilities through the analysis of complex clinical scenarios and therapeutic dilemmas encountered in the management of diseases
CO4	Critical evaluation of treatment options, including drug selection, dosing regimens, and monitoring parameters, while considering factors such as patient characteristics, comorbidities, and drug interactions
Course:	Code: 4.5P Biopharmaceutics and Pharmacokinetics
CO1	Understand the concept related to pharmacokinetic parameters and protein binding, bioavailability and bioequivalence
CO2	Determine dissolution studies, Pharmacokinetic parameters
CO3	Solve the problems related to pharmacokinetic parameters, protein binding etc.
CO4	Detect potential clinical pharmacokinetic problems and apply basic pharmacokinetic principles to solve them and to understand the kinetics of the drugs following Nonlinearity and also the pathways involved in biotransformation of drugs
Course:	Code: 5.4 Clerkship
CO1	Able to understand the Pharmacotherapy of all diseases
CO2	Able to analyze and interpret case studies of various diseases and clinical Pharmacy related activities
CO3	Students will develop effective communication skills by preparing and delivering case presentations on different diseases and Clinical Pharmacy related activities
CO4	Students will demonstrate proficiency in pharmacotherapy by engaging in viva sessions focused on the management of various diseases