



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

Course Outcomes (CO's)

B-PHARMACY I st SEMESTER (I st YEAR) (PCI Regulation)			
Course	Course Code	COs Number	Course Outcomes (COs)
Human Anatomy and Physiology-I (Theory)	BP101 T		Upon completion of the Course student will be able to
		1	Explain the gross morphology, structure and functions of various organs of the human body.
		2	Describe the various homeostatic mechanisms and their imbalances.
		3	Identify the various tissues and organs of different systems of human body.
		4	To Perform the various experiments related to special senses and nervous system.
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmaceutical Analysis (Theory)	BP102T		Upon completion of the Course student will be able to
		1	Understand fundamentals & principles of analytical chemistry.
		2	Carryout various volumetric and electrochemical titrations
		3	Develop analytical skills
		4	Understand the knowledge about assay of pharmaceutical substances
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmaceutics I (Theory)	BP103 T		Upon completion of the Course student will be able to
		1	Know the history of profession of pharmacy factors influencing the dose of drug and dose calculations.
		2	Understand the basics of different dosage forms, pharmaceutical incompatibilities and pharmaceutical calculations
		3	Understand the professional way of handling the prescription
		4	Preparation of various conventional dosage form
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmaceutical Inorganic Chemistry (Theory)	BP104 T		Upon completion of the Course student will be able to
		1	Understand the history of pharmacopoeia, sources and types of impurities and describe the official methods of control like limit tests.
		2	Acquires knowledge on acids, bases, buffers, buffered isotonic solutions, methods of adjusting isotonicity and major extra and intra cellular



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			electrolytes and know the monographs of dental products.
		3	Classify the gastrointestinal agents and described the methods of preparation, properties, storage, assay and uses with marketed formulations of inorganic compounds in gastrointestinal agents.
		4	Classify the miscellaneous compounds and know the monographs of inorganic compounds in each category.
		5	To understand the radioactivity and study of different radioisotopes, storage, precautions and applications of radioactive substances.
Course	Course Code	COs Number	Course Outcomes (COs)
Communication skills (Theory)	BP105T		Upon completion of the Course student will be able to
		1	Understand and apply knowledge of human communication and language processes as they occur across various contexts, e.g., interpersonal, intrapersonal, small group, organizational, media, gender, family, intercultural communication, technologically mediated communication.
		2	Find, use, and evaluate primary academic writing associated with the communication discipline
		3	Develop knowledge, skills, and job-ready skills in Pharmaceutical industry that facilitate their ability to work collaboratively with others.
		4	Enhance communication competencies such as managing conflict, understanding small group processes, active listening, appropriate self-disclosure, and other work place norms.
		5	Learn interview skills.
Course	Course Code	COs Number	Course Outcomes (COs)
Remedial Biology (Theory)	BP106RBT		Upon completion of the Course student will be able to
		1	Know the anatomical Principles followed by scientists for classification of five kingdom animals and its salient features.
		2	Get knowledge on different parts of plants and its morphological and anatomical characters and its importance.
		3	Know the basic components of human anatomy & physiology of prescribed systems.
		4	Know the basic components in plant anatomy & physiology.
		5	Know the plant growth and its regulation.
		6	Know the basic structural and functional organization of living organism.



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Course	Course Code	COs Number	Course Outcomes (COs)
Remedial Mathematics (Theory)	BP106RMT		Upon completion of the Course student will be able to
		1	Know Basic mathematical operations
		2	Know trigonometry mostly used in any sciences.
		3	Draw lines, finding the equations for the purpose of relational study
		4	Know Basic calculus which is used in analytical study of their life sciences applications
		5	Know Some advanced calculations in Research or Project works
		6	Enrich analytical skills in research study
B-PHARMACY IInd SEMESTER (1st YEAR) (PCI Regulation)			
Course	Course Code	COs Number	Course Outcomes (COs)
Human Anatomy and Physiology II (Theory)	BP201T		Upon completion of the Course student will be able to
		1	Explain the gross morphology, structure and functions of various organs of the human body, Identify the various tissues and organs of different systems of human body
		2	Describe the various homeostatic mechanisms and their imbalances.
		3	Perform the hematological tests like blood cell counts, haemoglobin estimation, bleeding/clotting time etc and also record blood pressure, heart rate, pulse and respiratory volume.
		4	Appreciate coordinated working pattern of different organs of each system
		5	Appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmaceutical Organic Chemistry I(Theory)	BP202T		Upon completion of the Course student will be able to
		1	Understand the structure, name and theories of stability, reactivity and orientation.
		2	Understand the types of isomerism and synthesis of organic compounds.
		3	Understand the physical and chemical properties, account for reactivity, and effect of substituents and stability of compounds.
		4	Understand the reactions, name reactions and orientation of reactions.



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Course	Course Code	COs Number	Course Outcomes (COs)
Biochemistry (Theory)	BP203 T		Upon completion of the Course student will be able to
		1	To Understand the catalytic role of enzymes,
		2	To know the importance of enzyme inhibitors in design of new drugs, therapeutic and diagnostic applications of enzymes.
		3	Understand the metabolism of nutrient molecules in physiological conditions.
		4	Understand the metabolism of nutrient molecules in pathological conditions.
		5	Understand the genetic organization of mammalian genome and functions of DNA in the synthesis of RNAs and proteins.
Course	Course Code	COs Number	Course Outcomes (COs)
Pathophysiology (Theory)	BP204T		Upon completion of the Course student will be able to
		1	Explain age-related differences in physiologic and patho physiologic processes and their clinical manifestations.
		2	Explore the most common etiologies and pathogenesis of human disease.
		3	Explore the sign and symptoms of the human disease.
		4	Explore the most common etiologies and predisposing factors associated with infectious disease.
Course	Course Code	COs Number	Course Outcomes (COs)
Computer Applications in Pharmacy (Theory)	BP205T		Upon completion of the Course student will be able to
		1	Know various types of application of computers in pharmacy.
		2	Know the various types of databases.
		3	Know the various applications of databases in pharmacy
		4	Familiar with overview of the computers and MS-office
		5	Familiar with internet, WWW, browsing, HTML & e-mails.
		6	Familiar with Database management
Course	Course Code	COs Number	Course Outcomes (COs)
Environmental sciences (Theory)	BP206T		Upon completion of the Course student will be able to



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		1	Understand basics of environment like ecology, ecosystem, food chain, food web and ecological pyramids.
		2	Know the different natural sources and their conservation to save the environment.
		3	Know the current problems of environment and how to solve them, Role of individual in conservation of environment and natural resources.
		4	Understand the different factors of environmental pollution and measures to minimize it.
		5	Aware about hazards of disposal wastes from hospitals and pharmaceutical industries.
		6	Know the Disaster management in natural calamities.
B.Pharmacy IIIrd Semester (IInd Year) (PCI Regulation)			
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmaceutical Organic Chemistry II (Theory)	BP301 T		Upon completion of the Course student will be able to
		1	write the structure, name and the type of isomerism of the organic compound
		2	write the reaction, name the reaction and orientation of reactions
		3	account for reactivity/stability of compounds,
		4	prepare organic compounds
Course	Course Code	COs Number	Course Outcomes (COs)
Physical Pharmaceutics I (Theory)	BP302 T		Upon completion of the Course student will be able to
		1	Understand various physicochemical properties of drug molecules in the designing the dosage forms
		2	Know the principles of chemical kinetics & to use them for stability testing and determination of expiry date of formulations adjustments
		3	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms.
		4	Classify the complexes and determining the methods of analysis of complexes
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmaceutical Microbiology (Theory)	BP303 T		Upon completion of the Course student will be able to
		1	Understand methods of identification, cultivation and preservation of various microorganisms
		2	To understand the importance and implementation of sterilization in pharmaceutical processing and industry



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		3	Learn sterility testing of pharmaceutical products
		4	Carried out microbiological standardization of Pharmaceuticals
		5	Understand the cell culture technology and its applications in pharmaceutical industries.
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmaceutical Engineering (Theory)	BP304 T		Upon completion of the Course student will be able to
		1	To know various unit operations and perform various processes involved in pharmaceutical manufacturing
		2	To understand the material handling techniques.
		3	To carry out various test to prevent environmental pollution.
		4	To appreciate and comprehend significance of plant lay out design for optimum use of resources.
		5	To appreciate the various preventive methods used for corrosion control in Pharmaceutical industries.
B.Pharmacy IVth Semester (IInd year) (PCI Regulation)			
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmaceutical Organic Chemistry III (Theory)	BP401 T		Upon completion of the Course student will be able to
		1	Explain the stereo chemical aspects of organic compounds and stereo chemical reactions
		2	understand the methods of preparation and properties of organic compounds
		3	Familiar with synthesis, reactions, relative aromaticity of various heterocyclic compounds
		4	To know the medicinal uses and other applications of organic compound
		5	Brief information on mechanisms of various naming reactions.
Course	Course Code	COs Number	Course Outcomes (COs)
Medicinal Chemistry I (Theory)	BP402 T		Upon completion of the Course student will be able to
		1	understand the chemistry of drugs with respect to their pharmacological activity
		2	understand the drug metabolic pathways, adverse effect and therapeutic value of drugs
		3	know the Structural Activity Relationship (SAR) of different class of drugs



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		4	write the chemical synthesis of some drugs
Course	Course Code	COs Number	Course Outcomes (COs)
Physical Pharmaceutics II (Theory)	BP403T		Upon completion of the Course student will be able to
		1	Understand various physicochemical properties of drug molecules in the designing the dosage forms
		2	Know the principles of chemical kinetics & to use them for stability testing nad determination of expiry date of formulations
		3	Demonstrate use of physicochemical properties in the formulation development and evaluation of dosage forms
		4	Calculate the expiration date of different dosage forms and describe the accelerated stability studies
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmacology I (Theory)	BP404T		Upon completion of the Course student will be able to
		1	Understand the pharmacological actions of different categories of drugs
		2	Drug discovery and clinical evaluation of new drugs
		3	Explain the mechanism of drug action at organ system/sub cellular/ macromolecular levels
		4	Apply the basic pharmacological knowledge in the prevention and treatment of various diseases.
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmacognosy and Phytochemistry I (Theory)	BP405T		Upon completion of the Course student will be able to
		1	Know the techniques in the cultivation and production of crude drugs
		2	Know the evaluation techniques for the herbal drugs
		3	Get knowledge regarding Sources of crude drugs
		4	Get acknowledge about role of plants in Alternative systems of Medicine
		5	Get knowledge on Primary and Secondary metabolites of plants
B.Pharmacy V th Semester (III rd Year) (PCI Regulation)			
Course	Course Code	COs Number	Course Outcomes (COs)
Medicinal Chemistry II (Theory)	BP501T		Upon completion of the Course student will be able to
		1	Understand the chemistry of drugs with respect to their pharmacological activity



SANTHIRAM COLLEGE OF PHARMACY

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		2	Understand the drug MOA, metabolic pathways, adverse effect and therapeutic value of drugs
		4	Know the Structural Activity Relationship of different class of drugs
		5	Study the chemical synthesis of selected drugs
Course	Course Code	COs Number	Course Outcomes (COs)
Industrial Pharmacy I	BP502T		Upon completion of the Course student will be able to
		1	Know the various pharmaceutical dosage forms and their manufacturing techniques.
		2	Know various considerations in development of pharmaceutical dosage forms
		3	Formulate solid, liquid and semisolid dosage forms and evaluate them for their quality
		4	Understand about basics various formulations of Cosmetics and Pharmaceutical Aerosols
		5	To undersatand legal and official requirements for Packaging Materials Science and quality control tests.
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmacology II (Theory)	BP503T		Upon Completion of this Course student will be able to
		1	Understand the mechanism of drug action and its relevance in the treatment of different diseases
		2	Explain the pharmacology and rational use of drugs used for the treatment various endocrine disorders.
		3	Have basic knowledge of Pharmacology of autocooids
		4	Describe the principles, applications and types of bioassay, Evaluate the potency of unknown compound with reference to standard
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmacognosy and Photochemistry II (Theory)	BP504T		Upon Completion of this Course student will be able to
		1	Learn about biogenetic studies and significance in drug discovery
		2	Know detailed information about various secondary metabolites.
		3	Know Isolation, identification and analysis of phytoconstituents by various analytical techniques.
		4	Understand Industrial production, estimation, and utilization of phytoconstituents



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		5	basics of phytochemistry including application of various analytical techniques in extraction and purification of phytoconstituents.
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmaceutical Jurisprudence (Theory)	BP505T		Upon Completion of this Course student will be able to
		1	The Pharmaceutical legislations and their implications in the development and marketing of pharmaceuticals.
		2	Various Indian pharmaceutical Acts and Laws
		3	The regulatory authorities and agencies governing the manufacture and sale of pharmaceuticals
		4	The code of ethics during the pharmaceutical practice
B.Pharmacy VIth semester (IIIrd Year) (PCI Regulation)			
Course	Course Code	COs Number	Course Outcomes (COs)
Medicinal Chemistry III – (Theory)	BP601T		Upon completion of the Course student will be able to
		1	Understand the importance of drug design and different techniques of drug design.
		2	Understand the chemistry of drugs with respect to their biological activity.
		3	Know the metabolism, adverse effects and therapeutic value of drugs
		4	Know the metabolism, adverse effects and therapeutic value of drugs.
		5	Know the importance of SAR of drugs.
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmacology III – Theory (Theory)	BP602T		Upon completion of the Course student will be able to
		1	Know drugs used in respiratory disorders and GIT disorders
		2	Learn in detail about various infectious agents, mechanisms, sensitivity, and resistance of different antii nfectives.
		3	Gain knowledge about different antiviral drugs pharmacology. Antitubercular, antileprotics, use of MDT, and drug resistance
		4	Study in detail about cancer pathophysiology and pharmacology of different anticancer drugs, Immunosupressants
		5	Explain about toxicological studies and chronopharmacology.



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Course	Course Code	COs Number	Course Outcomes (COs)
Herbal Drug Technology (Theory)	BP603T		Upon completion of the Course student will be able to
		1	Get knowledge about herbs as raw materials, biodynamic agriculture and organic farming
		2	Know Indian systems of medicine, Ayurvedic formulation preparation
		3	Know the WHO and ICH guidelines for evaluation of herbal drugs, patenting and regulating aspects of herbal drugs.
		4	Get knowledge about various herbal drug interactions
		5	Get knowledge about herbal formulations, herbal cosmetics and herbal excipients, scope and future prospects of herbal drug industry, GMP in manufacturing of herbal drugs,
Course	Course Code	COs Number	Course Outcomes (COs)
Biopharmaceutics and Pharmacokinetics Theory	BP604T		Upon completion of the Course student will be able to
		1	Understand the basic concepts in biopharmaceutics and pharmacokinetics and their significance on the concept of drug distribution, protein binding – factors.
		2	Use of plasma drug concentration-time data to calculate the pharmacokinetic parameters to describe the kinetics of drug absorption, distribution, metabolism, excretion, elimination.
		3	To understand the concepts of bioavailability and bioequivalence of drug products and their significance.
		4	Understand various pharmacokinetic parameters, their significance & applications.
		5	Understand the concept of Linear and Non-Linear kinetics, mechanisms and method of assessments.
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmaceutical Biotechnology (Theory)	BP605T		Upon Completion of This Course Student will be able to
		1	Understanding the importance of Immobilized enzymes in Pharmaceutical Industries
		2	Genetic engineering applications in relation to production of pharmaceuticals
		3	Importance of Monoclonal antibodies in Industries
		4	Understand the use of microorganisms in fermentation technology



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		5	Understand different types of immunity, preparation of various vaccines and related products, hybridoma technology, Microbial transformation.
Course	Course Code	COs Number	Course Outcomes (COs)
Quality Assurance (Theory)	BP606T		Upon Completion of This Course Student will be able to
		1	understand the cGMP aspects in a pharmaceutical industry
		2	appreciate the importance of documentation
		3	understand the scope of quality certifications applicable to pharmaceutical industries
		4	understand the responsibilities of QA & QC departments
		5	Qualification of Analytical instruments, Analytical method Validation.
Course	Course Code	COs Number	Course Outcomes (COs)
Instrumental methods of Analysis	BP701T	1	Understand the interaction of matter with electromagnetic radiations and its applications in drug analysis
		2	Understand the chromatographic and Electrophoresis separation and analysis of drugs.
		3	Perform quantitative & qualitative analysis of drugs using various analytical instruments.
		4	Understand the Electrophoresis separation and analysis of drugs.
Course	Course Code	COs Number	Course Outcomes (COs)
Industrial Pharmacy II	BP 702 T	1	Know the process of pilot plant and scale up of pharmaceutical dosage forms
		2	Understand the process of technology transfer from lab scale to commercial batch
		3	Know different Laws and Acts that regulate pharmaceutical industry
		4	Understand the approval process and regulatory requirements for drug products
Course	Course Code	COs Number	Course Outcomes (COs)
Pharmacy Practice	BP 703 T	1	To know Hospital pharmacy and its organization, drug distribution methods in a hospital and identify drug related problems.
		2	To monitor drug therapy of patient through medication chart review and clinical review
		3	To interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states



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		4	To understand pharmaceutical care services and provide patient counseling in community pharmacy to improve patient quality of life
		5	To understand Hospital formulary and inventory control
Course	Course Code	COs Number	Course Outcomes (COs)
Novel drug delivery Systems	BP 704 T	1	To understand various approaches for development of Controlled drug delivery system
		2	To understand the criteria for selection of drugs and polymers for the development of Controlled drug delivery systems, their formulation and evaluation
		3	To understand various approaches for development of Sustained drug delivery system
		4	To understand the criteria for selection of drugs and polymers for the development of Sustained drug delivery systems, their formulation and evaluation
		5	To understand various approaches for development of Targeted drug delivery system



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Course Outcomes (CO's)

I PHARM. D (PCI Regulation)			
Course Title	Course Code	Cos Number	Course Outcomes
Human Anatomy & Physiology (Theory)	17T00101		Upon completion of the course student will be able to:
		1	Describe the structure (gross and histology) and functions of various organs of the human body.
		2	Describe the various homeostatic mechanisms and their imbalances of various systems.
		3	Identify the various tissues and organs of the different systems of the human body.
		4	Perform the hematological tests and also record blood pressure, heart rate, pulse and Respiratory volumes.
		5	Coordinated working pattern of different organs of each system and appreciate the interlinked mechanisms in the maintenance of normal functioning (homeostasis) of human body.
Pharmaceutics	17T00102	1	Know the formulation aspects of different dosage forms.
		2	Different pharmaceutical calculation involved in formulation.
		3	Formulate different types of dosage forms.
		4	Appreciate the importance of good formulation for effectiveness.
Medicinal Biochemistry (Theory)	17T00103	1	Understand the catalytic activity of enzymes and importance of isoenzymes in diagnosis of diseases;
		2	Know the metabolic process of biomolecules in health and illness (metabolic disorders).
		3	Understand the genetic organization of mammalian genome; protein synthesis, replication; mutation and repair mechanism.
		4	Know the biochemical principles of organ function tests of kidney, liver and endocrine gland.
		5	Qualitative analysis and determination of biomolecules in the body fluids.



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Pharmaceutical Organic Chemistry	17T00104	1	Learn basic information about organic chemistry & study of Aliphatic/Alicyclic Hydrocarbons.
		2	Acquire knowledge on nomenclature, classification & reactions of Hydrocarbons, Halogen Compounds-Aromatic, Polynuclear aromatic hydrocarbons.
		3	Acquire knowledge Alcohols, Ethers, Phenols, Nitro compounds.
		4	Acquire knowledge on Amines, Nitriles, is nitriles, Carbonyl Compounds, Carboxylic acids and their derivatives.
Pharmaceutical Inorganic Chemistry	17T00105	1	Understand the principles and procedures of analysis of drugs and regarding the application of inorganic pharmaceuticals.
		2	Know the analysis of the inorganic pharmaceuticals their applications.
		3	Appreciate the importance of inorganic pharmaceuticals in preventing and curing the disease.
Remedial Mathematics/Biology	17T00106	1	Know Trigonometry, Analytical geometry, Matrices, Determinant, Integration, Differential equation, Laplace transform and their applications.
		2	Solve the problems of different types by applying theory.
		3	Appreciate the important applications of mathematics in pharmacy.
		4	Aware of various naturally occurring drugs and its history, sources, classification, distribution and the characters of the plants and animals.
II PHARM. D (PCI Regulation)			
Pathophysiology	17T00201	1	Describe the etiology and pathogenesis of the selected disease states.
		2	Learn the signs, symptoms & complications of the diseases.
Pharmaceutical Microbiology	17T00202	1	Know the anatomy, identification, growth factors and sterilization of microorganisms.
		2	Know the mode of transmission of disease causing microorganism, symptoms of disease, and treatment aspect.



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		3	Get knowledge on cultivation and identification of the microorganisms in the laboratory;
		4	Acquire knowledge on identification of diseases by performing the diagnostic tests.
		5	Appreciate the behavior of motility and behavioral characteristics of microorganisms
Pharmacognosy & Phytopharmaceuticals	17T00203	1	Understand the basic principles of cultivation, collection, and storage of crude drugs;
		2	Know the source, active constituents, and uses of crude drugs.
		3	Appreciate the applications of primary and secondary metabolites of the plant.
Pharmacognosy & Phytopharmaceuticals	17T00208	1	Learn about Macro, powder and microscopic study of various crude drugs.
		2	Identification of various carbohydrates by chemical test.
		3	Chemical evaluation of crude drugs.
Pharmacology – I	17T00204	1	Understand the pharmacological aspects of drugs falling under the above mentioned chapters.
		2	Handle and carry out the animal experiments.
Community Pharmacy	17T00205	1	Know pharmaceutical care services.
		2	Know the business and professional practice management skills in community pharmacies.
		3	Patient counseling & provide health screening services to public in community pharmacy;
		4	Respond to minor ailments and provide appropriate medication;
		5	Show empathy and sympathy to patients.
		6	Appreciate the concept of Rational drug therapy.
Pharmacotherapeutics - I	17T00206	1	Gain knowledge on pathophysiology of selected disease states and the rationale for drug therapy & therapeutic approach to management of these diseases.
		2	Understand importance of preparation of individualized therapeutic plans based on diagnosis.



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		3	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).
		4	Describe the pathophysiology of selected disease states and explain the rationale for drug therapy.
		5	Understand of the health and economic implications of toxic exposures.
		6	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).
III PHARMA D (PCI Regulations)			
Pharmacology – II	17T00301	1	Understand the pharmacological aspects of drugs falling under Blood, blood forming agents, Renal System, Immunopharmacology & chemotherapeutic agents.
		2	Appreciate the importance of pharmacology subject as a basis of therapeutics.
		3	Understand the Principles of Animal toxicology.
Pharmaceutical Analysis	17T00302	1	Gain knowledge on various quality assurance aspects reference to pharmaceutical industry.
		2	Learn various electrochemical techniques, modern analytical instrumental.
		3	Techniques viz spectroscopy and chromatography.
Pharmacotherapeutics – II	17T00303	1	Know the pathophysiology of selected disease states and the rationale for drug therapy.
		2	Know the therapeutic approach to management of these diseases.
		3	Know the controversies in drug therapy.
		4	Know the importance of preparation of individualized therapeutic plans based on diagnosis.
		5	Appreciate the needs to identify the patient-specific parameters relevant in initiating drug therapy, and monitoring



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			therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).
Pharmaceutical Jurisprudence	17T00304	1	Practice the Professional ethics.
		2	Understand the various concepts of the pharmaceutical legislation in India.
		3	Know the various parameters in the Drug and Cosmetic Act and rules.
		4	Know the Drug policy, DPCO, Patent and design act;
		5	Understand the labeling requirements and packaging guidelines for drugs and cosmetics.
		6	Understand the concepts of Dangerous Drugs Act, Pharmacy Act and Excise duties Act.
		7	Other laws as prescribed by the Pharmacy Council of India from time to time including International Laws.
Medicinal Chemistry	17T00305	1	Acquire skill in the structure of drugs and their biological activities.
		2	Gain knowledge on chemical nomenclature, SAR, mechanism of action, synthesis of important compounds, side effects.
		3	Brand names of important marketed products of drug class like Anti-infective agents, Antimalarials, Antibiotics, Antineoplastic agents, Cardiovascular agents, Hypoglycemic agents, Thyroid, Antithyroid agents, Diuretics, Diagnostic agents, Steroidal Hormones and Adrenocorticoids.
Pharmaceutical Formulations	17T00306	1	Understand the principle, preparation & evaluation involved in formulation of various pharmaceutical dosage forms.
		2	Understand and appreciate the concept of bioavailability and bioequivalence, their role in clinical situations.
IV PHARM. D (PCI Regulation)			
Pharmacotherapeutics –III	17T00401	1	Understand the pathophysiology of selected disease states, rationale for drug therapy, management, controversies in drug therapy
		2	Gain knowledge on importance of preparation of individualized therapeutic plans based on diagnosis.



SANTHIRAM COLLEGE OF PHARMACY

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NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

		3	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).
		4	Describe the pathophysiology of selected disease states and explain the rationale for drug therapy.
		5	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).
Hospital Pharmacy	17T00402	1	Know various drug distribution methods.
		2	Know the professional practice management skills in hospital pharmacies.
		3	Provide unbiased drug information to the doctors.
		4	Know the manufacturing practices of various formulations in hospital set up.
		5	Appreciate the practice based research methods.
		6	Appreciate the stores management and inventory control.
Clinical Pharmacy	17T00403	1	Monitor drug therapy of patient through medication chart review and clinical review.
		2	Obtain medication history interview and counsel the patients.
		3	Identify and resolve drug related problems.
		4	Detect, assess and monitor adverse drug reaction.
		5	Interpret selected laboratory results (as monitoring parameters in therapeutics) of specific disease states.
		6	Retrieve, analyses, interpret and formulate drug or medicine information.
Biostatistics And Research Methodology	17T00404	1	Develop the ability to apply the methods while working on a research project work.
		2	Describe the appropriate statistical methods required for a particular research design.



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

		3	Choose the appropriate research design and develop appropriate research hypothesis for a research project.
		4	Develop a appropriate framework for research studies
Biopharmaceutics And Pharmacokinetics	17T00405	1	Acquire knowledge on the factors influencing absorption,
		2	Calculate the pharmacokinetic parameters based on plasma level-time data & urine data.
		3	Understand the importance of clinical pharmacokinetics and the bioavailability.
Clinical Toxicology	17T00406	1	Understand of the health and economic implications of toxic exposures.
		2	Understand of general toxicology principles and clinical management practice.
		3	Understand the roles of various health care personnel in the prevention and management of poisonings.
Clinical Research	17T00501	1	Various Approaches to drug discovery
		2	Various steps in Clinical development of drug
		3	Learn about Good Clinical Practice, regulatory environment in USA, Europe and India
		4	Knowledge on clinical study documents (protocol, CRF, ICF, PIC with assignment)
V PHARM. D (PCI Regulation)			
Clinical Pharmacokinetics and Therapeutic Drug Monitoring	17T00503	1	Understand the basics principles and applications of pharmacokinetics in designing the individualized dosage regimen, to interpret the plasma drug concentration profile in altered pharmacokinetics, drug interactions and in therapeutic drug monitoring processes to optimize the drug dosage regimen.
		2	Enables students to understand the basic concepts of pharmacogenetics, pharmacometrics for modeling and simulation of pharmacokinetic data.
Clerkship		1	Impart the use resources of the health care system, in cooperation with patients, prescribers, other health care providers, and administrative and



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

			supportive personnel, to promote health.
		2	To provide, assess, and coordinate safe, accurate, and time-sensitive medication distribution; and to improve therapeutic outcomes of medication use.
Project		1	Develop data collection and reporting skills in the area of community, hospital and clinical pharmacy.
		2	Get data working on specific area/specialization hospital and clinical pharmacy
		3	Prepare written document comprising of objectives of the work, methodology, results, discussions and conclusions.
VI PHARM. D (PCI Regulation)			
Internship		1	Learn about various diseases & treatment regimen by working in different departments in hospital areas.
		2	Gain knowledge on finding of ADRs in prescription
		3	Gain knowledge on finding of correction of ADRs.



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

PROGRAMME: M. PHARMACY

DEPARTMENT OF PHARMACEUTICS

Programme Outcomes (POs)

1. Knowledge on principles of drug delivery system in the development of eco-friendly, efficacious dosage forms.
2. Ability to undertake multidisciplinary tasks in the pharmaceutical quality system.
3. Analyze, criticize, organize, improvise and manage documents, data and information related to pharmaceutical production process.
4. Absorb ethical practices and moral values in personal and professional endeavours.
5. Execute team based research to implement innovative solutions in the area of formulation, quality assurance and technology transfer.
6. Apply problem-based learning approach and analytical thinking in academic and professional
7. Validate the knowledge and skills gained through education to gain recognition in Pharmaceutical society and related field.
8. Set-up pharmaceutical production unit to design and formulate pharmaceutical dosage form.



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

Course Outcome (CO's)

M.PHARM (Pharmaceutics I st Sem) PCI Regulation			
Modern Pharmaceutical Analytical Techniques	21S01101		Upon completion of the course student will be able to
		1	The analysis of various drugs in single and combination dosage forms
		2	Theoretical and practical skills of the instruments
Advanced Physical Pharmaceutics	21S03101	1	The students will know particle size analysis method, solid dispersion, physics of tablets, polymer classification and its applications
		2	Student will also know the stability calculations, shelf life calculations and accelerated stability studies.
		3	They also know the rheology, absorption related to liquids and semi-solid dosage forms.
		4	They also know the factors affecting the dissolution and solubility in related to <i>in vitro/in vivo</i> correlations.
Modern Pharmaceutics – I	21S03102	1	Students shall explain the preformulation parameters, apply ICH guidelines and evaluate drug, drug excipients compatibility.
		2	Students also explain about formulation and development, use of excipients in tablets, powders, capsules, micro-encapsules and coating techniques.
		3	They also learn and apply the statistical design in different formulations
Advanced Biopharmaceutics & Pharmacokinetics	21S03103	1	Students will be able to tell factors affecting the bioavailability and stability of dosage form; they also know the bioequivalence studies and protocols for bioequivalent studies.
		2	They also know the parameters for the disposition, absorption and Michaelis-Menton constants for nonlinear kinetics.
M.PHARM (Pharmaceutics II nd Sem) PCI Regulation			
Modern Pharmaceutics - Ii	21S03201	1	Students will understand the planning of pilot plant techniques



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

			used for all pharmaceutical dosage forms such as tablets
		2	Students will understand the planning of pilot plant techniques used for all pharmaceutical dosage forms such as capsules, parenterals
		3	Students will understand the planning of pilot plant techniques used for all pharmaceutical dosage forms such as aerosols, cosmetics
		4	Students will understand the planning of pilot plant techniques used for all pharmaceutical dosage forms neutraceuticals
Advanced Drug Delivery Systems	21S03202	1	The students shall apply the pharmacokinetic and pharmacodynamic principles in the design of CDDS.
		2	Students will select the drugs for CDDS design of the formulation fabrication of oral, parenteral drug delivery systems
		3	Students will select the drugs for CDDS design of the formulation fabrication of Transdermal, implants Drug delivery systems
		4	Bio adhesives and targeted drug delivery systems.
Industrial Pharmacy	21S03203	1	The students will explain the machinery involved in milling, mixing, filtration, drying and packing material constructions used in the production of pharmaceutical materials
		2	They also learn salient feature1s of GMP, TQM applicable in industry.
		3	They also understand the effluent treatments and prevent the pollution.
		4	They also should evaluate the validation of analytical methods and processes
Nano Drug Delivery Systems	21S03204	1	The students should be able to select the right kind of materials, able to develop nano formulations with appropriate technologies
		2	Evaluate the product related test and for identified diseases



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

DEPARTMENT OF INDUSTRIAL PHARMACY

Programme Outcomes (POs)

1. Smear the principles of the drug delivery system in the expansion of ecological, efficient dosage forms.
2. Advancement in taking multidisciplinary tasks in the pharmaceutical formulations and imparting quality in them.
3. Analyze, criticize, organize, Improvise and manage documents, data and information related to the pharmaceutical production process.
4. Imbibe ethical practices and moral values in personal and professional activities.
5. Implementing team-based research to implement innovative solutions in the area of formulation, evaluation, validation, technology transfer, artificial intelligence and in silico modeling.
6. Putting practical based learning tactic and innovative thinking in academics and profession
7. Authenticate the knowledge and skills expanded through education to gain gratitude in the Pharmaceutical industry
8. Assembling production unit in a lab then in a pilot plant which helps in designing and fabrication of pharmaceutical dosage forms in the industry.



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

Course Outcome (CO's)

M.PHARM (Industrial Pharmacy I st Sem) PCI Regulation			
Advanced Instrumental Analysis	21S07201	1	Interpretation of the NMR, Mass and IR spectra of various organic compounds
		2	Theoretical and practical skills of the hyphenated instruments
		3	Identification of organic compounds
Advanced Physical Pharmaceutics	21S03101	1	The students will know particle size analysis method, solid dispersion, physics of tablets, polymer classification and its applications
		2	student will also know the stability calculations, shelf life calculations and accelerated stability studies.
		3	They also know the rheology, absorption related to liquids and semi-solid dosage forms.
		4	They also know the factors affecting the dissolution and solubility in related to <i>in vitro/in vivo</i> correlations.
Pharmaceutical Formulation Development	21S08101	1	Different machinery used for various steps in manufacture of various dosage forms.
		2	Formulation and evaluation of hard and soft gelatin capsules and their advantages over other dosage forms.
Advanced Biopharmaceutics And Pharmacokinetics	21S03103	1	Students will be able to tell factors affecting the bioavailability and stability of dosage form; they also know the bioequivalence studies and protocols for bioequivalent studies.
		2	Students will be able to tell factors affecting the bioavailability and stability of dosage form; They also know the bioequivalence studies and protocols for bioequivalent studies.
M.PHARM (Industrial Pharmacy II nd Sem) PCI Regulation			
Pharmaceutical Production Technology	21S08201	1	Students will know about the scale up and pilot plant techniques used for all pharmaceutical dosage forms like tablets
		2	Students will know about the scale up and pilot plant techniques used



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

			for all pharmaceutical dosage forms like capsules, parenterals, aerosols
		3	Students will know about the scale up and pilot plant techniques used for all pharmaceutical dosage forms like cosmetics and nutraceuticals.
Advanced Drug Delivery Systems	21S03202	1	The students shall apply the pharmacokinetic and pharmacodynamic principles in the design of CDDS.
		2	Students will select the drugs for CDDS design of the formulation fabrication of oral, parenteral drug delivery systems
		3	Students will select the drugs for CDDS design of the formulation fabrication of Transdermal, implants Drug delivery systems
		4	Bio adhesives and targeted drug delivery systems.
Pharmaceutical Industrial Management	21S08203	1	This subject aims at validation of different process, equipment methods
		2	Effective management of waste materials.



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

DEPARTMENT OF PHARMACOLOGY

1. Programme Outcomes (POs)

1. Relate the acquired scientific information and principles of pharmacokinetics and pharmacodynamics in drug discovery process.
2. Translate the high-level of understanding of drug action into key stages in preclinical and clinical research studies.
3. Apply skills to do specialized research in the core and applied areas of pharmaceutical sciences.
4. Evaluate current drug information in the delivery of pharmaceutical care and assure in regard to drug usage and their adverse effects
5. Demonstrate knowledge of professional and ethical responsibilities in clinical and nonclinical laboratory as required by regulatory bodies.
6. Develop an ability to visualize and work on multidisciplinary tasks in the area pharmaceutical and its allied field.
7. Appraise pharmacological model for investigation through logics and problem to solving ability.
8. Develop an ability to utilize novel tools in De novo drug design process to develop new drug candidates.



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

Course Outcome (CO's)

M.PHARM (Pharmacology 1 st Sem) PCI Regulation			
Course	Course Code	CO's Number	Course Outcome (COs)
Modern Pharmaceutical Analytical Techniques	21S01101		Upon completion of the course student will be able to
		1	The analysis of various drugs in single and combination dosage forms
		2	Theoretical and practical skills of the instruments
Advanced Pharmacology- I	21S01102	1	Discuss the pathophysiology and pharmacotherapy of certain diseases
		2	Explain the mechanism of drug actions at cellular and molecular level
		3	Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases
Clinical Pharmacology And Pharmacotherapeutics	21S01103	1	The pathophysiology of selected disease states and the rationale for drug therapy; the controversies in drug therapy
		2	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);
		3	Summarize the therapeutic approach to management of these diseases including reference. To the latest available evidence
		4	Therapy (including alternatives, time-course of clinical and laboratory indices of therapeutic response and adverse effects).
		5	Pathophysiology and applied pharmacotherapeutics of diseases associated with following system/diseases with of special reference to the drug of choice
	21S01104	1	Explain the receptor signal transduction processes.



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

Cellular And Molecular Pharmacology		2	Explain the molecular pathways affected by drugs.
		3	Appreciate the applicability of molecular pharmacology and biomarkers in drug discovery process.
		4	Demonstrate molecular biology techniques as applicable for pharmacology
M.PHARM (Pharmacology II nd Sem) PCI Regulation			
			Upon completion of the course student will be able to
Advanced Pharmacology – II	21S01201	1	Explain the mechanism of drug actions at cellular and molecular level
		2	Discuss the Pathophysiology and pharmacotherapy of certain diseases
		3	Understand the adverse effects, contraindications and clinical uses of drugs used in treatment of diseases
Pharmacological Screening Methods & Toxicology	21S01202	1	Appraise the regulations and ethical requirement for the usage of experimental animals.
		2	Describe the various animals used in the drug discovery process and good laboratory
		4	Describe the various newer screening methods involved in the drug discovery process
		5	Appreciate and correlate the preclinical data to humans
Principles Of Drug Discover	21S01203	1	Explain the various stages of drug discovery
		2	Appreciate the importance of the role of genomics, proteomics and bioinformatics in drug discovery
		3	Explain various targets for drug discovery
		4	Explain various lead seeking method and lead optimization
		5	Appreciate the importance of the role of computer aided drug design in drug discovery



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

Clinical Research And Pharmacovigilance	21S01204	1	Explain the regulatory requirements for conducting clinical trial
		2	Demonstrate the types of clinical trial designs
		3	Explain the responsibilities of key players involved in clinical trials
		4	Explain the principles of Pharmacovigilance



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

DEPARTMENT OF PHARMACEUTICAL ANALYSIS

Programme Outcomes (PO's)

1. Design and conduct analytical experiments for effective quality control system.
2. Utilize tools and skills to perform analytical research work using modern techniques.
3. Use knowledge and abilities to solve problem in pharmaceutical quality system.
4. Engage in innovative activities through creative thinking to envision better ways of accomplishing professional goals.
5. Exhibit behavior and moral values that required for a pharmaceutical analyst at the satisfaction of corporate industry, other health care providers.
6. Demonstrate the ability to work in team by combining individual strength, team dynamics and emotional intelligence.
7. Compare different techniques/technologies to assess and evaluate dosage forms for better quality.
8. Identify strategies for effective communication system to undertake multidisciplinary area at the interface of analytical method development.



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

Course Outcome (CO's)

M.PHARM (Pharmacuetical Analysis 1st Sem) PCI Regulation			
Modern Pharmaceutical Analytical Techniques	21S01101		Upon completion of the course student will be able to
		1	The analysis of various drugs in single and combination dosage forms
		2	Theoretical and practical skills of the instruments
Advanced Pharmaceutical Analysis	21S07101	1	Appropriate analytical skills required for the analytical method development
		2	Principles of various reagents used in functional group analysis that renders necessary support in research methodology and demonstrates its application in the practical related problems.
		3	Principles of various reagents used in functional group analysis that renders necessary support in research methodology and demonstrates its application in the practical related problems.
Pharmaceutical And Food Analysis	21S07102	1	various analytical techniques in the determination of Food constituents
		2	various analytical techniques in the determination of Food additives
		3	various analytical techniques in the determination of Finished food products
		4	various analytical techniques in the determination of Pesticides in food Pharmaceuticals (API & Dosage forms), And also student shall have the knowledge on food regulations and legislations
Quality Control And Quality Assurance	21S07103	1	The cGMP aspects in a pharmaceutical industry
		2	To appreciate the importance of documentation
		3	To understand the scope of quality certifications applicable to Pharmaceutical industries
		4	To understand the responsibilities of QA & QC departments



SANTHIRAM COLLEGE OF PHARMACY

Approved by AICTE & PCI, New Delhi - Affiliated to JNTUA, Anantapur
NH - 18, Nandyal, Kurnool District, Andhra Pradesh - 518501.

M.PHARM (Pharmacuetical Analysis IInd Sem) PCI Regulation			
Advanced Instrumental Analysis	21S07201	1	Interpretation of the NMR, Mass and IR spectra of various organic compounds
		2	Theoretical and practical skills of the hyphenated instruments
		3	Identification of organic compounds
Modern Bio-Analytical Techniques	21S07202	1	Extraction of drugs from biological samples
		2	Separation of drugs from biological samples using different techniques
		3	Guidelines for BA/BE studies.
Pharmaceutical Validation	21SOE301a	1	Explain the aspect of validation
		2	Carryout validation of manufacturing processes
		3	Carryout validation of manufacturing processes
		4	Validate the manufacturing facilities
Herbal And Cosmetic Analysis	21S07203	1	Determination of herbal remedies and regulations
		2	Analysis of natural products and monographs
		3	Determination of Herbal drug-drug interaction
		4	Principles of performance evaluation of cosmetic products.