PSG COLLEGE OF PHARMACY

2.6.1. COURSE OUTCOME

Course outcome for Pharm D

Course code	Name of the Course	
1.1	**Human Anatomy and Physiology**	
	CO1	Apply concepts and knowledge of the general terminology, cell structure and function, histology, gross anatomy, and physiology related to the integumentary, skeletal, muscular and nervous systems to novel technical and/or clinical scenarios.
	CO2	Research and critically evaluate various sources of information related to these systems in order to discern reliable scientific information from unsourced information.
	CO3	Communicate information related to these systems through written, verbal, or multimedia formats in order to assess current knowledge, answer investigative questions, and explore new questions for additional research.
	CO4	Evaluate information on human health and medical research as to its social, environmental, and ethical implications as part of responsible citizenship.
	CO5	Use scientific laboratory equipment in order to gather and analyze data on human anatomy and physiology. Use an understanding of how these human organ systems are interrelated to apply a holistic approach to human health
1.2	**Pharmaceutics**	
	CO1	Basic knowledge about development of pharmacy profession, pharmacopoeia and various types of dosage form.
	CO2	Ability to do different pharmaceutical calculations
	CO3	Knowledge about variation of monophasic, biphasic, solid dosage forms and its evaluation.
	CO4	Ability to understand methods of herbal extraction and its types
	CO5	Knowledge on handling of surgical aid's and its application. Acquire knowledge on stability and interaction of pharmaceutical drugs with various excipients
1.3	**Medicinal Biochemistry**	
	CO1	The students will be capable of understand the catalytic activity of enzymes and importance of isoenzymes in diagnosis of diseases.
	CO2	The students will Know the metabolic process of biomolecules in health and illness (metabolic disorders)
	CO3	The students will know Understand the genetic organization of mammalian genome: protein synthesis: replication:mutation and repair mechanism
	CO4	The students will understand the biochemical principles of organ function tests of kidney, liver and endocrine gland
	CO5	The students will do the qualitative analysis and determination of biomolecules in the body fluids.

1.4	**Pharmaceutical Organic chemistry**	
	CO1	CO 1 - Graduates will have a sound knowledge in nomenclature, physical properties of various classes of organic compounds which impart a foundation for the study of various medicinal compounds and their nature of reactivity.
	CO2	CO 2 - Concepts and the mechanisms for the synthetic tools in generating newer products can be correlated with novel drug design and development in future.
	CO3	CO 3 - The mode of quality control procedures and applications of numerous medicinal agents help to adapt the students to focus on purity parameters pertaining to the drugs of choice.
	CO4	CO 4 - The order of reactivity, orientation and stability of the compounds attribute to the influence towards predicting the prognosis of series of reactions.
	CO5	CO 5 - The practical knowledge from the laboratory synthesis of medicinal organic molecules and their qualitative organic analysis helps to interpret and arrive to valid conclusions.
1.5	**Pharmaceutical Inorganic chemistry**	
	CO1	Understand the possible source of impurities and their limits.
	CO2	Determine the percentage purity of the inorganic pharmaceuticals by various Assay methods.
	CO3	Understand the preparation methods, purity testing and application of various inorganic pharmaceuticals.
	CO4	Ability to understand the pharmacopeial monographs and perform various analytical techniques involved in it
	CO5	Preparation, storage and safety measures for radiopharmaceuticals and other miscellaneous inorganic pharmaceuticals.
1.6	**Remedial Mathamedics/Biology**	
		Mathematics
	CO1	a. Know Trignometry , Analytical geometry, Matrices, Determinant, integration,Differential
	CO2	equations, laplace transform and their applications:
	CO3	b.Solve the problems of different types by applying theory: and
	CO4	c. appreciate the important applications of mathematics in pharmacy.
		Biology
	CO1	Aware of various naturally occurring drugs and its history,sources, classification, distribution and the characters of the plants and animals
	CO2	gives basic foundation to pharmacognosy.
2.1	**Pathophysiology**	
	CO1	To understand the basic principles involved in cell injury and adaptation.
	CO2	To apprehend the pathogenesis of inflammation and wound healing.

	CO3	To understand the fundamental aspects of immunity and relate it to diseases of immunity.
	CO4	To know the pathogenesis of cancer.
	CO5	To know the pathogenesis, signs and symptoms and complications of common diseases and infections.

2.2	**Pharmaceutical Microbiology**	
	CO1	Understand the importance of microorganisms, able to cultivate, identify and preserve microorganism.
	CO2	Apply the knowledge of sterilization and disinfection process in hospital and pharmaceutical industry.
	CO3	Perform identification of diseases by performing the diagnostic tests.
	CO4	Explain the mechanism of immunity and advocate immunization programme.
	CO5	Know the mode of transmission of disease causing microorganism, symptoms, diagnostic tests and treatment

2.3	**Pharmacognocy & Phytopharmaceuticals**	
	CO1	Source of drug & its application, role of herbs in drug development, classification along with their merits & demerits
	CO2	Cultivation, Collection, processing & storage, standard protocol for evaluation of crude drugs.
	CO3	Different cell & cell wall constituents & its function, Macro, micro& powder microscopy of crude drugs
	CO4	Classification, MoA of natural pesticides, preparation & application of plant fiber.
	CO5	Primary & secondary metabolites containing drugs- classification, chemistry, method of extraction & analysis.

2.40	**Pharmacology - I**	
	CO1	The students will be capable of explaining the basics of pharmacology like drug, agonists & antagonists, pharmacokinetics & dynamics, receptors & its families, routes of drug administration and factors affecting drug action.
	CO2	The students will understand the sympathetic and parasympathetic divisions of ANS, various receptors, neurotransmitters in the ANS and pharmacology of drugs acting in it.
	CO3	The students will know the pharmacological management of various cardiovascular disorders like hypertension, angina, arrhythmia etc. and pharmacology of autocoids
	CO4	The students will understand the various CNS diseases and the pharmacology of drugs acting on central nervous system like sedative & hypnotics, anticonvulsants, general & local anesthetics etc.,
	CO5	The students will be capable of explaining the physiological role of hormones and pharmacology of hormonal agonist and antagonist. The students will know the pharmacology of drugs acting on respiratory tract.

2.5	**Community Pharmacy**	
	CO1	CO1: To understand the scope of community pharmacy and its management and inventory control methods needed to manage the pharmacy
	CO2	CO2: To be able to identify the parts of a prescription and check for medication related problems.
	CO3	CO3: To be able to learn the importance of pharmaceutical care, patient counseling, medication adherence and rationality of drug use.
	CO4	CO4: To understand the methods of health education, screening and OTC medications.
	CO5	CO5: To understand the importance of code of ethics.
2.6	**Pharmacotherapeutics - I**	
	CO1	To understand the etiopathogenesis, clinical presentation and management for cardiovascular diseases
	CO2	To apprehend the etiopathogenesis, clinical presentation and management for Respiratory diseases
	CO3	To understand the etiopathogenesis, clinical presentation and management for Endocrine disorders
	CO4	To know the etiopathogenesis, clinical presentation and management for ophthalmological disorders
	CO5	To understand the importance of rational drug therapy and prescribing guidelines for different age groups
3.1	**Pharmacology - II**	
	CO1	The students will be capable of Understand the Pharmacological aspects of drugs acting on blood and renal system
	CO2	The students will Know the pharmacological and therapeutic aspects of antimicrobial agents
	CO3	The students will appreciate the importance of cancer chemotherapy and Immuno pharmacology subject as a basis of therapeutics
	CO4	The students will understand the importance of animal toxicology and fundamental aspects of cellular and molecular pharmacology
	CO5	The students will be able to apply the knowledge of genome and its function to therapeutics in practice
3.2	**Pharmaceutical Analysis**	
	CO1	To understand the importance of analytical instruments and techniques for qualitative and quantitative estimation of drugs and biologicals.
	CO2	Know to choose the appropriate analytical techniques among chromatography methods for separation and identification of drugs and biological.
	CO3	Ability to understand and select the appropriate electrometric methods and other thermal and methods for drug analysis.

	CO4	To relate various concepts of spectroscopic methods for structural identification and quantitative estimation of drugs.
	CO5	To know the concepts and procedures related to GLP, GMP Quality control and Validation.
3.3	**Pharmacotherapeutics - II**	
	CO1	To understand the importance of antibiotic usage in different infectious conditions and preventive measures needed to minimize exposure to infections.
	CO2	To apprehend the pathophysiology and treatment options for musculoskeletal disorders.
	CO3	To be able to comprehend guidelines used for the management of renal conditions.
	CO4	To relate various concepts needed to work with chemotherapeutic agents in different types of cancers and to learn their management.
	CO5	To comprehend the importance of both non-pharmacological and pharmacological treatment in dermatology.
3.4	**Pharmaceutical Jurisprudence**	
	CO1	Role of different committees in framing pharmaceutical legislation,code of ethics, Prescription& non prescription drugs.
	CO2	Sch A-Z, Forms for sale & import, Constitution & functioning of DTAB, DCC, CDL
	CO3	Constitution, function of TNPC, PCI & ER-91, Layout & manufacturing in bonded & non bonded laboratory.
	CO4	EC & criteria for price fixing of scheduled & non-scheduled formulation, NPPA, Members & functioning of IAEC, prohibited & exempted Advertisements.
	CO5	Members & functioning of NDPS consultative committee & fund, steps involved in filing patent & designs.
3.5	**Medicinal Chemistry**	
	CO1	CO 1. Know the development, chemistry, SAR, Mechanism of action, brand name and synthesis of various anti infective agents and antibiotics.
	CO2	CO 2: Development, chemistry, SAR, Mechanism of action, brand name and synthesis of anti cancer agents.
	CO3	CO 3. Know the chemistry, SAR, Mechanism of action, brand name and synthesis of Drugs acting on CVS.
	CO4	CO 4. Know the development, chemistry, SAR, Mechanism of action, brand name and synthesis of hormones and drugs used for metabolic disorders.
	CO5	CO 5: Understand the concept and importance of drug design, different techniques of drug design and Gene targeted drugs.
3.6	**Pharmaceutical Formulations**	
	CO1	Attain detailed knowledge on different types of dosage forms and their application in the management of clinical therapy.
	CO2	a. Describe different tablet dosage form, coating and related concern for design & development of tablet dosage form.

		b.Develop dosage form and related concern for design of capsule dosage form.
	CO3	Design and develop sterile liquid dosages forms to treat various clinical diseases.
	CO4	Develop Semisolid Dosage forms with acceptable patient compliance.
	CO5	Describe suitable criteria and various approaches for development of novel drug delivery systems.
4.1	**Pharmacotherapeutics - III**	
	CO1	Understand the disease conditions and drug therapy, and ability to apply the drug knowledge on preparation of patient specific pharmacotherapeutic plan for gastrointestinal system diseases.
	CO2	Understand the disease conditions and drug therapy, and ability to apply the drug knowledge on preparation of patient specific pharmacotherapeutic plan for hematological diseases.
	CO3	Understand the disease conditions and drug therapy, and ability to apply the drug knowledge on preparation of patient specific pharmacotherapeutic plan for pain and nervous system diseases.
	CO4	Understand the disease conditions and drug therapy, and ability to apply the drug knowledge on preparation of patient specific pharmacotherapeutic plan for psychiatric disorders.
	CO5	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.
4.2	**Hospital Pharmacy**	
	CO1	Knowledge on hospital pharmacy, drug committees &policies of hospital
	CO2	To know the various inventory control techniques& 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
4.3	**Clinical Pharmacy**	
	CO1	Comprehension on Clinical Pharmacy services
	CO2	Develop a skill to identify and resolve medication error and ADRs
	CO3	Buildup a talent to interpret the Laboratory value
	CO4	Expand the knowledge to answering query
	CO5	Understanding the value of Communication skills in pharmaceutical care
4.4	**Biostatistics & Research Methodology**	
	CO1	Students were able to design research projects and proposals to test the candidate in preclinical and clinical testing.
	CO2	To Construct and labeling of graphs, histogram, piecharts, scatter plotsemilogarthimic plots from research data

	CO3	To Familiar with various computer application in Hospital, Clinical pharmacy and Drug Information Retrieval & Storage
	CO4	To understand the basic principles of medical research, necessity and medicinal care as per international guidelines.
	CO5	To apply proper statistical method for data interpretation and data management to have quality research outcome.
4.5	**Biopharmaceutics & Pharmcokinetics**	
	CO1	Understand different mechanism and factors affecting ADME processes.
	CO2	Determine the effect of Pharmacokinetic (ADME) parameters on the biological effects of the drug
	CO3	Understand various pharmacokinetic models and their significance in interpreting various pharmacokinetic parameters
	CO4	Ability to design a basic protocol for the conduct of BA/BE study and the interpretation of the BA/BE data
	CO5	Ability to use the concepts of pharmacokinetic principles in the clinical contexts
4.6	**Clinical Toxicology**	
	CO1	Attain the basic toxicological knowledge in the general principles involved in the management of poisoning, prevention and treatment of various poisoning.
	CO2	To correlate and differentiate the normal pharmacology effects and toxicological effects of various drugs.
	CO3	To identify the clinical symptoms of various poisoning and over dosage of drugs.
	CO4	Manage the case with basic first aids, and able to select the appropriate antidotes based upon the poisoning case.
	CO5	Understand the pharmacological actions, mechanism of various antidotes and its relevance in the treatment of different poisoning.
5.1	**Clinical Research**	
	CO1	a) Various approaches to drug discovery like pharmacological, toxicological, IND application drug characterization and dosage forms
	CO2	b) Phases of clinical trials, post marketing surveillance, abbreviated new drug application and its submissions
	CO3	c) ICH, GCP and CDSCO guidelines and its implementation, ethics in clinical research, institutional review board/institutional ethics committee and its functions
	CO4	d) Regulatory environments, biomedical research personnel roles and responsibilities according to ICH- GCP guidelines
	CO5	e) Preparation and documentation of clinical study documents, informed consent process, data management and safety monitoring
	Pharmacoepidemiology and Pharmacoeconomics	
5.2	**CO1**	Knowledge on Pharmacoepidemiology, its methods and their applications in health care

	CO2	Knowledge in measuring the outcomes of drug use and the risk in pharmacoepidemiology
	CO3	Understand the fundamental principles of Pharmacoeconomics and its methods
	CO4	To know the cost and consequences associated with pharmacy products and pharmaceutical services
	CO5	Understand the applications of Pharmacoeconomics in various pharmacy settings
5.3	**Clinical Pharmacokinetics & Pharmacotherapeutc Drug Monitoring**	
	CO1	Describe & apply the pharmacokinetic principles in dosing of drugs to specific populations
	CO2	Recognise the clinical areas where implementation of TDM will have a positive effect on patient care
	CO3	Analyse the dosage regimen of drugs to various clinical situations
	CO4	Gain knowledge on estimating the population pharmacokinetic parameters by various methods.
	CO5	Comprehense the concept of pharmacogenetics and pharmacogenomics and apply to enhance drug safety, improve drug discovery and identify optimal dosing.