

PHARM D – I YEAR (PCI)

S.NO	Course	Course code and number	Course outcome
1	Human Anatomy and Physiology (Theory)	C _(T1101) 1	Study the anatomy and physiology, basic anatomical terms, functions of various organs of human body and cellular level organization. The various homeostatic mechanisms and their imbalances of various systems and note on the functions of tissues (REMEMBER)
		C _(T1101) 2	Recognize bones and joints of human body, and Overview of the functions of formed elements in the blood (Haemopoietic system) (UNDERSTAND)
		C _(T1101) 3	Differentiate lymph and its role in immunity. Explain anatomy and physiology of CVS. (ANALYZE, REMEMBER)
		C _(T1101) 4	Recall Respiratory, GIT and Urinary systems and its physiological studies (REMEMBER)
		C _(T1101) 5	Assess the structure and functions of sympathetic, parasympathetic system, brain, spinal cord and cranial nerves and to and to intrep the physiology of endocrine system. (EVALUATE)
		C _(T1101) 6	Explain the physiology of reproductive system, sense organs and to discuss the physiological skeletal muscles and sports physiology. (UNDERSTAND)
2	Human Anatomy and Physiology –(Practical)	C _(T1108) 1	Identify and relate characteristics of various tissues of human body. (REMEMBER)
		C _(T1108) 2	Predict the number of RBC and WBC using hemocytometer. (EVALUATE)
		C _(T1108) 3	Demonstrate bleeding time, clotting time, blood pressure and blood group. (UNDERSTAND)
		C _(T1108) 4	Recall the functions of various organ system in human body. (REMEMBER)
		C _(T1108) 5	Interpret the mechanisms of pregnancy diagnosis tests and various family planning appliances. (UNDERSTAND)
		C _(T1108) 6	Construct and record simple curves using frog gastrocnemius sciatic nerve. (CREATE)
		C _(T1102) 1	Explain handling of prescription, posology & dose calculation of drug in children. Different types of dosage form (UNDERSTAND)

3	Pharmaceutics – (Theory)	C _{(T1102)2}	Discuss history of the profession of Pharmacy in India & Pharmacopeia and its development (UNDERSTAND)
		C _{(T1102)3}	Explain the different pharmaceutical calculation involved in formulation (UNDERSTAND)
		C _{(T1102)4}	Elaborate basic requirement and formulation of powder and liquid (monophasic & biphasic) dosages form (REMEMBER)
		C _{(T1102)5}	Explain different types of extraction process mainly maceration, percolation and their applications, different types of surgical aids and their application (UNDERSTAND)
		C _{(T1102)6}	Enumerate type of Pharmaceutical incompatibility and analyzing the incompatibilities (REMEMBER)
4	Pharmaceutics – (Practical)	C _{(T1109)1}	Prepare and label monophasic dosage forms for internal use (Remember)
		C _{(T1109)2}	Experiment with biphasic liquid dosage forms (Apply)
		C _{(T1109)3}	Formulate and dispense solid dosage forms (CREATE)
		C _{(T1109)4}	Formulate external liquid dosage forms (CREATE)
		C _{(T1109)5}	Formulate semi-solid dosage forms (CREATE)
		C _{(T1109)6}	Appraise the preparations of physical incompatibilities (EVALUATE)
5	Medicinal Biochemistry (Theory)	C _{(T1103)1}	Recall the structure and functions of cell and its constituents, various mechanisms for transport across membrane, catalytic activity of enzymes, enzyme action and applications of enzymes. (REMEMBER)
		C _{(T1103)2}	Discuss the metabolism of carbohydrates, lipids, electron transport chain and ATP formation and identify the metabolic disorders. (REMEMBER, UNDERSTAND)
		C _{(T1103)3}	Enumerate and Summarize the metabolism and disorders associated with amino acids and nucleic acids. (REMEMBER, UNDERSTAND)
		C _{(T1103)4}	Interpret the genetic code, describe the process of DNA replication and protein synthesis. (UNDERSTAND)
		C _{(T1103)5}	Apply the knowledge of clinical chemistry in diagnosis and prognosis of diseases. (APPLY)

		C _{(T1103)6}	Elaborate the principles of immunochemical techniques and their applications. (CREATE)
6	Medicinal Biochemistry – (Practical)	C _{(T110A)1}	Remember the qualitative analysis of urine for normal and abnormal constituents. (REMEMBER)
		C _{(T110A)2}	Demonstrate the estimation and clinical significance of biological constituents such as Glucose, Creatinine, Calcium and Chlorides in urine. (UNDERSTAND)
		C _{(T110A)3}	Describe and determine the blood constituents like glucose, Creatinine, uric acid, urea, proteins and infer the biological condition. (REMEMBER, UNDERSTAND, ANALYSE)
		C _{(T110A)4}	Perform the lipid profile tests and liver function tests (SGOT, SGPT). (UNDERSTAND, APPLY)
		C _{(T110A)5}	Determine the starch hydrolysis by salivary amylase and study the effect of temperature and pH on enzyme (salivary amylase) activity. (APPLY, ANALYSE)
		C _{(T110A)6}	Discuss the preparation of standard buffer solutions and their pH measurements. (UNDERSTAND)
		7	Pharmaceutical Organic Chemistry-(Theory)
C _{(T1104)2}	Explain Free radicals chain reactions of alkane and Alicyclic compounds, preparations, reactions and mechanisms (REMEMBER)		
C _{(T1104)3}	Understand the Nucleophilic aliphatic substitution reactions and Dehydrohalogenation reactions of 1,2 halo alkanes (UNDERSTAND)		
C _{(T1104)4}	Describe Electrophilic and free radicals addition and Carbon-carbon double bond as substituents and free radical substitution (REMEMBER)		
C _{(T1104)5}	Understand Theory of resonance, and Electrophilic aromatic substitution (UNDERSTAND)		
C _{(T1104)6}	Explain Nucleophilic addition reactions and mechanism and application of named reactions like, aldol condensation, claisen condensation, cannizzaro, Migration to electron deficient		

			nitrogen like Hoffman's reactions (UNDERSTAND)
		C _(T1104) 7	Demonstrate Nucleophilic aromatic substitution, Oxidation and reduction reactions (UNDERSTAND) Analyze structures, preparations, assay, test for purity and uses of official compounds. (ANALYSE)
8	Pharmaceutical Organic Chemistry – (Practical)	C _(T110B) 1	preparation of organic compounds by various techniques (CREATE)
		C _(T110B) 2	Explain and understand the principal, reaction mechanism and illustrate application (UNDERSTAND)
		C _(T110B) 3	Synthesize and purification of organic compounds (CREATE)
		C _(T110B) 4	Perform the preliminary and elemental analysis of organic compound and identify functional group of organic compounds by systematic qualitative analysis (CREATE & ANALYSE)
		C _(T110B) 5	Explain and understand the principal behind various qualitative tests and analyse the given unknown organic compound having different functional groups (CREATE & ANALYSE)
		C _(T110B) 6	Explain stereo models of some organic compounds (UNDERSTAND)
9	Pharmaceutical Inorganic Chemistry – (Theory)	C _(T1105) 1	Enumerate errors in pharmaceutical analysis and principles of volumetric analysis (REMEMBER)
		C _(T1105) 2	Interpret acid base titrations and limit tests for inorganic compounds. (UNDERSTAND)
		C _(T1105) 3	Choose the appropriate titrimetric method for analysis of drugs. (APPLY)
		C _(T1105) 4	Characterize and study method of preparation and assay of selected inorganic compounds. (Analyse)
		C _(T1105) 5	Demonstrate the importance of inorganic pharmaceuticals in preventing and curing the disease. (UNDERSTAND)
		C _(T1105) 6	Illustrate the Radioisotopes and applications of Radiopharmaceuticals. (UNDERSTAND)
10	Pharmaceutical Inorganic Chemistry – (Practical)	C _(T110C) 1	Recall the glassware and apparatus used in volumetric analysis (REMEMBER)
		C _(T110C) 2	Demonstrate the limit test for impurities in inorganic compounds (UNDERSTAND)

		C _{(T110C)3}	Apply the volumetric methods for performing assays (APPLY)
		C _{(T110C)4}	Evaluate selected inorganic compounds by different titrimetric methods (EVALUATE)
		C _{(T110C)5}	Determine the compounds present in a mixture (APPLY)
		C _{(T110C)6}	Justify test for identity of selected inorganic compounds (EVALUATE)
11	Remedial Mathematics (Theory)	C _{(T1106)1}	Identify the importance of mathematics in pharmacy. (REMEMBER)
		C _{(T1106)2}	Review the various topics in mathematics. (UNDERSTAND)
		C _{(T1106)3}	Formulate mathematical equations in doing problems. (CREATE)
		C _{(T1106)4}	Assemble the different concepts in solving problems. (CREATE)
		C _{(T1106)5}	Justify the important applications of mathematics. (EVALUATE)
		C _{(T1106)6}	Design and convert elementary functions using Laplace transform. (CREATE)
12	Remedial Biology (Theory)	C _{(T1107)1}	List the organization of plants, animals and its inclusions. (REMEMBER)
		C _{(T1107)2}	Differentiate the functions of various types of tissues and kingdom classification in plants and animals. (UNDERSTAND)
		C _{(T1107)3}	Develop knowledge on structural modifications in plants and importance of plant physiology. (CREATE)
		C _{(T1107)4}	Infer various physiological processes in plants and animals. (ANALYSE)
		C _{(T1107)5}	Enumerate the various taxonomical characters of different families and micro-organisms. (REMEMBER)
		C _{(T1107)6}	Differentiate the detailed study of frog, its internal structure & functions. (UNDERSTAND)
		C _{(T1107)7}	Demonstrate the study of different kinds of phylum's includes Pisces, Reptiles, Amphibians, Aves & Mammals. (UNDERSTAND)
13	Remedial Biology – (Practical)	C _{(T110D)1}	Explain about basic concept of microscopes and permanent slides (UNDERSTAND)
		C _{(T110D)2}	Appraise the cell wall constituents and cell inclusions of plant parts. (EVALUATE)
		C _{(T110D)3}	State the different modifications of plant parts. (REMEMBER)

		C _{(T110D)4}	Characterize the transverse section and identification of powder characteristics of various plant products. (ANALYSE)
		C _{(T110D)5}	Demonstration of simple plant physiological experiments. (UNDERSTAND)
		C _{(T110D)6}	Recall study of frog and its identification of animal models. (REMEMBER)
PHARM D – II YEAR (PCI)			
S.NO	Course	Course code and number	Course outcome
1	Pathophysiology (Theory)	C _{(T2101)1}	Describe basic aspects of cell injury and adaptation, and role of chemical mediators in inflammation and healing mechanism, along with biological effects of radiation on cell. (REMEMBER)
		C _{(T2101)2}	Explain immune response and autoimmune diseases along with organ compatibility in transplantation (UNDERSTAND)
		C _{(T2101)3}	State the principles involved in pathophysiology of cancer while understanding the classification of tumours (REMEMBER)
		C _{(T2101)4}	Compare the types of shock that influences their mechanism and management.
		C _{(T2101)5}	Describe pathophysiology and etiology involved in environmental, nutritional and infectious diseases. (REMEMBER)
		C _{(T2101)6}	Identify the cause and pathophysiology of common diseases associated with nervous, cardiovascular, gastrointestinal, liver, renal and respiratory system. (REMEMBER)
2	Pharmaceutical Microbiology (Theory)	C _{(T102)1}	Describe about science of microbiology, Major divisions of microbial world and Relationship among them (UNDERSTAND)
		C _{(T2102)2}	Discuss about Different methods of classification of microbes like Bacteria, Fungi, virus, Rickettsiae, Spirochetes, Nutritional requirements, growth and cultivation of bacteria and virus, different important media required for the growth of aerobic and anaerobic bacteria & fungi. (UNDERSTAND)
		C _{(T2102)3}	Demonstrate about Differential media, enriched media and selective media, maintenance of lab cultures, Different methods

			used in isolation and identification of bacteria with different staining techniques and biochemical reactions, Counting of bacteria - Total and Viable counting techniques(UNDERSTAND)
		C _(T2102) 4	Describe about sterilization and Sterilization methods for all pharmaceutical products, sterility testing of different pharmaceutical preparations and Validation , Disinfectants, antiseptics, fungicidal and virucidal agents factors affecting their activation and mechanism of action, Evaluation of bactericidal, bacteristatic, , virucidal activities, evaluation of preservatives in pharmaceutical preparations(REMEMBER)
		C _(T2102) 5	Explain about Immunity, Definition, Classification, General principles of natural immunity, Phagocytosis, acquired immunity(active and passive),Antigens, Antibodies, Antigen-Antibody reactions, Bacterial exotoxins and endotoxins,Significance of toxoids in active immunity, Immunization programme, and importance of booster dose and Diagnostic tests (REMEMBER)
		C _(T2102) 6	Discuss the concept of Microbial culture sensitivity Testing,Principles,methods of different microbiological assays, microbiological assay of Penicillin, Streptomycin and vitamin B2 and B12, Standardization of vaccines and sera,infectious diseases like Typhoid, Tuberculosis, Malaria, Cholera, Hepatitis, Meningitis, Syphilis & Gonorrhoea and HIV (UNDERSTAND)
3	Pharmaceutical Microbiology	C _(T2107) 1	Introduction and discuss about different equipment used in microbiology (UNDERSTAND)
		C _(T2107) 2	Analysis of characteristics of microbial by staining techniques,isolation methods,quantitative estimation (ANALYSE)

	(Practical)	C _{(T2107)3}	Discuss about construct standard graphs for estimating antibiotic, vitamin by using microbes(UNDERSTAND)
		C _{(T2107)4}	Evaluation of microbial contamination in a given sample (EVALUATE)
		C _{(T2107)5}	Analyse the qualitatively and quantitatively the amount of microbes in a sample (ANALYSE)
		C _{(T2107)6}	Evaluation of the microbes by serological and bacteriological methods(EVALUATE)
4	Pharmacognosy & Phytopharmaceuticals (Theory)	C _{(T2103)1}	Discuss the concept of Microbial culture sensitivity Testing, Principles, methods of different microbiological assays, microbiological assay of Penicillin, Streptomycin and vitamin B2 and B12, Standardization of vaccines and sera, infectious diseases like Typhoid, Tuberculosis, Malaria, Cholera, Hepatitis, Meningitis, Syphilis & Gonorrhoea and HIV (UNDERSTAND)
		C _{(T2103)2}	Explain the Cultivation, collection, processing and storage of crude drugs. Detailed method of cultivation of crude drugs. (UNDERSTAND)
		C _{(T2103)3}	Illustrate study of cell wall constituents and cell inclusions. Detailed study of various cell constituents. Different methods of adulteration of crude drugs. .(UNDERSTAND)
		C _{(T2103)4}	Define Carbohydrates and related products. Detailed study carbohydrate containing drugs.(REMEMBER)
		C _{(T2103)5}	Define sources, methods of extraction, chemistry and method of analysis of lipids. Detailed study of oils. (REMEMBER)
		C _{(T2103)6}	Define classification, chemistry and method of analysis of protein. Study of plants fibers used in surgical dressings and related products. (REMEMBER)
5	Pharmacognosy & Phytopharmaceuticals (Practical)	C _{(T2108)1}	Explain the Introduction of Pharmacognosy laboratory and experiments. (UNDERSTAND)
		C _{(T2108)2}	Explain Study of cell wall constituents and cell inclusions. (UNDERSTAND)
		C _{(T2108)3}	Determine the Macro, powder and microscopic study of Datura, Senna, Cinnamon, Cinchona, Ephedra, Quassia, Clove (APPLY)
		C _{(T2108)4}	Determine Macro, powder and microscopic study of Fennel, Coriander, Isapgol, Nux

			vomica, rauwolfia , Liquorice, Podopyllum, ginger (APPLY)
		C _{(T2108)5}	Determination of Iodine value, Saponification value and unsaponifiable matter (APPLY)
		C _{(T2108)6}	Determination of ester value, acid value (APPLY)
6	Pharmacology-I(Theory)	C _{(T2104)1}	Define the fundamental concepts of pharmacology and pharmacokinetics and to understand the basics of pharmacodynamics, route of administration, drug toxicity, drug interactions, adverse reactions and Pre-clinical evaluation drug discovery. (REMEMBER)
		C _{(T2104)2}	Identify the role of neuro-humoral transmission and drugs acting on Autonomic nervous system and summarize the drugs acting on it. (REMEMBER)
		C _{(T2104)3}	Analyse the pharmacology of drugs acting on cardiovascular system. (ANALYSE)
		C _{(T2104)4}	Summarise the functions of neurotransmitters and drugs acting on central nervous system. (UNDERSTAND)
		C _{(T2104)5}	Assess the drugs used in respiratory complications. (EVALUATE)
		C _{(T2104)6}	Demonstrate the drugs acting on endocrine system. (UNDERSTAND)
		C _{(T2104)7}	Predict the role of autacoids and related drugs. (EVALUATE)
7	Community Pharmacy (Theory)	C _{(T2105)1}	Describe scope of community pharmacy and roles and responsibilities of community pharmacist in essential drug concept and rational drug therapy along with code of ethics. (REMEMBER)
		C _{(T2105)2}	Compute designing, maintenance and legal requirements to set up a community pharmacy along with various methods involved in inventory control. (APPLY)
		C _{(T2105)3}	Enumerate the various composition of prescription along with identification of medication errors. (REMEMBER)
		C _{(T2105)4}	Describe the roles and responsibilities of community pharmacist in pharmaceutical care, patient counselling, medication adherence and OTC medications. (REMEMBER)
		C _{(T2105)5}	Determine health screening services like Blood Pressure, blood sugar, lung function test and cholesterol testing. (APPLY)

		C _{(T2105)6}	Describe on health education for communicable, nutritional deficiency diseases and family planning along with pathophysiology and treatment for minor ailment. (REMEMBER)
8	Pharmacotherapeutics-I (Theory)	C _{(T2106)1}	Describe the pathophysiology of cardiovascular diseases and the ability to identify therapeutic approach for management of these diseases. (REMEMBER)
		C _{(T2106)2}	State the various respiratory diseases and the diagnostic skills required for the assessment of such diseases to provide a suitable therapeutic plan. (REMEMBER)
		C _{(T2106)3}	Develop knowledge on various endocrine diseases and attain skills of diagnosis and management of these diseases. (CREATE)
		C _{(T2106)4}	Explain the significance of preparation of individualised therapeutic plan on paediatric patients and geriatric patients along with pregnant and lactating women. (UNDERSTAND)
		C _{(T2106)5}	Summarise the therapeutic approach to diseases related to ophthalmology. (UNDERSTAND)
		C _{(T2106)6}	Demonstrate the role of pharmacist in analysing specific parameters related to drug therapy and to provide rational drug formulations. (UNDERSTAND)
9	Pharmacotherapeutics-I (Practical)	C _{(T2109)1}	Describe the pathophysiology of cardiovascular diseases and the ability to identify therapeutic approach for management of these diseases. (REMEMBER)
		C _{(T2109)2}	State the various respiratory diseases and the diagnostic skills required for the assessment of such diseases to provide a suitable therapeutic plan. (REMEMBER)
		C _{(T2109)3}	Develop knowledge on various endocrine diseases and attain skills of diagnosis and management of these diseases. (CREATE)
		C _{(T2109)4}	Explain the significance of preparation of individualised therapeutic plan on paediatric patients and geriatric patients along with pregnant and lactating women. (UNDERSTAND)

		C _{(T2109)5}	Summarise the therapeutic approach to diseases related to ophthalmology. (UNDERSTAND)
		C _{(T2109)6}	Demonstrate the role of pharmacist in analysing specific parameters related to drug therapy and to provide rational drug formulations. (UNDERSTAND)
PHARM D – III YEAR (PCI)			
S.NO	Course	Course code and number	Course outcome
1	Pharmacology-II (Theory)	C _{(T3101)1}	Illustrate various agents acting on blood and treatment of blood disorders. (UNDERSTAND)
		C _{(T3101)2}	Analyse the drugs acting on renal system and describe the various ways of drugs action. (ANALYSE)
		C _{(T3101)3}	Understand and expand the knowledge on principles of chemotherapy and illustrate the mechanism of action of different antibiotics. (UNDERSTAND)
		C _{(T3101)4}	Assess the role of immunotherapeutic agents. (EVALUATE)
		C _{(T3101)5}	Describe various principles of animal toxicology. (REMEMBER)
		C _{(T3101)6}	Determine the role of genetic material in the synthesis of proteins. To understand gene structure and function with recombinant DNA technology. (APPLY)
2	Pharmacology-II (Practical)	C _{(T3107)1}	Recollect the different laboratory animals, equipment, and learn the importance of physiological salt solutions, routes of drug administration, and effect of anaesthetics that were utilized in experimental pharmacology. (REMEMBER)
		C _{(T3107)2}	Appraise the dose response relationship, effect of drugs on DRC and to construct the drug concentrations. (EVALUATE)
		C _{(T3107)3}	Construct bioassays using different methods. (CREATE)
		C _{(T3107)4}	Assess the potency of test substance and analyse the results from numerous animal investigations. (EVALUATE)
		C _{(T3107)5}	Interpret various screening models for analgesic, anticonvulsant, anti-depressant and

			anti- inflammatory activity of drugs. (UNDERSTAND)
		C _(T3107) 6	Analyze isolated frog heart preparations to assess the cardio tonic action of drugs. (ANALYSE)
3	Pharmaceutical Analysis (Theory)	C _(T3102) 1	Explain concepts of validation, calibration, ICH, GLP, TQM, ISO9000 and quality variation aspects. (UNDERSTAND)
		C _(T3102) 2	Discuss about the definition, Introduction, Principle, instrumentation and Methodology of Various Types of Chromatography like Column, Paper, TLC, Electrophoresis, Affinity chromatography, High performance liquid chromatography, Gas chromatography. (UNDERSTAND)
		C _(T3102) 3	Illustrate the theoretical aspects, Instrumentation & interpretation of data by using electrometric methods like potentiometry, conductometry, polarography, amperometry titrations. (UNDERSTAND)
		C _(T3102) 4	Demonstrate and Explain the Principle, Theory, Instrumentation and Working of UV - Visible Spectroscopy and Fluorimetry along with its applications. (UNDERSTAND)
		C _(T3102) 5	Describe the Introduction, Principle, Types of vibrations and factors affecting them, Instrumentation and Working of Infra-red Spectroscopy, Flame Photometry along with its applications. (REMEMBER)
		C _(T3102) 6	Enumerate Introduction, Principle, along with its applications of Mass spectroscopy, NMR Spectroscopy, ESR Spectroscopy, polarimetry, X-Ray diffraction. And thermal methods like DTA, DSC. (REMEMBER)
4	Pharmaceutical Analysis (Practical)	C _(T3108) 1	Identify and separate of mixture of compounds by paper chromatography, thin layer chromatography. (REMEMBER)
		C _(T3108) 2	Determine the effect of pH, solvent, dissociation constant and comparison of given compound with its derivatives by UV-visible Spectroscopy, interpret compound from NMR and IR spectroscopy (APPLY)
		C _(T3108) 3	Demonstrate the instrumentation of HPLC, HPTLC, HPLC, GC-MS, DSC. (UNDERSTAND)

		C _{(T3108)4}	Determine the compounds by using flame photometry, Nephloturbidimetry, fluorometric, techniques(APPLY)
		C _{(T3108)5}	Evaluate the two drugs present in given formulation simultaneously by using UV spectrophotometer and to determine drugs using colorimetry. (EVALUATE)
		C _{(T3108)6}	Analyse the mixture of acids with base by conductometric and potentiometric titrations. (ANALYSE)
5	Pharmacotherapeutics- II (Theory)	C _{(T3103)1}	List the guidelines involved in rational use of antibiotics and surgical use of prophylaxis. (REMEMBER)
		C _{(T3103)2}	Sketch the therapeutic approach based on the causative organism and the resulting pathogenesis of infectious diseases like tuberculosis, meningitis, malaria, fungal and viral infections etc. (ANALYSE)
		C _{(T3103)3}	Analyse the pathophysiology involved in various musculoskeletal diseases to provide suitable therapeutic management like Osteoarthritis, Rheumatoid arthritis, Gout etc. (ANALYSE)
		C _{(T3103)4}	Sketch therapeutic management on the basis of stages of renal failure along with the mechanisms involved in drug induce renal diseases. . (ANALYSE)
		C _{(T3103)5}	Enumerate the principles and general aspects of chemotherapeutic agents, specifically for breast and blood cancer along with management of nausea and vomiting induced by chemotherapy. (REMEMBER)
		C _{(T3103)6}	State the pathogenesis of organisms that cause dermal infections and provide suitable drug therapy. (REMEMBER)
6	Pharmacotherapeutics- II (Practical)	C _{(T3109)1}	Decide the principles guiding the prudent use of antibiotics and surgical prophylaxis. (EVALUATE)
		C _{(T3109)2}	Interpret therapy strategy based on the etiological agent and the pathogenesis of infectious diseases, such as tuberculosis, meningitis, malaria, fungal and viral infections, etc. (UNDERSTAND)
		C _{(T3109)3}	Choose appropriate treatment therapy for a variety of musculoskeletal illnesses, such

			as osteoarthritis, rheumatoid arthritis, gout, etc., one must understand the pathophysiology involved. (APPLY)
		C _{(T3109)4}	Analyse therapeutic management based on the mechanisms underlying drug-induced renal illnesses as well as the phases of renal failure. (ANALYSE)
		C _{(T3109)5}	Decide the management of nausea and vomiting brought on by chemotherapy, as well as the principles and general characteristics of chemotherapeutic drugs, specifically for breast and blood cancer. (EVALUATE)
		C _{(T3109)6}	Interpret the pathophysiology of the microbes that cause skin infections and to offer effective medication therapy. (UNDERSTAND)
7	Pharmaceutical Jurisprudence (Theory)	C _{(T3104)1}	Recall the concepts of pharmaceutical legislations in India and code of pharmaceutical ethics (REMEMBER)
		C _{(T3104)2}	Demonstrate the schedules and provisions given under Drugs and Cosmetics act 1940 and its rules 1945 (UNDERSTAND)
		C _{(T3104)3}	Determine the provisions of Pharmacy act 1948 and procedure for registration of pharmacist and to describe constitution and functions of PCI and State Pharmacy councils (APPLY)
		C _{(T3104)4}	List out the provisions under medicinal and toilet preparations act, narcotic drugs and psychotropic substances act and rules, drugs and magic remedies act and rules (REMEMBER)
		C _{(T3104)5}	Discuss the importance of Essential commodities act, and National drug policy and to outline the procedure to get a patent under the Patents and design act 1970 (UNDERSTAND)
		C _{(T3104)6}	Explain the salient features of Prevention of cruelty to animals act and to summarize the list of prescription and nonprescription drugs, DPCO act (UNDERSTAND)
8	Medicinal Chemistry – (Theory)	C _{(T3105)1}	Describe brief introduction of modern concept of drug design: QSAR, CADD, Combinatorial chemistry, Prodrug, anti sense drugs. (REMEMBER)

		C _{(T3105)2}	Explain in detail about drugs, and their structure, M.o.A, Classification, synthesis, SAR of local anti infectives and Sulphonamides (UNDERSTAND)
		C _{(T3105)3}	Discuss history, development, degradation reactions, structure, SAR, M.o.a., synthesize and uses of antibiotics, antimalarials, antineoplastics. (CREATE & UNDERSTAND)
		C _{(T3105)4}	Explain in detail about structure, M.O.A, adverse effects and uses of cardiovascular drugs, oral hypoglycaemics. (UNDERSTAND)
		C _{(T3105)5}	Define thyroid, antithyroid drugs, diagnostic agents and write in detail their M.O.A, synthesis and uses. (REMEMBER)
		C _{(T3105)6}	Explain in detail about diuretics, steroidal hormones and adrenocortical drugs. (UNDERSTAND)
9	Medicinal Chemistry – (Practical)	C _{(T3110)1}	Recall the various techniques of medicinal compounds (REMEMBER)
		C _{(T3110)2}	Synthesize and understand the principle, mechanism of various preparations (CREATE)
		C _{(T3110)3}	Prepare and explain purification of medicinal compounds (UNDERSTAND)
		C _{(T3110)4}	Perform assay and calculate percentage purity of medicinal compounds (ANALYSE)
		C _{(T3110)5}	Determine percentage purity of medicinal compounds by Various techniques (APPLY)
		C _{(T3110)6}	Identification of medicinal compounds (REMEMBER)
10	Pharmaceutical Formulations (Theory)	C _{(T3106)1}	Remember the types of tablets & describe the granulation techniques (REMEMBER)
		C _{(T3106)2}	Determine the quality control test and apply evaluation of uncoated as well as coated tablets. (APPLY)
		C _{(T3106)3}	Explain production and filling of hard & soft gelatine capsules. Quality control tests for capsules. (UNDERSTAND)
		C _{(T3106)4}	Formulate and evaluate the semisolid preparation such as ointments, gels (CREATE)
		C _{(T3106)5}	Describe the formulation concepts of pharmaceutical suspensions and remember the emulsions and their stability problems (REMEMBER)

		C _(T3106) 6	Understand the production facilities of Parenterals and Summarize various controlled and novel drug delivery systems (UNDERSTAND)
11	Pharmaceutical Formulations (Practical)	C _(T3111) 1	Formulate and develop different types of tablets (CREATE)
		C _(T3111) 2	Explain and formulate the manufacture of hard gelatin capsule (UNDERSTAND)
		C _(T3111) 3	Understand and review preparation of parenterals (UNDERSTAND)
		C _(T3111) 4	Appraise and evaluatedifferent liquid orals formulations (EVALUATE)
		C _(T3111) 5	Asses and evaluate semisolid preparations (EVALUATE)
		C _(T3111) 6	Preparation of cosmetics (CREATE)
PHARM D – IV YEAR (PCI)			
S.NO	Course	Course code and number	Course outcome
1	Pharmacotherapeutics-III (Theory)	C _(T4101) 1	Recognize the pathophysiology of gastrointestinal and liver diseases and the ability to identify therapeutic approach for management of these diseases. (UNDERSTAND)
		C _(T4101) 2	Differentiate the various haematological diseases and the diagnostic skills required for the assessment of such diseases to provide a suitable therapeutic plan. (UNDERSTAND)
		C _(T4101) 3	Describe various diseases associated with nervous system and attain skills of diagnosis and management of these diseases. (REMEMBER)
		C _(T4101) 4	Summarise the therapeutic approach to psychiatry disorders like schizophrenia, affective disorders, anxiety disorders, sleep disorders and obsessive compulsive disorders. (UNDERSTAND)
		C _(T4101) 5	Describe the various pain pathways in order to provide pain management in neuralgias and headaches. (REMEMBER)
		C _(T4101) 6	Determine judicious use of current best evidence available for a drug therapy. (APPLY)
2	Pharmacotherapeutics-III (Practical)	C _(T4107) 1	Recognize the pathophysiology of gastrointestinal and liver diseases and the ability to identify therapeutic approach for

			management of these diseases. (UNDERSTAND)
		C _{(T4107)2}	Differentiate the various haematological diseases and the diagnostic skills required for the assessment of such diseases to provide a suitable therapeutic plan. (UNDERSTAND)
		C _{(T4107)3}	Describe various diseases associated with nervous system and attain skills of diagnosis and management of these diseases. (REMEMBER)
		C _{(T4107)4}	Summarise the therapeutic approach to psychiatry disorders like schizophrenia, affective disorders, anxiety disorders, sleep disorders and obsessive compulsive disorders. (UNDERSTAND)
		C _{(T4107)5}	Describe the various pain pathways in order to provide pain management in neuralgias and headaches. (REMEMBER)
		C _{(T4107)6}	Determine judicious use of current best evidence available for a drug therapy. (APPLY)
3	Hospital Pharmacy (Theory)	C _{(T4102)1}	Define the structure, organisation and functions of hospital and hospital pharmacist (REMEMBER)
		C _{(T4102)2}	Preparation and implementation of budget, inventory control and various drug policies (CREATE)
		C _{(T4102)3}	Interpret various hospital committees to develop hospital pharmacy and news letters (UNDERSTAND)
		C _{(T4102)4}	Explain the sterile services, various drug distribution methods or inpatients and outpatients including narcotic and controlled drugs (UNDERSTAND)
		C _{(T4102)5}	Describe procurement, manufacturing and storage process various formulations and handling of radio pharmaceuticals (REMEMBER)
		C _{(T4102)6}	Develop programmes for professional upraising continuously and to build inter professional (CREATE)
4	Hospital Pharmacy (Practical)	C _{(T4108)1}	Describe drug profiles and drug distribution systems and various committees in hospitals (REMEMBER)
		C _{(T4108)2}	Evaluate the rationality of prescriptions (EVALUATE)

		C _{(T4108)3}	Design various methods for the preparation and labelling of pharmaceutical products such as powders and intravenous solutions (CREATE)
		C _{(T4108)4}	Write the solutions to overcome the drug interactions and adverse drug reactions (REMEMBER)
		C _{(T4108)5}	Describe various store management and inventory control (REMEMBER)
		C _{(T4108)6}	Explain drug information queries through the systematic approach (UNDERSTAND)
5	Clinical Pharmacy(Theory)	C _{(T4103)1}	Understand and explain scope and development of clinical Pharmacy the daily activities and roles of clinical pharmacist and to monitor the patient drug therapy through medication chart review and clinical review (UNDERSTAND)
		C _{(T4103)2}	Describe medication history interview and counsel the patients on various diseases and life style modifications by applying communication skills (REMEMBER)
		C _{(T4103)3}	Assess the response to DUE, drug information queries using systematic approach and to establish a drug information and poison information center (EVALUATE)
		C _{(T4103)4}	Interpret selected laboratory results of specific diseases status mentioned and report ADRs, drug related problems and medication errors understand the pharmacovigilance (UNDERSTAND)
		C _{(T4103)5}	Understand the concept pharmacovigilance (UNDERSTAND)
		C _{(T4103)6}	Evaluate biomedical literature in order to get an unbiased clinical evidence to develop individualised pharmaceutical care plan (EVALUATE)
6	Clinical Pharmacy (Practical)	C _{(T4109)1}	Describe drug profiles, Ward rounds and counseling techniques various laboratory tests.(REMEMBER)
		C _{(T4109)2}	Explain and respond to drug information queries using modified systematic approach by critically appraising the biomedical literature (UNDERSTAND)
		C _{(T4109)3}	Create awareness in patients by counselling them on various diseases using clinical knowledge and communication skills (CREATE)

		C _{(T4109)4}	Create awareness in patients by counselling them on various drugs using clinical knowledge and communication skills (CREATE)
		C _{(T4109)5}	Interpret laboratory results of specific disease while monitoring disease progression (UNDERSTAND)
		C _{(T4109)6}	Develop comprehensive and meticulous medication history interview for the preparation of individualized pharmaceutical care plan (CREATE)
7	Biostatistics & Research Methodology (Theory)	C _{(T4104)1}	Demonstrate the importance of biostatistics in pharmacy (UNDERSTAND)
		C _{(T4104)2}	Explain the importance of research methods in the design of pharmacoepidemiological study.(UNDERSTAND)
		C _{(T4104)3}	Determine appropriate statistical methods for data analysis and choose the methods of collection of data and its analysis and interpretation(APPLY)
		C _{(T4104)4}	Discuss and evaluate various software for statistical analysis of data(UNDERSTAND)
		C _{(T4104)5}	Explain various methods of testing hypothesisC
		C _{(T4104)6}	List the importance and procedures for using computers in pharmacy(REMEMBER)
8	Biopharmaceutics & Pharmacokinetics (Theory)	C _{(T4105)1}	Recall the basic concepts of absorption, distribution, metabolism and excretion of drugs.(REMEMBER)
		C _{(T4105)2}	Describe the mechanisms, interpret various factors affecting drug absorption, distribution, metabolism and excretion of drugs.(REMEMBER)
		C _{(T4105)3}	Apply the pharmacokinetic models for the determination of pharmacokinetic parameters.(APPLY)
		C _{(T4105)4}	Assess multiple dosage regimens based on pharmacokinetic parameters for maximizing therapeutic effectiveness and patient compliance (EVALUATE)
		C _{(T4105)5}	Choose various pharmacokinetic parameters for the drugs exhibiting saturation kinetics.(ANALYSE)
		C _{(T4105)6}	Design the bioavailability testing protocol of a drug and compare the bioequivalence between marketed products.(CREATE)

9	Biopharmaceutics & Pharmacokinetics (Practical)	C _{(T4110)1}	Recall the concepts in biopharmaceutics, basic pharmacokinetic parameters and their significance. (REMEMBER)
		C _{(T4110)2}	Interpret the effect of surfactant, diluents, lubricant and Polymorphism on rate of drug dissolution. (UNDERSTAND)
		C _{(T4110)3}	Solve bioavailability parameters of drugs by using plasma data and methods to improve bioavailability. (APPLY)
		C _{(T4110)4}	Analyze absorption rate constant, KE, biological half-life, mean residence time and mean absorption time for the given data. (ANALYZE)
		C _{(T4110)5}	Enumerate the extent of protein binding by equilibrium dialysis or dynamic dialysis methods. (REMEMBER)
		C _{(T4110)6}	Predict the pharmacokinetic parameters for the given data as per one compartment and two compartment models. (EVALUATE)
10	Clinical Toxicology (Theory)	C _{(T4106)1}	State the general aspects of management of poisoning along with antidotes for specific application. (REMEMBER)
		C _{(T4106)2}	Describe supportive cares like Airway Breathing Circulation in case of poisoning and also methods of gut decontamination for elimination of such poisons. (REMEMBER)
		C _{(T4106)3}	Enumerate the toxicokinetics of the poison and application of extracorporeal methods for elimination of toxins. (REMEMBER)
		C _{(T4106)4}	State management of acute poisoning based on symptoms due to caustics, neurotoxins, irritants, pesticides, hydrocarbons, NSAIDs and radiation (REMEMBER)
		C _{(T4106)5}	Explain therapeutic management for chronic poisoning of heavy metals based on the diagnostic investigations. (UNDERSTAND)
		C _{(T4106)6}	Demonstrate management plans for food poisoning, snake bites and arthropod bites and stings. (UNDERSTAND)

PHARM.D – V YEAR

S.NO	Course	Course code and number	Course outcome
1	Clinical research (Theory)	C _{(T5101)1}	Explain developmental process of new chemical entity discovered via pharmacological approach,

			toxicological approach, Investigational New Drug Application, drug characterization and dosage form. (REMEMBER)
		C _{(T5101)2}	Interpret the different phases of trial and to evaluate the safety and efficacy of the drug from pre-clinical trials to post marketing surveillance. (UNDERSTAND)
		C _{(T5101)3}	Describe regulatory authorities (ICH, CDSCO) responsibilities for monitoring clinical trial process, lay guidelines and address to its challenges in implementation. (REMEMBER)
		C _{(T5101)4}	Identify guidelines followed for the countries USA, India and Europe along with roles and responsibilities of clinical trial personnel. (UNDERSTAND)
		C _{(T5101)5}	Tabulate the ethical guidelines in clinical research along with composition and functions of institutional review board. (REMEMBER)
		C _{(T5101)6}	Assemble essential clinical study documents needed in clinical trial, like case report forms, informed consent form, participant identification centers etc. are involved. (CREATE)
		C _{(T5101)7}	Describe role of computers in data management along with safety monitoring in clinical trials. (REMEMBER)
2	Pharmacoepidemiology & Pharmacoeconomics (Theory)	C _{(T5102)1}	Explain the origin, scope and applications of Pharmacoepidemiology and Pharmacoeconomics in clinical settings and discuss the various Pharmacoepidemiologic outcome measures. (UNDERSTAND)
		C _{(T5102)2}	Choose the tools effectively in evaluating risk and benefit of therapy and determine the concept of risk in pharmacoepidemiology and different methods of measurement of risk. (APPLY)

		C _{(T5102)3}	Explain various pharmacoepidemiology studies and evaluate the outcomes of measures using case studies. Understand the Pharmacoepidemiologic databases and <u>illustrate</u> the sources of data for Pharmacoepidemiologic studies. (UNDERSTAND)
		C _{(T5102)4}	Describe the selected special applications of pharmacoepidemiology. (REMEMBER)
		C _{(T5102)5}	Explain pharmaco-economic outcome measures and <u>discuss</u> the various methods to measure outcomes in pharmaco-economic studies. (UNDERSTAND)
		C _{(T5102)6}	Select the various types of software and its applications in Pharmaco-economic analysis using case studies. (ANALYSE)
3	Clinical Pharmacokinetics and Pharmacotherapeutic Drug Monitoring (T5103)	C _{(T5103)1}	Understand the basics of pharmacokinetics, nomograms, tabulations and their applications and design the dosage regimen and therapy of a drug based on the pharmacokinetic principles and route of administration. (UNDERSTAND)
		C _{(T5103)2}	Describe the individualization the dosage regimen for the patients who are obese, pediatrics, geriatrics and patients with impaired renal and hepatic functions. (REMEMBER)
		C _{(T5103)3}	Evaluate the patient case where they find potential drug-drug, drug-food, drug-disease interactions with appropriate recommendations for drug dosage and food adjustments. (EVALUATE)
		C _{(T5103)4}	Develop knowledge about population pharmacokinetics data, Bayesian theory, adaptive method, and dosing with feedback. (CREATE)
		C _{(T5103)5}	Analyse the plasma drug concentration with patient's therapeutic outcome in

			cardiovascular disease, seizure disorders, psychiatric disorders, organ transplantation, to formulate protocol of TDM and correlate TDM with drug therapy. (ANALYSE)
		C _{(T5103)6}	Develop knowledge about pharmacogenetics and find the genetic polymorphisms in drug metabolism, drug transport & drug target in the patients, if any with the clinical outcomes in the patients. (CREATE)
4	Clerkship (T5104)	C _{(T5104)1}	Analyse patient case sheet and classify the patient's illness, chief complaints, social history, family history, past and present medical history, occupational history, diagnosis, treatment and lifestyle modifications. (ANALYSE)
		C _{(T5104)2}	Evaluate the diagnosis by observing all the laboratory investigations closely in chronological order and correlating it with the disease condition of the patient. (EVALUATE)
		C _{(T5104)3}	Set-up patient counselling for the in-patients and OPD patients regarding medications, life style modifications and precautions. (CREATE)
		C _{(T5104)4}	Identify any adverse drug reactions in any patient by closely monitoring and interviewing the patients. (REMEMBER)
		C _{(T5104)5}	Identify any potential evidence of drug-drug, drug-food and drug-disease interactions and do interventions wherever required in consultations with the duty doctors. (REMEMBER)
		C _{(T5104)6}	Choose evidence-based drug information to doctors, nurses, pharmacists and patients for their drug related queries and documenting it properly. (APPLY)
5	Project Work (T5105)	C _{(T5105)1}	Describe the Aim and Objectives of the project by identifying the issues related to use of pharmaceuticals and health in community population or

			hospital epidemiology. (REMEMBER)
		C_{(T5105)2}	Review literatures on the selected project topic to have understanding of current project work before starting new investigation on the work. (UNDERSTAND)
		C_{(T5105)3}	Design the protocol comprising of aim, objectives, plan of the study, study duration, study site, materials and methods, statistical tools, data collection forms, etc. (CREATE)
		C_{(T5105)4}	Evaluate the protocol by the ethical committee and head of the department and get it approved. (EVALUATE)
		C_{(T5105)5}	Generate the data collection, analyse the data based upon the decided parameters, perform statistical analysis, draw the results and conclusion. (CREATE)
		C_{(T5105)6}	Analyse the outcomes of the project work and its future scope in the given field of study. (ANALYSE)

PHARM.D – VI YEAR (R08)

S.NO	Course	Course code and number	Course outcome
1	Internship	C_{(Internship)1}	Analyse the case sheet of patients during ward round participation with the duty doctors by utilising their clinical, pharmacological, pathological, therapeutical knowledge and correlate the findings. (ANALYSE)
		C_{(Internship)2}	Infer the diagnosis of the patients by analysing their laboratory, radiology and other reports. (ANALYSE)
		C_{(Internship)3}	Design dose in paediatrics, geriatrics, and in patients with renal and hepatic impairment. (CREATE)
		C_{(Internship)4}	Set-up patient counselling regarding their disease/disorder, medications, lifestyle modifications, adverse drug reactions, precautions and contraindications. (CREATE)

		C(Internship)5	Evaluate and analyse each case closely to find and report any drug-drug and drug-food interactions and do interventions if required. (EVALUATE, ANALYSE)
		C(Internship)6	Identify and provide evidence-based drug/poison information to doctors, nurses, pharmacists, patients for their drug/poison related queries. (REMEMBER)