First Year PharmD.

Subject: Human Anatomy and Physiology-I (Theory) **Subject Code: 1.1T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C1.1.T.1 To describe the structure (gross and histology) and functions of various organs of the human body.

C1.1.T.2 To describe various homeostatic mechanisms and their imbalances of various systems.

C1.1T.3 To describe hematological tests and also record blood pressure, heart rate, pulse and Respiratory volumes.

C1.1.T.4 To understand coordinated working pattern of different organs of each system and to enhance the understanding of how the drugs act on the various body systems in correcting the disease state of the organs

Subject: Human Anatomy and Physiology-I (Practical) **Subject Code: 1.1P**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of laboratory experiments, learner should be able to:

C1.1.P.1 To Identify the various tissues of the different systems of the human body.

C1.1.P.2 To Study and identify different organs in different systems of the human body.

C1.1.P.3 To Perform the hematological tests and also record blood pressure, heart rate, pulse and Respiratory volumes

C1.1.P.4 To perform the various experiments related to special senses and nervous system

Subject: Pharmaceutics-I (Theory) **Subject Code: 1.2T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C1.2.T.1 To understand the formulation of different dosage forms.

C1.2.T.2 To understand the basics of the applied field of pharmacy.

C1.2.T.3 To understand different pharmaceutical calculation involved in formulation specifically for children.

C1.2.T.4 To understand the importance of good formulation and effectiveness

Subject: Pharmaceutics-I (Practical) **Subject Code: 1.2P**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of laboratory experiments, learner should be able to:

C1.2 P.1 To understand the formulation of different dosage forms like solid, liquid and semisolid dosage forms.

C1.2 P.2 To understand the packaging of the different formulations.

C1.2 P.3 To know about the label, storage, application and handling of the dosage forms.

C1.2 P.4 To understand different types of incompatibilities of different dosage forms.

Subject: Medicinal Biochemistry (Theory) **Subject Code: 1.3 T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C1.3.T.1 To understand the catalytic activity of enzymes and importance isoenzymes in diagnosis of diseases

C1.3.T.2 To know the metabolic process of bio molecules

C1.3.T.3 To understand the genetic organization of mammalian genome; protein synthesis; replication; mutation and repair mechanism

C1.3.T.4 To know the biochemical principles of organ function tests of kidney, liver and endocrine gland.

Subject: Medicinal Biochemistry (Practical) **Subject Code: 1.3P**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of laboratory experiments learner should be able to:

C1.3.P.1 To perform qualitative analysis and determination of biomolecules in the body fluids.

C1.3.P.2 To perform quantitative analysis and determination of electrolytes**.**

C1.3.P.3 To estimate SGOT, SGPT, Urea & protein in serum

C1.3.P.4 To study factors affecting enzyme activity and preparation, pH measurement.

Subject : Pharmaceutical Organic Chemistry (Theory) **Subject Code: 1.4T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C1.4.T.1 To be able to write IUPAC/Common names of simple organic compounds belonging to different classes of organic compounds in organic chemistry.

C1.4.T.2 To achieve understanding of the some important physical properties of pharmaceutical organic compounds.

C1.4.T.3 To achieve understanding of the some important physical properties of pharmaceutical organic compounds.

C1.4.T.4 To gain through knowledge of some named organic reactions with mechanisms

Subject: Pharmaceutical organic Chemistry (Practical) **Subject Code:1.4P**

Course learning objectives related to knowledge, skill and attitude: Upon completion of laboratory experiments, learner should be able to:

C1.4.P.1 To acquire the knowledge and understanding of the basic experimental principles related to basic experimental techniques

C1.4.P.2 To know about the synthesis of pharmaceutical organic molecules by mechanism

C1.4.P.3 To Identify unknown pharmaceutical organic molecules by systemic qualitative analysis.

C1.4.P.4 To construction of organic stereo models of simple organic molecules.

Subject: Pharmaceutical Inorganic Chemistry (Theory) **Subject Code: 1.5T**

Course learning objectives related to knowledge, skill and attitude: Upon completion of theory topics, learner should be able to:

C1.5.T.1 To understand applications of inorganic pharmaceuticals.

C1.5.T.2 To achieve Knowledge about the sources of impurities and methods to determine the impurities in inorganic drugs and pharmaceuticals by assay, semiquantitative inorganic analysis methods.

C1.5.T.3 To appreciate the importance of inorganic pharmaceuticals in preventing and curing the disease.

C1.5.T.4 To have been introduced to a variety of inorganic drug classes

Subject: Pharmaceutical Inorganic Chemistry (Practical) **Subject Code: 1.5P**

Course learning objectives related to knowledge, skill and attitude: Upon completion of laboratory experiments, learner should be able to:

C1.5.P.1 To acquire the knowledge and understanding of the basic lab experimental techniques in Pharmaceutical Inorganic Chemistry

C1.5.P.2 To become well acquainted with the principles, procedures to make test, standard and reactions of limit tests of inorganic impurities

C1.5.P.3 To know about assay of drugs by different volumetric titration methods.

C1.5.P.4 To gain knowledge of tests for identity, preparations and test for purity for inorganic pharmaceuticals.

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Second Year Pharm D

Subject: Phathophysiology (Theory) **Subject Code:2.1T**

Course learning objectives related to knowledge, skill and attitude: Upon completion of theory topics, learner should be able to:

C2.1.T.1 Describe the aetiology of the selected disease states.

C2.1.T.2 Describe the Pathogenesis of the selected diseased states

C2.1.T.3 Name the signs and symptoms of the diseases

C2.1.T.4 Mention the complications of the diseases.

Subject: Pharmaceutical Microbiology (Theory) **Subject Code: 2.2T**

Course learning objectives related to knowledge, skill and attitude: Upon completion of theory topics, learner should be able to:

C2.2.T.1 To understand the anatomy, identification, growth factors and sterilization of microorganisms

C2.2.T.2 To do cultivation and identification of the microorganisms and their diagnostic test in the lab.

C2.2.T.3 To do estimation of RNA and DNA and there by identifying the source;

Subject: Pharmaceutical Microbiology (Practical) **Subject Code: 2.2P**

Course learning objectives related to knowledge, skill and attitude: Upon completion of, laboratory experiments learner should be able to:

C2.2.P.1 To study the apparatus used in microbiology & preparation, sterilization of glassware's and media

C2.2.P.2 To perform culture sensitivity testing, sterility testing for powder & liquid and determination of MIC

C2.2.P.3 To perform culture sensitivity testing, sterility testing for powder & liquid and determination of MIC

Subject: Pharmacognosy & Phytopharmaceuticals (Theory) **Subject Code: 2.3T**

Course learning objectives related to knowledge, skill and attitude: Upon completion of theory topics, learner should be able to:

C2.3T.1 To know history, scope, sources, classification and quality control methods of natural origin, meaning and significance of Pharmacognostic parameters and Pharmacognostic scheme of study of crude drugs.

C2.3T.2 To understand techniques of cultivation, collection, storage of crude drugs, morphology and anatomy of plant parts and know primary and secondary metabolites of crude drugs.

C2.3T.3 To know the source, properties, methods of extraction, active constituents, uses of crude drugs, pharmaceutical and industrial applications of carbohydrates, natural fibres, lipids and proteins and their derived products

C2.3T.4 To understand adulteration and methods of adulteration of crude drugs

Subject: Pharmacognosy & Phytopharmaceuticals (Practical) Subject Code: 2.3P

Course learning objectives related to knowledge, skill and attitude: Upon completion of laboratory experiments, learner should be able to:

C2.3.P.1 To understand cell wall constituents and cell inclusion.

C2.3.P.2 To understand morphology, microscopy and characteristics of crude drugs

C2.3.P.4 To be able to identify unorganized drugs by chemical methods

Subject: Pharmacology-I -I (Theory) Subject Code: 2.4T

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C2.4.T.1 To understand the pharmacological aspects of drugs falling under the mentioned chapters

C2.4.T.2 To handle and carry out the animal experiments.

C2.4.T.3 To Appreciate the importance of pharmacology subject as basis of therapeutics

C2.4.T.4 To Correlate and apply the knowledge therapeutically.

Subject Pharmacology-I (Practical) Subject Code: 2.4P

Course learning objectives related to knowledge and cognitive skills: Upon the completion of laboratory experiments ,learner should be able to:

C2.4.P.1 To understand the commonly used instruments and guidelines (OECD, CPCSEA etc.) in experimental pharmacology.

C2.4.P.2 To record CRC of dugs using suitable isolated tissue preparations.

C2.4.P.3 To Study various anesthetics, routes of drug administration, animal physiology and techniques of Euthanasia

C2.4.P.4 To Study various activities like mydriatic, miotic, analgesic, locomotor, muscle relaxant, antihistamic, anxiolytic etc. in experimental animals.

Subject: Community Pharmacy (Theory) **Subject Code:2.5T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics learner should be able to:

C2.5T.1	To understand the scope of community pharmacy and its management and inventory control methods needed to manage the pharmacy
C2.5.T.2	To be able to identify the parts of a prescription and check for medication related problems
C2.5.T.3	To be able to learn the importance of pharmaceutical care, patient counseling, medication adherence and rationality of drug use
C2.5.T.4	To understand the methods of health education, screening and OTC medications

Subject: Pharmacotherapeutics – I (Theory) **SubjectCode:2.6T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C2.6.T.1	To understand the etiopathogenesis, clinical presentation and management for cardiovascular diseases
C2.6.T.2	To apprehend the etiopathogenesis, clinical presentation and management for Respiratory diseases
C2.6.T.3	To understand the etiopathogenesis, clinical presentation and management for Endocrine disorders
C2.6.T.4	To understand the importance of rational drug therapy and prescribing guidelines for different age groups

Subject: Pharmacotherapeutics – I (Practical) **Subject Code: 2.6P**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C2.6.P.1	To Discuss the controversies in drug therapy
C2.6.P.2	To prepares individualized therapeutic plans based on diagnosis
C2.6.P.3	To Identify the patient-specific parameters relevant in initiating drug therapy.
C2.6.P.4	To Monitoring of drug therapy including alternatives,time-course therapeutic response.

Third Year Pharm D

Subject: Pharmacology -II (Theory) **Subject Code: 3.1.T**

Course learning objectives related to knowledge, skill and attitude: Upon completion of theory topics, learner should be able to:

C.3.1.T.1 To understand the pharmacological aspects of drugs acting on blood and blood forming agents and pharmacology of drugs acting on renal system

C.3.1.T.2 To study pharmacology of chemotherapeutic agents, vitamins and essential minerals

C.3.1.T.3 To study immune system, pharmacology of autocoids and hormones and to study principles of animal toxicology

C.3.1.T.4 To study the dynamic cell & genome structure and function

Subject: Pharmacology -II (Practical) **Subject Code: 3.1.P**

Course learning objectives related to knowledge, skill and attitude: Upon completion of laboratory experiments learner should be able to:

C.3.1.P.1 To study various routes of drug administration, use of anesthetics in laboratory animals and their handling

C.3.1.P.2 To learn the composition of physiological salt solutions and basic instruments used in experimental pharmacology

C.3.1.P.3 To perform isolated experiments using various isolated preparation and the effect of different drugs on the concentration response curves.

Subject: Pharmaceutical Analysis (Theory) **Subject Code: 3.2T**

Course learning objectives related to knowledge, skill and attitude: Upon completion of theory topics , learner should be able to:

C.3.2.T.1 To understand validation of analytical instruments & methods as per ICH/ USP guidelines, concept of quality assurance and quality control technique

C.3.2.T.2 To understand principles, instrumentation and application of various chromatographic techniques.

C.3.2.T.3 To understand principle, instrumentation and application of various Electrometric methods

C.3.2.T.4 To Understand principle, instrumentation and application of UV- Vis, Atomic Absorption and Emission Spectroscopy,

Subject: Pharmaceutical Analysis (Practical) **Subject Code: 3.2P**

Course learning objectives related to knowledge, skill and attitude: Upon completion of laboratory experiments, learner should be able to:

C.3.2.P.1 To perform separation and identification of samples using paper, thin layer chromatographic technique.

C.3.2.P.2 To analyze the samples using UV visible spectrophotometer, study the effect of pH, solvent effect, derivatization on UV spectra

C.3.2.P.3 To study and demonstrate IR spectroscopy, HPLC, HPTLC, polarimeter etc.

Subject: Pharmacotherapeutics – II (Theory) **Subject Code:3.3T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C.3.3.T.1 To know the pathophysiology of selected disease states and the rationale for drug therapy

C.3.3.T.2 To understand the therapeutic approach for management of different diseases.

C.3.3.T.3 To know the importance of preparation of individualized therapeutic plans based on diagnosis & controversies in drug therapy

C.3.3.T.4 To understand and identify the patient-specific parameters relevant initiating drug therapy, and monitoring therapy.

Subject: Pharmacotherapeutics – II (Practical) **Subject Code:3.3P**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C.3.3.P.1 To understand therapeutic goals of the drugs used in different diseases

C.3.3.P.2 To check & analyze drug interactions, adverse drug reactions.

C.3.3.P.3 To understand dose and frequency of the medications

C.3.3.P.4 To understand the time-course of clinical and laboratory indices of therapeutic response and adverse effects.

Subject: Pharmaceutical Jurisprudence (Theory) **Subject Code:3.4T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C.3.4.T.1 To appreciate study Pharmaceutical Legislation, relevance and significance of jurisprudence to Pharmaceutical Sciences

C.3.4.T.2 To know fundamentals of legislation to regulate import manufacture, distribution and sales of drug and cosmetics.

C.3.4.T.3 To know the various parameters in the Drug and Cosmetic Act and rules, Drug policy, Drug Price Control Order.

C.3.4.T.4 To understand the concepts of Narcotic Drugs and Psychotropic substances, Pharmacy Act and Excise duties Act

Subject : Medicinal Chemistry (Theory) **Subject Code:3.4T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C.3.4.T.1 To understand modern concept of rational drug design

C.3.4.T.2 Learn development of the anti-infective drugs including structure activity relationship, mechanism of action, synthesis, chemical nomenclature, brand names and side effects of important compounds

C.3.4.T.3 Understand classification, mechanism of action, structure activity relationship, synthesis, nomenclature and side effects of the drugs acting as antineoplastic agents.

C.3.4.T.4 Understand classification, mechanism of action, structure activity relationship, synthesis, nomenclature and side effects of the drugs acting as Cardiovascular agents,Hypoglycemic agents, Diureties.

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Subject: Medicinal Chemistry (Practical) **Subject Code: 3.5P**

Course learning objectives related to knowledge, skill and attitude: Upon completion of laboratory experiments, learner should be able to:

C.3.5.P.1 To Learn assays of important drugs from the course

C.3.5.P.2 To Learn synthesis of medicinally important compounds / drug intermediates with recrystallization, TLC techniques

C.3.5.P.3 To Understand monograph analysis of important drugs.

C.3.5.P.4 To Determine partition coefficients, dissociation constants and molar refractivity of compounds for QSAR analysis.

Subject: Pharmaceutical Formulation (Theory) **Subject Code: 3.6T**

Course learning objectives related to knowledge, skill and attitude: Upon completion of theory topics, learner should be able to:

C.3.6.T.1 To understand the principle involved in formulation of various pharmaceutical dosage forms

C.3.6.T.2 To prepare various pharmaceutical formulation

C.3.6.T.3 To perform evaluation of pharmaceutical dosage forms.

Subject: Pharmaceutical Formulation (Practical) **Subject Code: 3.6P**

Course learning outcomes related to Knowledge, Skills & attitude: Upon completion of laboratory experiments, learner should be able to:

C.3.6.P.1 To describe different tablet dosage form, coating and related concern for design & development of tablet dosage form

C.3.6.P.2 To develop Semisolid Dosage forms with acceptable patient compliance

C.3.6.P.3 To design and develop sterile liquid dosages forms to treat various clinical diseases

Fourth Year Pharm D

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Subject: Pharmacotherapeutics III (Theory) **Subject Code: 4.1.T**

Course learning outcomes related to Knowledge, Skills & attitude: Upon completion of theory topics, learner should be able to:

C.4.1.T.1 The therapeutic approach to management of these diseases

C.4.1.T.2 The controversies in drug therapy

C.4.1.T.3 The importance of preparation of individualized therapeutic plans based on diagnosis.

C.4.1.T.4 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).

Subject: Pharmacotherapeutics III (Practical) **Subject Code: 4.1.P**

Course learning outcomes related to Knowledge, Skills & attitude: On completion of theory topics, learner should be able to:

C.4.1.P.1 To understand therapeutic goals of the drugs used in different diseases

C.4.1.P.2 To check & analyze drug interactions, adverse drug reactions.

C.4.1.P.4 To understand the time-course of clinical and laboratory indices of therapeutic response and adverse effects.

C.4.1.P.5 To prepare the individualised therapeutic plans based on diagnosis

Subject: Hospital Pharmacy (Theory) **Subject Code: 4.2T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C4.2.T.1 The various drug distribution methods

C4.2.T.2 The professional practice management skills in hospital pharmacies

C4.2.T.3 The unbiased drug information to the doctors

C4.2.T.4 The manufacturing practices of various formulations in hospital set up

Subject: Hospital Pharmacy (Practical) **Subject Code: 4.2 P**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of laboratory experiments, learner should be able to:

C4.2.P.1 To know various drug distribution methods.

C4.2.P.2 To know the professional practice management skills in hospital pharmacies & appreciate the stores management and inventory control

C4.2.P.4 To know the manufacturing practices of various formulations in hospital set up

Subject: Clinical Pharmacy (Theory) **Subject Code: 4.3T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C4.3.T.1 To monitor drug therapy of patient through medication chart review and clinical review

C4.3.T.2 To obtain medication history interview and counsel the patients.

C4.3.T.3 To identify and resolve drug related problems

C4.3.T.4 To detect, assess and monitor adverse drug reaction

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Subject:- Clinical Pharmacy (Practical) **SubjectCode:4.3P**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C4.3.P.1 To be able to Answer drug information questions

C4.3.P.2 To be able to conduct Patient History Interview

C4.3.P.3 To be able to perform patient medication counselling.

Subject: Biostatistics & Research Methodology (Theory) **Subject code: 4.4T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C4.4.T.1 To Recognize the importance of biostatistics in pharmacy

C4.4.T.2 To understand the research methodology in the Pharmacoepidemiologic study

C4.4.T.3 The methods of collection of data and its analysis and Interpretation

C4.4.T.4 To evaluate various software's for statistical analysis of data

Subject: Biopharmaceutics & Pharmacokinetics -I (Theory) **Subject Code: 4.5T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C4.5.T.1 The effect of Pharmacokinetic parameters on the biological effects of the drug.

C4.5.T.2 Understand various pharmacokinetic models and their significance in interpreting various pharmacokinetic parameters

C4.5.T.3 To design a basic protocol for the conduct of BA/BE study and the interpretation of the BA/BE data

C4.5.T.4 To ability to use the concepts of pharmacokinetic principles in the clinical contexts.

Subject: Clinical Toxicology -I (Theory) **Subject Code: 4.5T**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C4.5.T.1 To correlate and differentiate the normal pharmacology effects and toxicological effects of various drugs

C4.5.T.2 To identify the clinical symptoms of various poisoning and over dosage of drugs

C4.5.T.3 To Manage the case with basic first aids, and able to select the appropriate antidotes based upon the poisoning case

Fifth Year Pharm D

Subject: Clinical Research (Theory) **Subject Code: 5.1T**

Course learning objectives related to knowledge, skill and attitude: Upon completion of theory topics, learner should be able to:

C5.1.T.1	To describe the concept of new drug development process
C5.1.T.2	To describe the various phases of clinical trials
C5.1.T.4	To recognize the regulatory and ethical requirements in clinical trials
C5.1.T.5	To recognize the roles and responsibilities of clinical trial study team

Subject: Pharmacoepidemiology a Pharmacoeconomics (Theory) **Subject Code:5.2T**

Course learning objectives related to knowledge, skill and attitude: Upon completion of theory topics, learner should be able to:

C5.2.T.1	To understand drug use pattern and their outcome measures
C5.2.T.2	To conduct Pharmacoepidemiologic Studies
C5.2.T.3	To conduct Pharmacoeconomic studies and evaluate the cost-benefit ratio
C5.2T.4	To adopt the tools effectively in evaluating risk and benefit of therapy

Subject: Clinical Pharmacokinetics and Therapeutic Drug Monitoring **Subject Code: 5.3T**

Course learning objectives related to knowledge, skill and attitude: Upon completion of theory topics, learner should be able to:

C5.3.T.1	To design the drug therapy regimen for individual patient
C5.3.T.2	To be able to interpret and correlate the plasma drug concentration with patients therapeutic outcome
C5.3.T.4	To recommended dosage adjustment for patients with renal/hepatic impairement
C5.3.T.5	To detect and manage drug- drug interaction

Subject:- Clerkship (Practical) **Subject Code: 5.4P**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C5.4.P.1	To know the roles and responsibilities of a clinical pharmacist by participating in the ward rounds, identifying and reporting drug interactions, Adverse drug reactions, medications errors etc
C5.4.P.2	To create personalized therapeutic plan for different patients based on their investigations and clinical symptoms.
C5.4.P.3	To be able to conduct medication history interview, patient counselling and to answer drug information questions.
C5.4.P.4	To summarize the therapeutic approach for the management of diseases including with the reference to the latest available evidence

Subject: Project (Practical) **Subject Code: 5.5P**

Course learning objectives related to knowledge and cognitive skills: Upon the completion of theory topics, learner should be able to:

C.5.6.P.1	To know the concept of clinical research and the procedures included in research
C.5.6.P.2	To understand the preparation of protocol.
C.5.6.P.3	To know the ethical and scientific aspects related to research works.
C5.6.P.4	To know the statistical procedures in various types of research works.

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