First Year

First Semester

Course No.	Course Name	Total credits	Weekly hours		Prereq ./Co
			Lec.	Lab	
MED 110	Human Anatomy	3	2	3	-
PHS 111	Pharmaceutical organic chemistry I	3	2	3	-
MATH 112	Applied calculus	3	3	0	-
PHS 113	Pharmaceutical biochemistry	3	2	3	PHS 111 /Co.
PHS 114	Pharmaceutical microbiology	3	2	3	-
ENGL 101	An introduction to academic discourse	3	3	0	-
Total		**18**	**14**	**12**	

Second Semester

Course No.	Course Name	Total credits	Weekly hours		Prereq. /Co
			Lec.	Lab	
MED 120	Human physiology	3	3	0	MED 110
PHS 121	Pharmaceutical organic chemistry II	3	2	3	PHS 111
PHDR 122	Pharm D. orientation	1	1	0	-
PHDR 123	Clinical biochemistry	3	2	3	PHS 113
PHDR 124	Pharmaceutical calculations	1	1	0	MATH 112
PHDR 125	Patient counselling	2	2	0	-
ENGL 102	Introduction to report writing	3	3	0	ENG 101
ARB 101	Practical grammar	2	2	0	-
Total		**18**	**16**	**6**	

Second Year

First Semester

Course No.	Course Name	Total credits	Weekly hours		Prereq ./Co
			Lec.	Lab	
MED 210	Pathophysiology	2	2	0	MED 120
PHDR 211	Pharmaceutics I	3	3	0	PHS 121 PHDR 124
PHDR 212	Medicinal Chemistry I	2	2	0	PHS 121
PHDR 213	Introduction to patient centered care	2	2	0	PHDR 125
PHDR 214	Pharmacology I	4	3	3	MED 120 MED 210/ Co
PHDR 215	Pharmacy Practice Lab I	2	1	3	PHDR 211/ Co
MATH 216	Biostatistics	2	2	0	MATH 112
SLM 183	Belief and its consequences	2	2	0	-
Total		**19**	**17**	**6**	

Second Semester

Course No.	Course Name	Total credits	Weekly hours		Prereq./Co
			Lec.	Lab	
PHDR 220	Pharmaceutics II	3	3	0	PHDR 211
PHDR 221	Pharmacology II	3	2	3	PHDR 214
PHDR 222	Medicinal chemistry II	2	2	0	PHDR 212
PHDR 223	Pharmacy practice lab II	2	1	3	PHDR 215
MED 224	Immunology and vaccines	2	2	0	MED 120
PHDR 225	Toxicology	2	2	0	MED 120
PHDR 226	Patient safety and informatics	3	3	0	-
ARB 201	Writing for professional needs	2	2	0	ARB 101
Total		**19**	**17**	**6**	

Summer Field Training I

Course No.	Course Name	Total Credits	Weekly hours		Total weeks	Total training hours	Prereq./Co.
			Lec	Training hours per week			
PHDR 227	IPPE 1- Community Pharmacy	3	0	40	4	4 weeks x5 days x8 hours = 160 clock hours	PHDR 220 PHDR 221 PHDR 222

Third Year

First Semester

Course No.	Course Name	Total credits	Weekly hours		Prereq./Co
			Lec	Lab	
PHDR 310	Pharmacology III	3	3	0	PHDR 221
PHDR 311	Therapeutics I	5	4	3	MED 210
PHDR 312	Pharmacy Practice Lab III	1	0	3	PHDR 223
PHDR 313	Principle of pharmacokinetics	3	3	0	PHDR 211
PHDR 314	Drug information and literature evaluation	3	2	3	MATH 216 PHDR 222
PHDR 315	Pharmacy Law and ethics	2	2	0	PHDR 215
SLM 284	Professional Ethics	2	2	0	SLM 183
Total		**19**	**16**	**9**	

Second Semester

Course No.	Course Name	Total credits	Weekly hours		Prereq./Co
			Lec.	Lab	
PHDR 320	Therapeutics II	5	4	3	PHDR 311
PHDR 321	Clinical Pharmacokinetics	2	2	0	PHDR 313
PHDR 322	Pharmacogenomics	2	2	0	PHS 113
PHDR 323	Parenteral Dosage Form	2	2	0	PHDR 220 PHDR 313
PHDR 324	Pharmacy Practice Lab IV	1	0	3	PHDR 312
PHDR 325	Pharmacy in health care system	2	2	0	-
PHDR 326	Research design	2	2	0	MATH 216
ARB 302	Oral Communication Skills	2	2	0	ARB 201
Total		**18**	**16**	**6**	

Summer Field Training II

Course No.	Course Name	Total credits	Weekly hours		Total weeks	Total Training hours	Prereq./Co.
			Lec	Training hours per week			
PHDR 327	IPPE 2- Institutional Pharmacy	3	0	40	4	4 weeks x5 days x8 hours = 160 clock hours	PHDR 227

Fourth Year

First Semester

Course No.	Course Name	Total credits	Weekly hours		Prereq./Co
			Lec	Lab	
PHDR 410	Therapeutics III	5	4	3	PHDR 320
PHDR 411	Natural Products and Evidenced Based Medicine	3	3	0	PHDR 314
PHDR 412	Self-care and non-prescription medications	3	3	0	PHDR 220
PHDR 413	Pharmacy Practice Lab V	1	0	3	PHDR 324
PHDR 414	Leadership and Professional Development	2	2	0	PHDR 315
PHDR 415	Pharmacoepidemiology	1	1	0	MATH 216
SLM 388	Human Rights in Islam	2	2	0	SLM 284
PHDR XXX	Major Elective	2	2	0	Senior standing
Total		**19**	**17**	**6**	

Second Semester

Course No.	Course Name	Total credits	Weekly hours		Prereq./Co
			Lec.	Lab	
PHDR 420	Therapeutics IV	5	4	3	PHDR 410
PHDR 421	Clinical Decision Making	2	2	0	PHDR 410
PHDR 422	Pharmacy Practice Lab VI	1	0	3	PHDR 413
PHDR 423	Pharmacoeconomics	2	2	0	MATH 216
PHDR 424	Practice management and marketing	2	2	0	PHDR 413
PHDR 425	Pharmacy Project and Seminar	2	2	0	PHDR 415
PHDR XXX	Major Elective	2	2	0	Senior standing
PHDR XXX	Major Elective	2	2	0	Senior standing
Total		**18**	**16**	**6**	

Summer APPE Clinical Rotations						
Course NO.	Course Name	Total Credits	Weekly hours		Total weeks	Prerequisite
			Lec	Training hours per week		
PHDR 500	Internal Medicine I	4	0	40	4	All courses including IPPE 1 & IPPE II
PHDR 501	Hospital Pharmacy	4	0	40	4	
Total		8			8	
Total training hours for each course = 4 weeks x 5 days x 8 hours = 160 clock hours						

Fifth Year APPE Clinical Rotations													
Semester I							Semester II						
Course NO.	Course Name	Total Credits	Weekly hours		Total weeks	Prereq.	Course NO.	Course Name	Total Credits	Weekly hours		Total weeks	Prereq.
			Lec	Training hours per week						Lec	Training hours per week		
PHDR 510	Internal Medicine II	4	0	40	4	All courses including IPPE 1 & IPPE II	PHDR 520	Ambulatory Care	4	0	40	4	All courses including IPPE 1 & IPPE II
PHDR 511	Internal Medicine III	4	0	40	4		PHDR 521	Critical Care	4	0	40	4	
PHDR 512	Community Pharmacy	4	0	40	4		PHDR 522	Pediatrics	4	0	40	4	
PHDR XXX	Elective Rotation	4	0	40	4		PHDR XXX	Elective Rotation	4	0	40	4	
Total		16			16		Total		16			16	
Total training hours for each course = 4 weeks x 5 days x 8 hours = 160 clock hours													

COURSE DESCRIPTION

YEAR 1, SEMESTER 1

MED 110: Human Anatomy (2-3-3)

This course provides a comprehensive study of the anatomical structure of the human body at cellular, tissue, organ, and system level. Body structure will be studied by organ systems and will involve a balance between gross anatomical study and histology. Form-function relationships will be emphasized. The laboratory study will involve working with human skeletal collections and preserved specimens and tissue microscopy.

Pre-requisite: None

PHS 111: Pharmaceutical organic chemistry I (2-3-3)

This course provides students in pharmacy a solid foundation in organic chemistry where relevant pharmaceutical topics will be applied to illustrate organic chemistry. It covers molecular orbital theory of organic compounds, saturated aliphatic cyclic and acyclic hydrocarbon. Principles of the IUPAC nomenclature of organic compounds, unsaturated hydrocarbons, halogen compounds. Isomerism and stereoisomerism of organic compounds, alkyl halides, free-radical reactions, alcohols, ethers, epoxides, sulfides and their pharmaceutical applications. Laboratory experiments include identification, purification and synthesis of the organic compounds that are discussed in the theoretical class.

Pre-requisite:- None

MATH 112: Applied calculus (3-0-3)

This course introduces students to the basic mathematics concepts that help them to solve problems with applications directed primarily to the life sciences. Topics include; Limits and Continuity, differentiation, Applications of Derivatives, Integration and the Fundamental Theorem of the Calculus, Methods of integration and Elementary differential Equations.

Pre-requisite:- None

PHS 113: Pharmaceutical biochemistry (2-3-3)

This course introduces students to the fundamental concepts of biochemistry and applications of these concepts to identify endogenous targets for drug therapy and rational drug design strategies. Structure, properties, biological

functions, applicable kinetics, and metabolic fate of macromolecules essential to life including carbohydrates, lipids, steroids, prostaglandins, amino acids, proteins, nucleoproteins, nucleic acids, hemoproteins, xenobiotics, free radicals and antioxidants in addition to their regulation. The experimental part deals with biochemical estimation of some enzyme activities and levels of some elements in blood and urine.

Pre-requisite: None

Co-requisite: PHS 111

PHS 114: Pharmaceutical microbiology (2-3-3)

This course involves the study of microorganisms associated with the manufacture of pharmaceuticals. Structure, function, and properties of microorganisms (bacteria, viruses, parasites, and fungi) responsible for human disease, and rational approaches to their containment or eradication. The experimental part deals with microbiological techniques, bacterial stains, antimicrobial tests and other microbiological procedures.

Pre-requisite: None

YEAR 1, SEMESTER 2

MED 120: Human physiology (3-0-3)

This course covers the homeostatic function and normal response reactions across the lifespan of non-diseased human cells, organs, and systems. It deals with the electrophysiological properties of cell membrane, the physiology of muscles and nerves, the autonomic nervous system, the blood and the cardiovascular system, the functions, control and regulation of respiratory, renal, digestive and central nervous systems.

Pre-requisite: MED 110

PHS 121: Pharmaceutical organic chemistry II (2-3-3)

This course is a continuation of PHS 111, with emphasis on the physicochemical properties of biological molecules. It covers alkenes and alkynes, aromaticity and benzene, substituted benzene, aldehydes and ketones, carboxylic acids and derivatives (amides, anhydrides, esters), amines and heterocyclic compounds. Laboratory experiments include identification, purification and synthesis of the organic compounds that are discussed in the theoretical class.

Pre-requisite: PHS 111

PHDR 122: Pharm D. orientation (1-0-1)

An introduction to clinical pharmacy and opportunities for career advancement. Overview of the medical and pharmacy terminology related to systems in the body different areas of the pharmacy profession, the history of pharmacy, the transition from a focus on the drug to a focus on the patient and the drug and exploration of contemporary pharmacy practice settings.

Pre-requisite: None

PHDR 123: Clinical biochemistry (2-3-3)

Application of clinical laboratory data to disease state management, including screening,
diagnosis, progression, and treatment evaluation. It includes metabolic disorders related to metabolism of carbohydrates, lipids, steroids, amino acids, proteins, nucleoproteins, nucleic acids and hemoproteins; starvation and obesity; clinical enzymology; vitamins and minerals; electrolyte and trace elements. The laboratory part deals with evaluation of the disease parameters in biological fluids and their interpretations.

Pre-requisite: PHS 113

PHDR 124: Pharmaceutical calculations (1-0-1)

This course provide students with a basic pharmaceutical calculations necessary for prescription, drug order preparation, compounding dosage forms, patient-specific nutritional and medication dosage calculations based on patient specific factors. Appropriate documentation of numerical answers (including units) is required. Approaches to minimize errors and maximize accuracy with pharmaceutical calculations are emphasized.

Pre-requisite: MATH 112

PHDR 125: Patient counselling (2-0-2)

This course covers theories in communication and patient counseling, applications and techniques of communication, special medication techniques, e.g. eye drops, ear drops, suppositories, inhalers, etc.

Pre-requisite: None

YEAR TWO, SEMESTER 1

MED 210: Pathophysiology (2-0-2)

This course provides a basic understanding of the physiological basis of pathology, etiology of diseases, and clinical manifestations of disease states. inflammation process and cell cycle; cellular disturbances (degeneration; regeneration and repair); basics of neoplasm and metabolic diseases; diseases of cardiovascular system, diseases of respiratory system, GIT disorders, renal disorders endocrine disorders, hematological disorders (anemia, polycythemia, leukemia, leukocytosis & Leukopenia); CNS disorders (sensory & motor neurological disturbances, basal ganglia disorders, headache), skin transmitted diseases, sexually transmitted diseases; microbial and parasitic diseases.

Pre-requisite: MED 120

PHDR 211: Pharmaceutics I (3-0-3)

This course provides a foundation in the basic concepts of pharmaceutics that are the foundation of drug delivery. Integration of the principles of physical pharmacy and traditional and modern pharmaceutical dosage forms. Oral solutions, Suspensions, emulsions, aerosols, and dermatological and rectal route preparations otic, nasal and ophthalmic preparations, and sterile pharmaceutical dosage forms.

Pre-requisite: PHS 121 & PHDR 124

PHDR 212: Medicinal Chemistry I (2-0-2)

This course covers the chemistry of medicinal products, including cholinergic, adrenergic, dopaminergic and serotonergic agents, antidepressants, sedative/hypnotics, antianxiety drugs, opioid drugs acting at histamine receptors, and inhibitors of mediator release.

Pre-requisite: PHS 121

PHDR 213 : Introduction to patient centered care (2-0-2)

This course teaches students the key communication principles and skills necessary to deliver patient care and interact with other health care professionals. This includes evaluation of patient function and dysfunction through the performance of tests and assessments leading to objective (e.g., physical assessment, health screening, and lab data interpretation) and subjective (patient interview) data important to the provision of care.

Pre-requisite: PHDR 125

PHDR 214: Pharmacology I (3-3-4)

The course gives an introduction to the general principles of pharmacology such as drug absorption, distribution, metabolism, excretion and clearance of drugs, agonists- antagonists, dose-response relationships, efficacy, potency and therapeutic index. Pharmacological actions of important drugs, including drugs that affect the peripheral nervous system, cardiovascular system, diuretics, antihypertensives and autacoids.

Lab includes in-vitro experiments demonstrating the effects of drugs affecting the peripheral nervous system, cardiovascular system, diuretics, antihypertensives and autacoids.

Pre-requisite: MED 120

Co-requisite: MED 210

PHDR 215: Pharmacy Practice Lab I (1-3-2)

This course is the first in the pharmacy practice skills series that focuses on contemporary community pharmacy practice. Case studies, and problem sets that actively involve the student in problem-solving, applying and interrelating important concepts from the core courses taught that semester. Practical methods for preparing, evaluating and dispensing pharmaceutical solutions with proper patient counseling.

Pre-requisite: None

Co-requisite: PHDR 211

MATH 216: Biostatistics (2-0-2)

The aim of this course is to introduce students to concepts in statistics with focus on descriptive and inferential statistics as applied in medical practice. It includes descriptive measures and probability concepts and application, sampling distribution, point and interval estimation, type of errors, concept of P-value, and testing hypothesis are discussed with clinical examples.

Pre-requisite: MATH 112

YEAR 2, SEMESTER 2

PHDR 220: Pharmaceutics II (3-0-3)

This course is a continuous of PHDR 211, it is an integration of the principles of physical pharmacy, and traditional and modern pharmaceutical dosage forms. Solid pharmaceutical dosage forms such as tablets, hard and soft gelatin capsules, powders and granules will be discussed.

Pre-requisite: PHDR 211

PHDR 221: Pharmacology II (2-3-3)

This course is a continuous of pharmacology I, pharmacological actions of important drugs including hematopoietics, thrombolytics, anti-hyperlipidemics, immunopharmacologic, anti-inflammatory, stimulants, sedatives, hypnotics, anxiolytics, general anesthesia, anti-epileptics, anti-emetics, anti- psychotics, anti-parkinsons, opioid and non-opioid analgesics and antidepressants,

Lab includes some in-vivo experiments demonstrating the effects of the above mentioned drugs.

It also includes some drug profiles to be presented by student.

Pre-requisite: PHDR 214

PHDR 222: Medicinal chemistry II (2-0-2)

This course is a continuous of Medicinal chemistry I, chemistry of medicinal products will be discussed, including anti-hyperlipidemics, glucocorticoids, estrogens, progestins, nonsteroidal anti-inflammatories, anti-tumor agents, and enzyme inhibitors.

Pre-requisite: PHDR 212

PHDR 223: Pharmacy practice lab II (1-3-2)

This course is the second in the pharmacy practice skills series that focuses on contemporary community pharmacy practice. Case studies, and problem sets that actively involve the student in problem-solving, applying and interrelating important concepts from the core courses taught that semester. Practical part includes methods for preparing semi-solid pharmaceutical preparations such as creams and suppositories, and dispersed pharmaceutical preparations such as suspensions and emulsions. Evaluating and dispensing these dosage forms with proper patients counseling.

Pre-requisite: PHDR 215

MED 224: Immunology and vaccines (2-0-2)

This course covers basic and clinical concepts in immunology, adaptive and innate immunity, immunological products and their applications in prophylaxis, therapy and diagnosis; antigen-antibody reactions, immune-regulation, immunological memory and tolerance, aberrations of the immune system including autoimmunity, transplantation and rejection; specific topics including anatomy of the immune system, organs, tissues, cells and soluble factors of immune system; the immune response, innate immune system, adaptive immune system, humoral immunity, cell-mediated immunity, hypersensitivity reactions, autoimmunity, immune deficiency disorders, transplantation immunology and tumors immunity.

Pre-requisite: MED 120

PHDR 225: Toxicology (2-0-2)

This course introduces the pharmacodynamics, mechanisms, prevention, and treatment of the toxic effects of drugs and poisons, including poisons associated with bioterrorism.

Pre-requisite: MED 120

PHDR 226: Patient safety and informatics (3-0-3)

This course provides core knowledge and skills needed by pharmacists to promote patient safety and use the tools of healthcare informatics; understand the landscape, epidemiology and culture of patient safety data privacy and security. Case studies will address disclosure of medication errors and reporting adverse events. Informatics tools such as computer order entry, electronic medical record systems, health information exchanges, and decision support will be explained. The use of informatics tools to promote patient safety will be emphasized.

Pre-requisite: None

PHDR 227: IPPE 1: Community Pharmacy (0- 40 training hours-3 cr)

Students are trained for 4 consecutive weeks in a registered community pharmacy inside Saudi Arabia.

Pre-requisite: PHDR 220; PHDR 221; PHDR 222

YEAR 3, SEMESTER 1

PHDR 310: Pharmacology III (3-0-3)

This course is the third in pharmacology courses series, it covers the pharmacological actions and underlying basic and clinical science of anti-microbial, anti-viral, anti-cancer, hormones and other drugs affecting the endocrine system.

Pre-requisite: PHDR 221

PHDR 311: Therapeutics I (4-3-5)

Clinical application of medications in the management of various disease states. Assessment and therapeutic monitoring of disease states and drug therapy using the concepts of pharmacokinetics/dynamics, drug interactions, pharmacy practice and patient counseling. Topics include cardiovascular and pulmonary therapeutics.
Laboratory is a case based seminars to develop clinical skills necessary to solve problems related to supplying patients with cost-effective and safe treatment. Discussion of clinical cases of patients suffering from cardiovascular and pulmonary diseases.

Pre-requisite: MED 210

PHDR 312: Pharmacy Practice Lab III (0-3-1)

The third in the series of pharmacy practice labs that connect the theoretical courses in pharmacy with pharmacy practice. Practical methods for preparing different types of solid pharmaceutical dosage forms, and evaluating and dispensing these dosage forms with the proper patient counseling.

Pre-requisite: PHDR 223

PHDR 313: Principle of pharmacokinetics (3-0-3)

Mathematical determination of the rate of drug movement from one therapeutic or physiologic compartment to another. Application of physicochemical and kinetic principles and parameters to therapeutically important issues, such as receptor theory, ligand-macromolecule binding, biopharmaceutics, drug metabolism, pharmacokinetics, and pharmacodynamics.

Pre-requisite: PHDR 211

concentrations of a medication and its effect, duration of effect, and elimination from the body. Calculation exercises include empiric dose selection and modification of doses based on therapeutic drug monitoring.

Pre-requisite: PHDR 313

PHDR 322: Pharmacogenomics (2-0-2)

This course integrates the pharmacogenomic knowledge into the pharmacist education and training program to meet the immediate requirements in the current and future clinical practice. This course is designed to introduce genetic basis for disease and individual differences in metabolizing enzymes, transporters, and other biochemicals impacting drug disposition and action that underpin the practice of personalized medicine.

Pre-requisite: PHS 113

PHDR 323: Parenteral dosage form (2-0-2)

This course covers the different types of parenteral products derived from biotechnology. Advanced extemporaneous prescription compounding and preparation of sterile products, with emphasis on physico-chemical stability and compatibility.

Pre-requisite: PHDR 220 & PHDR 313

PHDR 324: Pharmacy Practice Lab IV (0-3-1)

This course is the fourth in the series of pharmacy practice labs that connect the theoretical courses in pharmacy with the pharmacy practice. This course covers the practical methods for preparing sterile pharmaceutical preparations such as intravenous solutions as well as evaluating and dispensing these preparations with proper counseling for the patients and other health care team members.

Pre-requisite: PHDR 312

PHDR 325: Pharmacy in health care system (2-0-2)

The main purpose of this course is to provide students with an introduction to the structures and functions of the kingdom Health Care System. It is also designed to provide the student with an opportunity to compare and contrast the methods used in other countries to address the needs of society for provision of health care to its members.

Pre-requisite: None

PHDR 314: Drug information and literature evaluation (2-3-3)

This course is designed to provide students with the fundamental skills needed for the provision of drug information in pharmacy practice. Emphasis is placed on the evaluation, interpretation, and practical implications of primary medical literature on the delivery of pharmaceutical care. Recently published clinical trials will be reviewed and discussed to illustrate contemporary issues in the interpretation of biomedical research.

Pre-requisite: MATH 216 & PHDR 222

PHDR 315: Pharmacy Law and Ethics (2-0-2)

Governmental laws, regulations, detailed laws that govern and affect the practice of pharmacy in Saudi Arabia, such as drugs, narcotics and medical devices; general legal principles, non-controlled prescription requirements and over-the-counter (OTC) drug requirements; responsibilities of pharmacists on care for patients; professional code of conduct, common ethical issues and considerations, identification of ethical problems and their workup.

Pre-requisite: PHDR 215

YEAR 3, SEMESTER 2

PHDR 320: Therapeutics II (4-3-5)

Clinical application of medications in the management of various disease states. Assessment and therapeutic monitoring of disease states and drug therapy using the concepts of pharmacokinetics/dynamics, drug interactions, pharmacy practice and patient counseling. Topics include renal, endocrine, gastrointestinal, rheumatologic and immunologic disease therapeutics.

Laboratory is a case based seminars to develop clinical skills necessary to solve problems related to supplying patients with cost-effective and safe treatment. Discussion of clinical cases of patients suffering from renal, endocrine, gastrointestinal, rheumatologic and immunologic disease therapeutics.

Pre-requisite: PHDR 311

PHDR 321: Clinical Pharmacokinetics (2-0-2)

Clinical pharmacokinetics includes the application of pharmacokinetics and drug action to the selection and titration of medications. The course includes consideration of patient, disease, and drug factors that affect the

PHDR 326: Research design (2-0-2)

This course emphasizes practical aspects of experimental design and analysis. Evaluation of research methods and protocol design required to conduct valid and reliable studies to test hypotheses or answer research questions, and to appropriately evaluate the validity and reliability of the conclusions of published research studies.

Pre-requisite: MATH 216.

PHDR 327 : IPPE 2- Institutional Pharmacy (0-40 training hours-3 cr)

Students are trained for 4 consecutive weeks in an Institutional pharmacy inside Saudi Arabia.

Pre-requisite: PHDR 227

YEAR 4, SEMESTER 1

PHDR 410: Therapeutics III (4-3-5)

Clinical application of medications in the management of various disease states. Assessment and therapeutic monitoring of disease states and drug therapy using the concepts of pharmacokinetics/dynamics, drug interactions, pharmacy practice and patient counseling. Topics include hematology/oncology, neurological, psychiatric and infectious disease therapeutics.

Laboratory is a case based seminars to develop clinical skills necessary to solve problems related to supplying patients with cost-effective and safe treatment. Discussion of clinical cases of patients suffering from hematology/oncology, neurological, psychiatric and infectious diseases.

Pre-requisite: PHDR 320

PHDR 411: Natural Products and Evidenced Based Medicine (3-0-3)

Evidence-based evaluation of the therapeutic value, safety, and regulation of pharmacologically active natural products and dietary supplements.

Pre-requisite: PHDR 314

PHDR 412: Self-care and non-prescription medications (3-0-3)

Therapeutic needs assessment, including the need for triage to other health professionals, drug product recommendation/selection, and counseling of patients on non-prescription drug products, non-pharmacologic treatments and health/wellness strategies.

Pre-requisite: PHDR 220

PHDR 413: Pharmacy Practice Lab V (0-3-1)

The course will utilize problem based learning and simulated or actual clinical cases to continue development of students' knowledge base in human disorders and therapeutics and enhance their skills in problem solving, organization, communication, and literature assessment. Students will also learn how to recommend over-the-counter (OTC) products, dietary supplements, natural products and other alternative medicine therapies.

Pre-requisite: PHDR 324

PHDR 414: Leadership and Professional Development (2-0-2)

Development of professional self-awareness, capabilities, responsibilities, and leadership. Analysis of contemporary practice roles and innovative opportunities, and inculcation of professional attitudes, behaviors, and dispositions.

Pre-requisite: PHDR 315

PHDR 415: Pharmacoepidemiology (1-0-1)

Cause-and-effect patterns of health and disease in large populations that advance safe and effective drug use and positive care outcomes within those populations.

Pre-requisite: MATH 216

YEAR 4, SEMESTER 2

PHDR 420: Therapeutics IV (4-3-5)

Clinical application of medications in the management of various disease states. Assessment and therapeutic monitoring of disease states and drug therapy using the concepts of pharmacokinetics/dynamics, drug interactions, pharmacy practice and patient counseling. Topics include pediatric, woman (infertility, post-menopause, pregnancy, delivery, lactation, contraception) and man health (prostate diseases, impotence and infertility) and

comprehensive (disorders involving more than one system in the body especially critical care cases) medication review and assessment.

Laboratory is a case based seminars to develop clinical skills necessary to solve problems related to supplying patients with cost-effective and safe treatment. Discussion of clinical cases of patients suffering from pediatric, woman and man health and comprehensive medication review and assessment.

Pre-requisite: PHDR 410

PHDR421: Clinical Decision Making (2-0-2)

The course allows students to gain an understanding of how each discipline contributes to the healthcare team, the importance of effective communication, and the role of team collaboration in clinical decision making.

Pre-requisite: PHDR 410

PHDR422: Pharmacy Practice Lab VI (0-3-1)

This course facilitates further development of aspects of the pharmacists' patient care process, preparing students for subsequent advanced pharmacy practice experiences. Emphasis is placed on developing the following clinical skills: data collection through use of the electronic medical record, drug therapy assessment, written patient-centered care plans including evidence-based recommendations, drug information retrieval, oral case presentations and other formal presentations.

Pre-requisite: PHDR 413

PHDR423: Pharmacoeconomics (2-0-2)

Application of economic principles and theories to the provision of cost-effective pharmacy products and services that optimize patient-care outcomes, particularly in situations where healthcare resources are limited.

Pre-requisite: MATH 216

PHDR 424: Practice management and marketing (2-0-2)

This course introduces concepts and principles related to managing pharmacy operations and systems for patient care, and managing financial aspects, budgeting techniques, inventory control, and purchasing skills to manage their pharmacies.

Pre-requisite: PHDR 413

PHDR 425: Pharmacy Project and Seminar (2-0-2)

The course is designed to direct student to deliver a project or seminar in one of the clinical problems. Students work under the supervision of their faculty mentor to develop data collection forms and methods to archive data in a way that facilitates their analysis.

Pre-requisite: PHDR 415

SUMMER APPE CLINICAL ROTATIONS

Rotation 1- PHDR 500: Internal Medicine I (0-40 training hours- 4 cr)

This required Pharm D experiential course integrates prior didactic course work in pharmacotherapy, pathophysiology, and drug literature evaluation into the provision of pharmaceutical care to hospitalized patients. Training includes various activities in the rotation area such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department.

Prerequisite: successfully completing all courses: theoretical (including elective), practical and IPPE training.

Rotation 2 - PHDR 501: Hospital Pharmacy (0-40 training hours- 4 cr)

Four weeks of training in the hospital pharmacy departments, which covers inpatient and outpatient pharmacies.

Prerequisite: successfully completing all courses: theoretical (including elective), practical and IPPE training.

YEAR 5, SEMESTER 1

Rotation 3- PHDR 510: Internal Medicine II (0-40 training hours- 4 cr)

This required Pharm D experiential course integrates prior didactic course work in pharmacotherapy, pathophysiology, and drug literature evaluation into the provision of pharmaceutical care to hospitalized patients. Training includes various activities in the rotation area such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department.

Prerequisite: Successfully completing all courses: theoretical (including elective), practical and IPPE training.

Rotation 4: PHDR 511: Internal Medicine III (0-40 training hours- 4 cr)

This required Pharm D experiential course integrates prior didactic course work in pharmacotherapy, pathophysiology, and drug literature evaluation into the provision of pharmaceutical care to hospitalized patients. Training includes various activities such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department.

Prerequisite: Successfully completing all courses: theoretical (including elective), practical and IPPE training.

Rotation 5- PHDR 512: Community Pharmacy (0-40 training hours- 4 cr)

The purpose of the community pharmacy clerkship is to provide the student with an educational experience where they can develop the skills and judgment necessary to apply the knowledge gained in the basic and clinical sciences to specific patient care situations. In addition, the course seeks to demonstrate the philosophy that clinical (APPE) and distributive pharmaceutical services should be patient oriented and integrated in contemporary ambulatory practice.

Prerequisite: Successfully completing all courses: theoretical (including elective), practical and IPPE training.

Rotation 6- PHDR XXX: Elective Rotation ((0-40 training hours- 4 cr)

Students choose one of the elective courses during the first semester of year 5.

Prerequisite: successfully completing all courses: theoretical (including elective), practical and IPPE training.

YEAR 5, SEMESTER 2

Rotation 7- PHDR 520: Ambulatory Care (0-40 training hours- 4 cr)

This experiential course integrates prior course work in pharmacotherapy, pathophysiology, and drug literature evaluation into the provision of pharmaceutical care to ambulatory patients. Students will conduct patient interviews and assessments, provide drug information to patients and health professionals, and monitor drug therapy in ambulatory settings.

Prerequisite: Successfully completing all courses: theoretical (including elective), practical and IPPE training.

Rotation 8- PHDR 521: Critical Care (0-40 training hours- 4 cr)

This experiential course integrates prior course work in pharmacotherapy, pathophysiology, and drug literature evaluation into the provision of pharmaceutical care to critical case patients. This includes various activities such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department.

Prerequisite: Successfully completing all courses: theoretical (including elective), practical and IPPE training.

Rotation 9- PHDR 522: Pediatrics (0-40 training hours- 4 cr)

This experiential course integrates prior course work in pharmacotherapy, pathophysiology, and drug literature evaluation into the provision of pharmaceutical care to ambulatory patients. This includes various activities such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department.

Prerequisite: Successfully completing all courses: theoretical (including elective), practical and IPPE training.

Rotation 10- PHDR XXX: Elective Rotation (0-40 training hours-4cr)

Students choose one of the elective courses during the second semester of year 5.

Prerequisite: Successfully completing all courses: theoretical (including elective), practical and IPPE training.

ELECTIVE COURSES

PHDR 416: Making Medicine: The Process of Drug Development (2-0-2)

This course examines the drug development process and its connections to clinical research and healthcare outcomes through independent student exploration of on-line content followed by group activities and facilitated classroom discussion on important issues related to each state of the drug development process.

Prerequisite: Senior standing.

PHDR 417: Radiopharmacy (2-0-2)

The course introduces students to the use of radioactivity in medicine science, the practice of compounding, medical imaging, and the role of pharmacists in molecular imaging, instrumentation used in radiopharmacy as well as the biological effects of radiation.

Prerequisite: Senior standing.

PHDR 426: Geriatric pharmacy practice (2-0-2)

This course is designed to provide opportunities to enhance knowledge and skills in geriatric pharmacotherapy and other health disciplines involved in the care of seniors. This course will challenge students to identify and resolve health and medication use problems they may encounter while caring for older patients.

Prerequisite: Senior standing.

PHDR 427 : Multidisciplinary Perspectives on Managing Diabetes (2-0-2)

This course examines the current issues involved in managing diabetes mellitus in persons over their life span. Contributions of the multidisciplinary team are an important theme throughout this course.

Prerequisite: Senior standing.

PHDR 428: Critical Care (2-0-2)

The course is designed to develop knowledge in common acute diseases encountered in the ICU by utilizing patient cases. Classes will focus on choice and rationale for therapy, dosing guidelines, and monitoring parameters.

Prerequisite: Senior standing.

PHDR 429: Advanced Cardiovascular Pharmacotherapy (2-0-2)

This course provides an in-depth discussion of the pharmacotherapy of major cardiovascular diseases such as hyperlipidemia, hypertension, ischemic heart disease, heart failure, and arrhythmias.

Prerequisite: Senior standing.

ELECTIVE CLINICAL ROTATIONS

PHDR 513: Clinical Rotation-Cardiac Care Unit (0-40 training hours- 4 cr)

This experiential course integrates prior didactic course work in pharmacotherapy, pathophysiology, and drug literature evaluation into the provision of pharmaceutical care to hospitalized patients. Training includes various activities in the rotation area such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department.

Prerequisite: Successfully completing all courses: theoretical (including elective), practical and IPPE training.

PHDR 514: Clinical Rotation – Oncology (0-40 training hours- 4 cr)

This experiential course integrates prior didactic course work in pharmacotherapy, pathophysiology, and drug literature evaluation into the provision of pharmaceutical care to hospitalized patients. Training includes various activities in the rotation area such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department.

Prerequisite: Successfully completing all courses: theoretical (including elective), practical and IPPE training.

PHDR 523: Clinical Rotation - Infectious disease (0-40 training hours- 4 cr)

This experiential course integrates prior didactic course work in pharmacotherapy, pathophysiology, and drug literature evaluation into the provision of pharmaceutical care to hospitalized patients. Training includes various activities in the rotation area such as attending morning rounds, other clinical rounds, and discussing clinical cases based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department.

Prerequisite: Successfully completing all courses: theoretical (including elective), practical and IPPE training.

PHDR 524: Clinical Rotation – Nephrology (0-40 training hours- 4 cr)

This experiential course integrates prior didactic course work in pharmacotherapy, pathophysiology, and drug literature evaluation into the provision of pharmaceutical care to hospitalized patients. Training includes various activities in the rotation area such as attending morning rounds, other clinical rounds, and discussing clinical cases

based on daily follow-up and monitoring, and detailed evaluation of the pharmacotherapeutics of their assigned patients in the department.

Prerequisite: Successfully completing all courses: theoretical (including elective), practical and IPPE training.