



COURSE DESCRIPTIONS

Doctor of Pharmacy (PharmD) Program

College of Pharmacy

Jazan University



Prepared by

Vice Deanship of Development, College of Pharmacy, Jazan University, Kingdom of Saudi Arabia



كلية الصيدلة
Faculty of Pharmacy

رؤية
VISION
2030
المملكة العربية السعودية
KINGDOM OF SAUDI ARABIA



Dr. Abdulkarim M. Meraya

Dean, College of Pharmacy

The Dean's Message

Dear students, Welcome to the College of Pharmacy at Jazan University. It is my pleasure to introduce the Course Descriptions for the Doctor of Pharmacy (PharmD). The main purpose of the Course Descriptions is to enlighten our students about the courses they will study in the PharmD program and serve as a guide for the staff members.

Our program aims to develop your skills as a competent pharmacist so that each one of you will have much to contribute to our community and life in Jazan. We expect that you will get the most benefits as the PharmD program at the College represents a source of knowledge with much to offer you, including outstanding staff members as well as an excellent curriculum which is not only benchmarked with reputed national and international universities but also benchmarked with the Accreditation Council for Pharmacy Education (ACPE) and Saudi Pharmacy Licensure Examination (SPLE).

The Doctor of Pharmacy (PharmD) program operates under an environment of mutual respect and collaboration with high Islamic ethical standards. I am extremely thankful to President of Jazan University, His Excellency Dr. Mar'ei bin Hussein Al-Qahtani for his unlimited support and encouragement.

1. PROGRAM VISION, MISSION & GOALS

Vision

To lead and innovate in pharmacy education, research and community service to optimize patient care for individuals and the society.

Mission

The mission of PharmD program is to prepare skilled pharmacy professionals having the abilities to conduct research and effectively participate in community activities.

Program Goals

1. Establish student-centered learning and academic environment
2. Develop an effective practice of pharmacy
3. Participate in program-related community services
4. Enhance scientific research skills
5. Practice patient-centered approach in providing comprehensive medication management
6. Promote ethical practices with honesty, trust, and respect with patients and other healthcare professionals



2. COURSE DESCRIPTIONS

NEW STUDY PLAN

211 PHT Pharmaceutical Calculation and Mathematics

This course is designed to introduce the quantitative and basic principles of pharmaceutical calculations to pharmacy practice and pharmaceutical science. It enables the student to use different tools of mathematics for solving and evaluating problems such as industry, economy, agriculture, planning and others. Examines how to apply basic mathematical skills in calculations required for the usual dosage determinations, as well as solution preparations using weight, metric, household, and apothecary systems. Discuss ratio and proportion and allegation methods of calculation in pharmacy operations.

221 PHC Pharmaceutical Chemistry-1

This course containing the different methods for preparation of some Aromatic compounds, Aldehydes, Ketones, Carboxylic acids, Heterocyclic Compounds, Amino acids, Carbohydrates, Lipids as well as its specific and general reactions including chemical properties. In addition to, the practical part afforded the safety chemical tests for identifications of organic compounds.

231 PHL Anatomy & Physiology - I

The course stresses on the topics like Pituitary hormones, Insulins and oral hypoglycemic agents, Thyroid and Antithyroid drugs, Parathormone & Calcitonin, Corticosteroids, Sex hormones and oral contraceptives, Oxytocics & Tocolytics, Drugs for peptic ulcer, constipation and diarrhea, drugs for emesis, reflux and digestive disorders. The drugs acting on these systems will be taught to the students with their main pharmacological actions and uses.



HLT-201 Biochemistry

The course will prepare the students to understand the structure, properties and functions of biological macromolecules (carbohydrates, proteins, lipids and nucleic acids). Nomenclatures of enzymes and its functions and role in chemical reactions. Study of functions of minerals, vitamins in the body, introduction to hormones and its functions. Introduction to bioenergetics and metabolism.

241 PHCL Introduction to Pharmacy and health care system

Introduces the student to the profession of pharmacy and the role of the pharmacist within health care delivery. The course considers the context of pharmacy practice in various healthcare-systems.

242 PHCL Medical and Pharmaceutical Terminology

The course stresses on structure of the medical language, the body in health and disease, and some medical specialties and body system such as gastroenterology, pulmonology, cardiology, neurology, urology, male and female reproductive medicines, gynecology and obstetrics, endocrinology, psychiatry and oncology

212 PHT Microbiology - I

The structure of the course is based on presenting the fundamentals of microbiology to include structures, morphology and classification of bacteria, viruses, fungi and parasites. The course will also cover the Antimicrobial therapy as well as Sterilization and Disinfection. Part one Microbiology will cover the Parasitology in terms of Helminths and Protozoa.



213 PHT Pharmaceuticals – I

This course is designed to impart a fundamental knowledge of physical pharmacy, reaction kinetics and stability.

222 PHC Pharmaceutical Analysis

Throughout this course, students will be able to learn about the analytical techniques used in pharmaceutical analytical chemistry such as detection techniques such as Mass, NMR and IR spectroscopy) and theoretical background of chromatography and separation. Then the course focuses on liquid chromatography coupled with mass spectrometry and how this method is used in various applications such as process control, analysis of patient samples and in the development of new drugs. It also includes methods development, quality assurance and GLP (Good Laboratory Practice).

232 PHL Anatomy & Physiology – II

Throughout this course, students will learn about anatomy and physiology cardiovascular, respiratory, renal, endocrinology as well as reproduction and metabolism as a basic medical science. For each system students will learn about structure, functions and homeostasis of these systems. Moreover, they will be understanding the integration between these systems that keep the body controlled under any variation (Both internal or external). This course will help students in next coming courses of pathophysiology as well as pharmacology.

233 PHL Biochemistry – II

The student will understand the metabolic pathways of carbohydrates, amino acids, proteins and lipids, and also, they can correlate the clinical aspects associated with any defect in these pathways. Moreover, the students also interpret the understanding of integration of these pathways.



243 PHCL Pharmacy Practice Skills -I (Communication Skills & Professionalism)

Throughout this course, students will learn about the written, verbal and nonverbal communication skills. This course helps to highlight the nature, dynamics and the process of communication in the field of pharmacy profession. It involves the practical steps in develop the professionalism, professional ethics, communicating with technology. This course will help the students to identify various patient situations, barriers in the communication and how to overcome the potential barriers during the communication. It also deals with counseling skills, monitoring skills, laboratory data interpretation, interviewing and assessment.

311 PHT Microbiology - II

This course will introduce students to the microbial species that cause human disease. It will cover bacteria, fungi, viruses focusing on morphology and principal characteristics of pathogens. Pathogenesis, mode of transmission, disease symptoms and treatment will also be covered.

312 PHT Pharmaceutics - II

This course is designed to impart fundamental knowledge on various pharmaceutical dosage forms and additives used in their formulation. The students gain knowledge about the extemporaneous preparations, prescription writing, interactions studies and various extraction processes.

321 PHC Pharmaceutical Chemistry - II

Pharmaceutical Chemistry - II focuses on the basic concepts about the role of functional groups of drugs related to physico-chemical properties, drug bio-transformation, drug action and application of the concepts in therapeutic decision making and drug development



process. Students will be involved in theoretical classroom and practical laboratory activities.

By learning closely, the chemistry, stereochemistry, synthesis, and structure-activity relationship of drugs acting on autonomic nervous system and cardiovascular system, students will identify the specific functional groups influencing drug-receptor interactions, pharmacokinetics, side effects, and drug development. Students will also develop skills in performing qualitative and quantitative determination of drugs, drug formulations.

331 PHL Pharmacology – I

The course stresses on the topics like Introduction and scope of pharmacology, Routes of drug administration, Pharmacokinetics (Absorption, Distribution, and Metabolism & Excretion), Pharmacodynamics, and Cholinergic & Anti-cholinergic drugs, Adrenergic & Anti-adrenergic drugs, autocooids, and skeletal muscle relaxants.

341 PHCL Pharmacy Practice Skills-II (Drug Information- I & Health Informatics)

Throughout this course, students will learn different forms of Drug Information, Health informatics and different drug information services. The students will learn various concepts and principles of Drug Information Services. The students will learn ways of evaluating medical literature. They will also learn the ethical and legal aspects of drug information practice.

342 PHCL Basic Life Support /First Aid

This course focuses on the theoretical knowledge about emergency situations which is an essential component of the health care delivery system. This course is designed to give students the chance to gain in depth understanding of nature of emergency condition and role of pharmacist in meeting different needs of the patient. It provides the students with knowledge that will help them to provide efficient first aid care during emergency and disaster situations either in pre-hospital settings or in hospital setting and also in disasters.



This course will include three main parts, namely basics of emergency, first aid and emergency care for trauma in the different body systems and first aids and emergency care for specific medical emergencies. Critical thinking and problem solving is emphasized.

361 PHG Natural Products & Dietary Supplements I

Throughout this course, the students will learn about the identification of the correct medicinal plant on the basis of macro and microscopical analysis. Since the natural products are the basis of herbal remedies and dietary supplements, hence their phytochemical evaluation and phytochemistry along with the drug interactions are the key features of descriptive mode of the course. Proper understanding of the secondary metabolites i.e. their presence and biogenesis are also included to develop the interest of the candidate to correlate it with novel research aspects. The clinical utilities and toxicities of the natural products are also focused to adopt the alternative approach with utmost care and precautions. This course certainly will help the students how the natural products can be used safely and effectively.

313 PHT Immunology

The course aims to provide students with the basic knowledge of the principles of immunity and molecular mechanisms. This course features the non-specific immunity, specific immunity, self vs. non-self, and variance: the immune system and its molecules, the antigens and antibodies, the Immune response, and their mechanisms, Hypersensitivity and mechanisms, Inflammation and its mediators, Vaccines, immunization, cold chain, and immune therapies, Autoimmunity and immune tolerance, cancer immunity, transplantation immunity, and immune deficiency.



314 PHT Pharmaceuticals – III

This course is designed to provide fundamental knowledge on various processes involved in the manufacturing of major pharmaceutical dosage forms tablets and capsules, including the good manufacturing practice (GMP), process validation and industrial safety.

322 PHC Pharmaceutical Chemistry -III

This course will offer knowledge about the chemistry, stereo-chemical aspects, chemical basis of drug action and structure activity relationships of the drugs acting on central nervous system, peripheral nervous system as well as diabetes and allergy. In each topic, students will also learn about the structures and physicochemical properties of drugs and their effects on the activity, pharmacokinetics and toxicity which would guide them to make a proper therapeutic decision in different cases.

323 PHC Drug Discovery & Development

Throughout this course, student will learn the basic principles of new drug discovery and development. This course helps students to gain in-depth knowledge to improve pharmacokinetic and Pharmacodynamics of the drugs.

332 PHL Pharmacology – II

Throughout this course, students will learn about the pharmacological aspects of drugs used to treat central nervous system (CNS), gastrointestinal (GI) and inflammatory disorders. For each category of disorders, students will learn the basic fundamentals of the disease in order to identify the drug targets, classes of drugs, mechanism of action, pharmacological actions, pharmacokinetics, adverse drug reactions and drug-drug interactions. This course will help students gain a better understanding about the drugs used in the treatment of CNS, gastrointestinal and inflammatory disorders.



343 PHCL Pharmacy Practice Skills - III (Patient Assessment & General Therapeutics)

Clinical laboratory tests are valuable to gain additional information about the patient. Its enable pharmacist to assess current status, evaluate and monitoring medication in order to achieve appropriate pharmaceutical care of care.

344 PHCL Pathology and Histology

The course covers the general concepts of pathology like cell injury, cell adaptation, cell death, tissue repair, intracellular accumulation, inflammation, hemodynamic disorders, genetic disorders, immunity and nutritional diseases.

362 PHG Natural Products & Dietary Supplements II

Throughout this course, the students will learn about the importance of natural products and dietary supplements in clinical practice for system-based disorders. The concept of traditional approaches and classifications as an alternative approach to treat the various ailments is described as per the course requirements. The aspects for the regulatory affairs and status for approved products are the key features of the course. Role of FDA and Saudi authorities as effective concern are included to update the students for the better compliance of the herbal products and dietary supplements for the users. This course will help the students how the natural products can be used safely and effectively.

345 PHCL IPPE (Community Pharmacy)

IPPEs expose students to common contemporary Saudi practice models, including inter-professional practice involving shared patient care decision-making, professional ethics and expected behaviors, and direct patient care activities. IPPEs are structured and sequenced



to intentionally develop in students a clear understanding of what constitutes exemplary pharmacy practice in Saudi Arabia prior to beginning APPE.

411 PHT Biopharmaceutics & Pharmacokinetics

Biopharmaceutics and Pharmacokinetics course provides basic principles of pharmacokinetics and their application, including single-dose intravenous and oral kinetics, non-compartment model, multiple dosing, nonlinear pharmacokinetics and pharmacodynamics. The interrelationship between the physicochemical properties of the drug and the rate/extent of absorption will be explored. Determination of bioavailability and bio-equivalency, factors affecting and methods to assess the bioavailability will also be extensively studied. Mathematical modelling of the plasma concentration time curves following drug administration will constitute a major part of the course. Fundamental pharmacokinetic principles and quantitative relationships will be used to determine approaches in designing dosage regimens.

421 PHC Pharmaceutical Chemistry -IV

Throughout this course the students will study the chemical principles required to understand action and behavior of drugs. The subject further deals with relationship between structure and stereochemistry of the drug and its chemical and therapeutic properties. The course will cover the chemistry, pharmacological activities, stereochemical aspects, structure activity relationships (SAR) and synthesis of chemotherapeutic agents. The student will develop an enhanced ability to think critically and scientifically about drug use decisions.



431 PHL Molecular Biology & Pharmacogenomics

The course stresses on the topics like nucleic acid, nucleotide, replication, transcription translation, and protein synthesis. This course also stresses on basic knowledge of pharmacogenomics, and advancement of the drug response on genetic basis, genetic variability in enzymes, drugs receptors, transporters and regulatory proteins etc.

432 PHL Pharmacology - III

The course stresses on the topics like drugs acting on central nervous system, analgesics, drugs used to treat diseases of the blood and local and general anesthetics. The drugs acting on these systems will be taught to the students with their main pharmacological actions and uses.

441 PHCL Biostatistics & Research Design

The goal of this course is to facilitate integration knowledge of experimental and observational study designs and statistical techniques. We will also discuss how to explain the key terms and concepts in statistics that are used in pharmacy and medical journals such as statistical significance, p-value, confidence interval, and power. Common statistical tests and their interpretations will also be discussed in the class.

442 PHCL Pathophysiology & Pharmacotherapy - I

This course covers the therapeutic management of cardiovascular and respiratory diseases.

443 PHCL Pharmacy Practice Skills-IV (Drug Information II & Literature Evaluation)

This course is designed to introduce the student to locate, evaluate drug and poison information systematically, manage and distribute information. Examples of other study



designs besides the basic controlled clinical trial. Discuss the potential utility, limitations of these study designs. Also, the student will study the characteristics of various observational trial designs, Type I and Type II errors; how to differentiate them and methods to reduce the possibility of either of these errors occurring. Student will learn about primary, secondary, and tertiary sources of information and to perform an evaluation of a drug product for a drug formulary.

412 PHT Pharmaceutics-IV

Pharmaceutics IV is a discipline which includes manufacturing, development, marketing and distribution of drug products including quality assurance of these activities. This broad research area relates to different functions in pharmaceutical industry and having contact areas with engineering and economics. Drug development refers to activities undertaken after a compound is identified as a potential drug in order to establish its suitability as a medication. Objectives of drug development are to determine appropriate formulation and dosing, as well as to establish safety. Research in these areas generally includes a combination of *in vitro* studies, *in vivo* studies, and clinical trials. The cost of late stage development has meant it is usually done by the larger pharmaceutical companies.

413 PHT Pharmaceutical Biotechnology

This course provides the knowledge on Animal cell culture cell lines, primary cultures, preparation and maintenance of cell lines, and application of animal cell culture, Genetic engineering and their applications. Principles of gene expression and regulations with respect drug therapy. Gene therapy Methods of gene transfer and Barriers of gene therapy, Gene therapy for various disease model such as diabetes mellitus and inflammatory mediated diseases. Stem cell therapy, Stem cell therapy and its application, stem cell therapy in cancer, an introduction to tissue engineering. Basic principles in fermentation, cultural systems, strain developments, microbial metabolites and production of antibiotics. Vaccine and biologicals, techniques used in vaccine production, principles involved in the production



of vaccine and anti-sera, vaccine adjuvant system and their mechanism. Pharmacopeia standardization, handling, principles involved in stability, designing modern vaccine and their mechanisms. Protein pharmaceuticals, Proteomics & Bioinformatics and their application, Saudi Human Genome, protein expression and purification, transgenic animals and transgenic plants, production of therapeutic proteins, principles involved in the stability, storage conditions. Problems and challenges associated with protein pharmaceuticals. Monoclonal antibodies, production, applications and in targeted therapy.

433 PHL Pharmacology – IV

The course stresses on the topics like pituitary hormones, insulins and oral hypoglycemic agents, thyroid and antithyroid drugs, parathormone & calcitonin, corticosteroids, sex hormones and oral contraceptives, oxytocics & tocolytics, drugs for peptic ulcer, constipation and diarrhea, Drugs for emesis, reflux and digestive disorders. The drugs acting on these systems will be taught to the students with their main pharmacological actions and uses.

434 PHL Molecular Pharmacology

Molecular Pharmacology offers information in molecular basis of drug action. The teaching program shares an interest in linking molecular mechanisms of drug action to dysfunctional biological and cellular processes of several human diseases.

444 PHCL Pathophysiology & Pharmacotherapy – II

This course covers the therapeutic management of renal, endocrine and rheumatological disorders



445 PHCL Pharmacy Practice Skills- V (Therapeutic Drug Monitoring)

This course is designed to update the students about general concept of therapeutic drug monitoring. Upon completion of this subject overall students will be able to understand the concept of drug individualization therapy and important adverse drug reaction can monitored which is important for therapeutic benefit and prevent from toxicity.

446 PHCL Pharmacy Regulation & Ethics

The course is designed to provide the students with the rules, regulations and ethics governing the practice of pharmacy profession trafficking pharmaceuticals, medical devices and professional practice. Upon successful completion of this course the student should be able to point out laws, ethics, regulations and their applications in various solutions in field of pharmacy practice.

447 PHCL IPPE (Institutional Pharmacy)

Institutional pharmacy is offered during summer semester, after completion of 4th professional year. Students are trained for total duration of 240 hours, i.e., 8 hours daily 5 days a week for a period of 6 weeks in hospital pharmacies of tertiary care hospitals of region. IPPE institutional pharmacy is preceded by IPPE community pharmacy, and five courses on Pharmacy Practice Skills aimed at preparing students for direct patient centered care. This course provides students with essential information on structure and functions of Hospital Pharmacy and role of a pharmacist as member of team of interprofessional health care providers. In addition to achievement of core competencies required for working in hospital setting. It also prepares students for Advanced Pharmacy Practice Experience.

531 PHL Pharmacology- V

The course is designed to impart a fundamental knowledge on pharmacological aspects of anti-microbial chemotherapy (anti-bacterials, anti-parasitics, anti-fungal and anti-viral drugs),



cancer chemotherapy, immunopharmacology, drugs for bone disorders, vaccines, immunoglobulins and other biological products.

541 PHCL Self-Care Pharmacotherapy

Throughout this course, students will learn about the over the counter (OTC) medications available to treat different medical conditions at community pharmacies. For each condition discussed, students will learn the basic causes, signs, and symptoms; self-care guidelines; and when to see a health care provider. For each medication discussed, students will learn the basic mechanism of action, uses, and potential side effects. This course will help students gain a better understanding of how OTC medications can be used safely and effectively.

542 PHCL Pharmacy Practice Skills - VI (MTM, Community Pharmacy Skills)

Medication Therapy Management (MTM) involves a partnership between the patient, pharmacist, and other healthcare providers to promote safe and effective medication use so that desirable patient outcomes are attained. It is founded on the philosophy of Pharmaceutical Care, and may encompass an array of services, whereby the pharmacist employs a systematic patient-centered approach to define and achieve goals related to optimal pharmacotherapy. MTM will allow students to begin to apply knowledge and develop skills needed to undertake MTM, with content drawn from co-requisite and pre-requisite courses.

543 PHCL Pharmacy Practice Management

The course provides broad information about various management aspects of pharmacy and pharmaceutical industries to mold the students in management and leadership skills.



544 PHCL Pathophysiology & Pharmacotherapy-III

This course covers the therapeutic management of gastrointestinal, neurological and psychiatric disorders.

545 PHCL Pharmacoepidemiology & Medication Safety

Pharmacoepidemiology and medication introduces students to the field of pharmacoepidemiology including study methodologies, data sources, measurement of treatments and outcomes, sources of bias and control of confounding, techniques to reduce bias and confounding and drug safety surveillance and risk management

546 PHCL Pharmacy Research Project

The goal of this course is to facilitate students in critical reflection on project design in Pharmacy Practice, with the aim of designing their own Pharmacy research projects. Research Project design involves the formulation of research problems in connection with the choice and combination of theory, methodology and empirical research. Research design is about the overall structure and idea of what a research project is about and how it is carried out. Clearly, research design is crucial for the success of a research project – in addition to empirical substance, and theoretical and methodological elements. The course offers PharmD-students help in sharpening and refining their research questions, in strengthening the focus of their research, in increasing the consistency of their overall project plan, in making explicit the various theoretical and methodological choices that must be made in the course of the project, and in improving the composition of the research report

532 PHL Toxicology & Drug Abuse

This course has been designed to introduce the fundamental concept of toxicology and drugs of abuse, exposure of chemical poisons (pesticides, heavy metals, corrosives, and food



additives), natural poisons (*Datura*, *Calotropis*, *Abrus precatorius*, and snake venom) and their management. Students will also develop the knowledge of teratogens, and forensic toxicology. Further we have highlighted the drugs of abuse such as opiates, barbiturates and benzodiazepines, alcohols, cocaine, amphetamine, nicotine, hallucinogens, cannabis, addiction potential, drug dependence and their management.

547 PHCL Public Health & Social Pharmacy

The course is designed to provide the students with the basic understanding and general knowledge of public health issues. Upon successful completion of the course the students shall be able to know various drug health promotion, patient counseling, infection control, rational drug therapy, pain management and health management. The main focus of this course to promote health promotion in community, role of law in public health and ethics and economics in public health.

548 PHCL Pharmacy Practice Skills – VII (Intoxication & Poisoning Management Skills)

This course helps the students to understand the basic principles of toxicology and the drug & poison information system utilization in poisoning cases; to gain knowledge regarding the initial evaluation of the patient for vital signs & toxic syndromes, principles of managing the acutely poisoned or overdosed patient, and principles of antidote stocking; to understand the technique used to prevent gastrointestinal, dermal, ophthalmic, and inhalational absorption of poisons, management of toxicity due to individual drugs such as acetaminophen and N - acetylcysteine, non-steroidal anti-inflammatory drugs, antihistamines & decongestants, beta adrenergic antagonists, benzodiazepines and other hypnotics; to understand the serious consequences of exposure to caustics and hydrocarbons; and, to gain knowledge regarding snake and scorpion venomization.



549 PHCL Pharmacotherapy of Special Populations

Based on the solid foundation in integrated pharmacotherapy, this course explores the unique pharmacotherapeutic considerations for several “special populations” (geriatrics, pediatrics, and pregnancy & lactation).

550 PHCL Clinical Nutrition

The course provides broad information about Basic concepts, principles and methods of clinical nutrition in clinical settings. At the end of the course completion the students will be able to know the concepts of nutrition, parenteral and enteral nutrition especially total parenteral nutrition (TPN).

551 PHCL Pathophysiology & Pharmacotherapy-IV

This course covers the therapeutic management of various infectious diseases, cancer diseases, and hematological disorders.

552 PHCL Pharmacoeconomics & Outcome Research

The course introduces students to the concept of pharmacoeconomics, methods, and practice for decision making keeping in mind the cost and patient outcomes.

553 PHCL Seminars in Pharmacy

This course covers disease topics covering CVS disorders, RS disorders, musculoskeletal disorders, endocrine disorders, hematological disorders, oncological disorders and infections.



651 PHCL APPE-1 Advanced Community pharmacy

The clinical rotation in Primary Health Care Pharmacy service/community pharmacy is designed to provide the intern with an opportunity to gain experience in providing basic health care pharmacy services for patients suffering from uncomplicated chronic diseases requiring basic monitoring and refill of prescriptions. To learn about the practice in various pharmacy settings like community independent, community chain pharmacy and community pharmacy services in primary health centres.

652 PHCL APPE-2 Advanced Hospital pharmacy

The aim of the hospital pharmacy internship is to provide the intern with experience in pharmacy administration, unit dose system and dispensing of medications in hospital pharmacy. It also provides the opportunity to understand the processes and functions carried in the inpatient and outpatient pharmacy, extemporaneous pharmaceuticals preparation, drug inventory control, drug orders and ward stock.

653 PHCL APPE-3 Ambulatory care

This internship aims to prepare the intern with a knowledge base and problem-solving skills related to the management of patients with ambulatory care problems from a pharmaceutical care perspective.

654 PHCL APPE-4 Inpatient general medicine-1

This internship is intended to enrich the knowledge base and develop problem-solving skills in relation to the patient management in inpatient wards from a pharmaceutical care perspective. This training helps in overall development of critical thinking skills, the ability to evaluate a patient's medical information, identify and solve drug therapy problems, developing skills in designing drug therapy interventions and professionally communicating recommendations to other respective health care professionals.



655 PHCL APPE-5 Inpatient General Medicine-2

This internship is intended to enrich the knowledge base and develop problem-solving skills in relation to the patient management in inpatient wards from a pharmaceutical care perspective. This training helps in overall development of critical thinking skills, the ability to evaluate a patient's medical information, identify and solve drug therapy problems, developing skills in designing drug therapy interventions and professionally communicating recommendations to other respective health care professionals.

656 PHCL APPE-6 (Elective-1)

The internship specialties in internal medicine are intended to enrich the knowledge base and develop problem-solving skills in relation to the patient management in specialties like pediatrics, endocrinology, gastroenterology, pulmonary medicine, nephrology, cardiology, neurology and emergency medicine from a pharmaceutical care perspective

657 PHCL APPE-7 (Elective-2)

The internship specialties in internal medicine are intended to enrich the knowledge base and develop problem-solving skills in relation to the patient management in specialties like pediatrics, endocrinology, gastroenterology, pulmonary medicine, nephrology, cardiology, neurology and emergency medicine from a pharmaceutical care perspective

658 PHCL APPE-8 Research Practice Experience

This internship course will provide the intern with the opportunity to develop skills in research and get hands on experience in application of various research methodologies that they have learned. It also helps to integrate the research with clinical practice to build scientific temper and research aptitude in the students.



OLD STUDY PLAN

211 PHT Introduction to Pharmacy Profession

Introduces the student to the profession of pharmacy and the role of the pharmacist within health care delivery. The course considers the context of pharmacy practice in various healthcare-systems.

221 PHC Pharmaceutical Organic Chemistry

This course containing the different methods for preparation of some Aromatic compounds, Aldehydes, Ketones, Carboxylic acids, Heterocyclic Compounds, Amino acids, Carbohydrates, Lipids as well as its specific and general reactions including chemical properties. In addition to, the practical part afforded the safety chemical tests for identifications of organic compounds.

231 PHL Human Physiology - I

Understand the complexities of the cells, tissues, and major organs and systems of the human body. Study a different system each week, concentrating on basic mechanisms underlying human life processes and important diseases affecting normal human function.

232 PHL Biochemistry - I

Understanding of chemical structures of carbohydrates, amino acids and proteins, lipids and nucleic acids and also their clinical importance. The enzymes structures, classifications, theories of their mechanism of actions, kinetics and the clinical importance of both enzymes and isoenzymes and their value as diagnostic agents. Fat and water-soluble vitamins sources, mechanism of actions. functions, deficiencies and hypervitaminosis.



233 PHL Anatomy & Histology

The course is intended to provide an introduction to human anatomy for Pharmacy students. Basic concepts and essential details will be presented in a regional manner. The functional aspects of human anatomy will be integrated with structure, and the clinical importance of anatomical relationships will be introduced where appropriate.

201 MATH Mathematics

Mathematics is an important course which enables the student to use different tools for solving and evaluating problems such as industry, economy, agriculture, planning and others. Studying this course enables understanding basic algebraic operations, equations, inequalities, functions, differentiation and integration, in addition to some basic concepts of solving first order linear ordinary as well as partial differential equations.

212PHT Pharmaceutical Microbiology

The structure of the course is based on presenting the introduction, history, properties, classification, morphology, physiology, metabolism, enzymes and biochemistry of microorganisms, genetics of microorganisms, viruses and fungi, Culture media, growth and multiplication of these organisms, medical microbiology, disinfection, antisepsis, preservation, sterilization, and antibiotics and their assays and parasitology.

213 PHT Pharmaceutics – I

This course is designed to impart fundamental knowledge on various pharmaceutical dosage forms and additives used in their formulation. The students gain knowledge about the extemporaneous preparations, prescription writing, interactions studies and various extraction processes.



222PHC Pharmaceutical Analytical Chemistry

The course starts with an overview of the analytical techniques used in pharmaceutical analytical chemistry such as detection techniques such as mass-and NMR spectroscopy) and theoretical background of chromatography and separation. The course then focuses on liquid chromatography coupled with mass spectrometry and how this method is used in various applications such as process control, analysis of patient samples and in the development of new drugs. It also includes methods development, quality assurance and GLP (Good Laboratory Practice).

234PHL Human Physiology – II

Understand the complexities of the cells, tissues, and major organs and systems of the human body. Study a different system each week, concentrating on basic mechanisms underlying human life processes and important diseases affecting normal human function.

235 PHL Biochemistry – II

Understanding metabolic pathways of carbohydrates, amino acids and proteins and lipids, also the clinical aspects associated with any defect in these pathways. Moreover, understanding the integration of these pathways in all metabolic states.

251PHCL First Aid

This course focuses on the theoretical knowledge about emergency situations which is an essential component of the health care delivery system. This course is designed to give students the chance to gain in depth understanding of nature of emergency condition and role of pharmacist in meeting different needs of the patient. It provides the students with knowledge that will help them to provide efficient first aid care during emergency and disaster situations either in pre-hospital settings or in hospital setting and also in disasters.



This course will include three main parts, namely basics of emergency, first aid and emergency care for trauma in the different body systems and first aids and emergency care for specific medical emergencies. Critical thinking and problem solving is emphasized.

311 PHT Immunology

The course aims to provide students with the basic knowledge of the principles of immunity and molecular mechanisms. This course features the non-specific immunity, specific immunity, self vs. non-self, and variance: the immune system and its molecules, the antigens and antibodies, the Immune response, and their mechanisms, Hypersensitivity and mechanisms, Inflammation and its mediators, Vaccines, immunization, cold chain, and immune therapies, Autoimmunity and immune tolerance, cancer immunity, transplantation immunity, and immune deficiency.

312 PHT Pharmaceutics – II

This course is designed to impart a fundamental knowledge of physical pharmacy, reaction kinetics and stability.

321 PHC Medicinal Chemistry – I

The course introduces the basic concepts in medicinal chemistry and also provides an insight into the structure, structure-activity relationship and synthesis of drugs acting on ANS and CVS and related classes of drugs like diuretics, anti-hyperlipidemics.

331 PHL Pharmacology – I

The course stresses on the topics like Introduction and scope of pharmacology, Routes of drug administration, Pharmacokinetics (Absorption, Distribution, Metabolism & Excretion), Pharmacodynamics, Cholinergic & Anti-cholinergic drugs, Adrenergic & Anti-adrenergic



drugs, skeletal muscle relaxants, effect of drugs on eye, autacoids and drugs acting on respiratory system. The drugs acting on these systems will be taught to the students with their main pharmacological actions and uses.

361 PHG Pharmacognosy – I

Throughout the session the course is believed to provide a wide range of concept to get update with the use of medicinal plants and their folklore uses. Since the correct identification of botanical products and plants is an important aspect of study and research, hence it comprises the required information in the given curriculum. The information pertaining to the active phyto-constituents and adulteration has been covered up to meet the requirements of the program.

313PHT Pharmaceutics – III

This course is designed to provide fundamental knowledge on types, advantages and disadvantages as well as preparation of solid dosage forms and industrial aspects of pharmaceutical manufacturing.

323PHC Drug Discovery and Development

The course implemented to apply basic principles of new drug discovery and development and also provides in-depth knowledge to improve pharmacokinetic and Pharmacodynamics of the drugs.

324 PHC Medicinal Chemistry – II

This course will offer knowledge about the chemistry, stereo-chemical aspects, chemical basis of drug action and structure activity relationships of the drugs acting on central nervous system, peripheral nervous system as well as diabetes and allergy. In each topic,



students will also learn about the structures and physicochemical properties of drugs and their effects on the activity, pharmacokinetics and toxicity which would guide them to make a proper therapeutic decision in different cases.

332 PHL Pharmacology – II

The course stresses on the topics like Central Nervous System, Analgesics, Gastrointestinal Tract and Local and General anesthetics. The drugs acting on these systems will be taught to the students with their main pharmacological actions and uses.

351 PHCL Clinical Skills for Pharmacist

Throughout this course the students will learn the basics of clinical pharmacy and be familiar with the activities of clinical pharmacist and case presentation basics. They will also learn communication skills and how to face the common barriers in communication with health care professionals and patients. This course will also introduce the student to physical assessment skills, laboratory investigations, therapeutic planning and monitoring skills & how to use different information resources.

341 PHCL Pathophysiology – I

The course covers the pathophysiology of general concepts of inflammation, and diseases of cardiovascular system and respiratory system, cancer, infections and sexually transmitted diseases.

362 PHG Pharmacognosy – II

The course is the extension of pre-requisite PHG 361, whose description is based upon the understanding of secondary metabolites (Alkaloids, Glycosides, volatile oils, Tannins, Resins etc.) with the phytochemistry involved therein. The biogenesis and drug interaction are well



emphasized to meet the clinical aspects of the practice. In addition to the theoretical aspects the course the practical utilities are included to explore the new flora in the region.

411 PHT Basic Pharmacokinetics

This course provides basic principles of pharmacokinetics and their application, including single-dose intravenous and oral kinetics, non-compartment model, multiple dosing, nonlinear pharmacokinetics and pharmacodynamics. The interrelationship between the physicochemical properties of the drug and the rate/extent of absorption will be explored. Determination of bioavailability and bio-equivalency, factors affecting and methods to assess the bioavailability will also be extensively studied. Mathematical modeling of the plasma concentration time curves following drug administration will constitute a major part of the course. Fundamental pharmacokinetic principles and quantitative relationships will be used to determine approaches in designing dosage regimens.

412 PHT Pharmaceutics – IV

To provide fundamental knowledge on sterile dosage forms, study of cosmetics, dermatological preparations, aerosols and sprays.

413 PHT Biostatistics

The purpose of this course is to familiarize students with the basics of biostatistics topics based on sources, scope, collection, classification, and presentation of descriptive data; Probability; Sampling; Statistical Inferences. The course will empower to write statistical part of, data collection and statistical analysis plans for grants; enable to read most of the relevant pharmacy related literature with understanding of the statistical content, publications and to organize results in appropriate visual displays or tables. Hence forth, it



revolves on the application of basic techniques as well as main concepts of inferential statistics.

421 PHC Research Paper Writing

Throughout this course, student will learn how to write a research paper with enhanced technical writing skills. This course helps students to interpret the different experimental results for making appropriate conclusion.

431 PHL Pharmacology – III

The course stresses on the topics like drugs acting on hyperlipidemia, coagulants and anticoagulants, drugs acting on Cardiovascular system and Endocrine system, Corticosteroids and sex steroid hormones. The drugs acting on these systems will be taught to the students with their main pharmacological actions, uses, adverse effects and drug interactions.

441 PHCL Pathophysiology – II

The course will cover the pathophysiology and diagnosis of systemic diseases like hematological diseases, immunological diseases, endocrinal diseases, central nervous system diseases, reproductive, urinary system and gastrointestinal diseases. The students will be able to learn about the etiological causes, sign and symptoms, risk factors, pathogenesis, criteria of diagnosis, and lab investigations of above diseases.

442 PHCL Pharmacotherapy – I

This course covers the therapeutic management of cardiovascular diseases and respiratory disorders.



451 PHCL Pharmacy Practice

The course is designed to provide the students with the basic understanding and general knowledge of pharmacy practice

422 PHC Medicinal Chemistry – III

Throughout this course the students will learn the chemistry, stereochemical aspects, pharmacological activities, chemical synthesis and structure activity relationship of the chemotherapeutic agents. This course will enable the students to learn the concepts of physicochemical properties of chemotherapeutic agents involved in their biological actions. This course also deals with the laboratory establishment of pharmacopoeial standards of selected drugs.

432PHL Pharmacology – IV

The course is designed to impart a fundamental knowledge on pharmacological aspects of anti-microbial chemotherapy (anti-bacterial, anti-fungal, anti-viral and anti-parasitic drugs), cancer chemotherapy and immunopharmacology.

433PHL Drug Abuse

The course is designed to impart a fundamental knowledge on harmful aspects of drugs of abuse (Nicotine, Morphine, Heroin, Alcohol, Cannabinoids, Hallucinogens etc.)

434 PHL Molecular Biology

The course stresses on the topics like nucleic acids, nucleotide, replication, transcription translation, protein synthesis, gene regulation and molecular techniques such as PCR and western blotting.



443 PHCL Pharmacotherapy – II

The student will learn the therapeutic management of common gastrointestinal, endocrine, obstetrics-gynecology, and renal diseases. This course covers the pathophysiology and process of diagnosis of these disease conditions with help of clinical features and laboratory investigations. The students will learn the detailed pharmacotherapy along with any therapeutic drug monitoring.

452 PHCL Applied Pharmacokinetics

Throughout this course, students will learn about the general concept of therapeutic drug monitoring. Upon completion of this subject overall students will be able to understand the concept of drug individualization therapy and important adverse drug reaction can monitored which is important for therapeutic benefit and prevent from toxicity.

453 PHCL Pharmacy Management

Throughout this course, students will learn various management functions and activities in different pharmaceutical care settings. The activities include different types of planning and managing various resources and operations in the pharmacy settings. Various options and the steps in setting up their own successful business including marketing and risk management activities are discussed in detail. The managerial and leadership skills required in profitable running of different pharmaceutical care businesses are also discussed.

531 PHL Toxicology

Throughout this course, students will learn about the introduction of toxicology, scope and its branches, exposure of toxicant, dose response relationship, chemical and drug poisoning, natural poisoning (plant and animal poisons) and their managements. Students will also learn about the teratogenicity caused by drugs, as well as concept of forensic toxicology and



identification of suspected death. This course will help students gain a better understanding of the poisoning cases and their managements as well as suspected death identification.

541 PHCL Pharmaceutical Care - I

Based on the solid foundation in integrated pharmacotherapy, this course explores the unique pharmacotherapeutic considerations for several “special populations” (geriatrics, pediatrics, and pregnancy & lactation).

551 PHCL Pharmacy Regulation and Ethics

Throughout this course, students will learn about the rules, regulations and ethics governing the practice of pharmacy profession and pharmaceutical products in Kingdom of Saudi Arabia. This course will help students gain a better understanding of their responsibilities to work as a health care professional and to protect the public and ensure patients' well-being.

542 PHCL Pharmacotherapy - III

Throughout this course, students will learn about the essential knowledge on clinical pharmacodynamics, clinical lab investigations, pharmacotherapy (with algorithms, guidelines, precautions and guideline for special populations) of neurological & psychiatric disorders, rheumatic diseases and the rationale for drug therapy.

552 PHCL Introduction to Drug and Poison Information

Throughout this course, students will learn various concepts of locating, evaluating drug and poison information systematically, managing and distributing information to health care providers and general population. The students will also learn different types of medical literature. They will learn ways of evaluating medical literature. They will also learn the



functions attributes and structure of a P&T committee. They will learn how to perform an evaluation of a drug product for a drug formulary and learn how to report ADRs.

553 PHCL Pharmacoepidemiology

This course will introduce students to the fields of epidemiology and pharmacoepidemiology including study methodologies, data sources, measurement of treatments and outcomes, sources of bias and control of confounding, drug safety surveillance and risk management.

554PHCL Clinical Case Studies& Seminar - I

This course covers analysis of patient cases covering different disorders, including cardiovascular, endocrine and respiratory system diseases.

563PHG Biotechnology

This course provides the knowledge on Animal cell culture cell lines, primary cultures, preparation and maintenance of cell lines, and application of animal cell culture. Genetic engineering and their applications. Principles of gene expression and regulations with respect drug therapy. Gene therapy Methods of gene transfer and Barriers of gene therapy, Gene therapy for various disease model such as diabetes mellitus and inflammatory mediated diseases. Stem cell therapy, Stem cell therapy and its application, stem cell therapy in cancer, an introduction to tissue engineering. Basic principles in fermentation, cultural systems, strain developments, microbial metabolites and production of antibiotics. Vaccine and biologicals, techniques used in vaccine production, principles involved in the production of vaccine and anti-sera, vaccine adjuvant system and their mechanism. Pharmacopeia standardization, handling, principles involved in stability, designing modern vaccine and their mechanisms. Protein pharmaceuticals, Proteomics & Bioinformatics, protein expression and purification, transgenic animals and transgenic plants, production of therapeutic



proteins, the principles involved in the stability, storage conditions. Problems and challenges associated with protein pharmaceuticals. Monoclonal antibodies, production, applications and in targeted therapy.

532 PHL Molecular Pharmacology

Molecular Pharmacology offers information in molecular basis of drug action. The teaching program shares an interest in linking molecular mechanisms of drug action to dysfunctional biological and cellular processes of several human diseases.

533PHL Pharmacogenomics

The course stresses on the knowledge of the genetic basis for variable drug response, genetic variability in enzymes, drugs receptors, transporters and regulatory proteins involved in promoting and inhibiting transcription and translation process. The pharmacological drugs will be taught to the students with their main relation to change in response from one person to another.

543 PHCL Pharmaceutical Care-II

Throughout this course, students will learn about the over the counter (OTC) medications available to treat different medical conditions at community pharmacies. For each condition discussed, students will learn the basic causes, signs, and symptoms; self-care guidelines; and when to see a health care provider. For each medication discussed, students will learn the basic mechanism of action, uses, and potential side effects. This course will help students gain a better understanding of how OTC medications can be used safely and effectively.

555 PHCL Clinical Nutrition

This course will provide broad information about basic concepts, principles and methods of clinical nutrition in the clinical settings. The theoretical concepts of medical nutritional management of surgical and critical care, pediatrics, and internal medicine diseases discussed. Provide nutritional recommendations to optimize patient care in the assigned area. Communicate effectively the nutritional care plans with other members of the healthcare team. At the end of the course completion the students will be able to know the concepts of nutrition, parenteral and enteral nutrition especially total parenteral nutrition (TPN) and its application.

544 PHCL Pharmacotherapy-IV

Through this course students will learn essential knowledge on the pharmacotherapy management of various infectious, hematology diseases and oncology. Via clinical lab investigations, signs, symptoms, causative microorganism and therapeutic options according to the guidelines. And design appropriate therapeutic plan according to the patient's specific parameters.

556 PHCL Evidence Based Therapy

This course prepares the students to learn the concept of evidence-based practice, with emphasis on identifying, using and critically appraising medical literature. In identification of medical literatures, the student will learn to locate the information contained in various databases which then critically appraise and apply in specific patient conditions. In addition, the course exposes students to the process of drug approval process, development of guidelines and conducting external research in generation of evidence.



557 PHCL Pharmacoeconomics

The course introduces students to the concept of Pharmacoeconomics, important terms, methods used in pharmacoeconomic evaluations, interpretation and decision making, to elicit good patient outcomes.

558 PHCL Clinical Case Study & Seminar-II

This course covers discussion of case studies related to different diseases in nephrology, gastroenterology and anemia. Case studies are a written description of a real-life problem which help the student to distinguish between relevant and irrelevant facts in the analysis of patient data and selection of a rational therapeutic plan. In case-based learning, students apply their knowledge of therapeutics to solve clinical cases.

650 PHCL APPE-1 Hospital Pharmacy

The aim of the hospital pharmacy internship is to provide the intern with experience in pharmacy administration, unit dose system and dispensing of medications in hospital pharmacy. It also provides the opportunity to understand the processes and functions carried in the inpatient and outpatient pharmacy, extemporaneous pharmaceuticals preparation, drug inventory control, drug orders and ward stock.

651 PHCL APPE-2 Community Pharmaceutical Care Practice

The clinical rotation in Primary Health Care Pharmacy service is designed to provide the intern with an opportunity to gain experience in providing basic health care pharmacy services for patients suffering from uncomplicated chronic diseases requiring basic monitoring and refill of prescriptions. To learn about the practice in various pharmacy



settings like community independent, community chain pharmacy and community pharmacy services in primary health centres.

652 PHCL APPE-3 Pharmaceutical Care Skills

This internship helps the interns to gain experience in providing drug information services to patients through a Drug and Poison Information Centre (DPIC), Therapeutic Drug Monitoring (TDM) services and Total Parenteral Nutrition (TPN) services. The intern is given a choice to select DPIC, TDM or TPN.

653 PHCL APPE-4 Ambulatory Pharmaceutical Care

This internship aims to prepare the intern with a knowledge base and problem-solving skills related to the management of patients with ambulatory care problems from a pharmaceutical care perspective.

654 PHCL APPE-5 General Medicine

This internship is intended to enrich the knowledge base and develop problem-solving skills in relation to the patient management in internal medicine from a pharmaceutical care perspective. This training helps in overall development of critical thinking skills, the ability to evaluate a patient's medical information, identify and solve drug therapy problems, developing skills in designing drug therapy interventions and professionally communicating recommendations to other respective health care professionals.

655 PHCL APPE-6 Elective-1

This rotation aims to provide an intern with clinical experience that will broaden his knowledge and skills in understanding various issues related to the child health, planning the most suitable, safe and effective pharmacotherapeutic regimens in the pediatric population.

655 PHCL APPE-7 Elective-2

The internship specialties in internal medicine are intended to enrich the knowledge base and develop problem-solving skills in relation to the patient management in specialties like endocrinology, gastroenterology, pulmonary medicine, nephrology, cardiology, neurology and emergency medicine from a pharmaceutical care perspective.

655 PHCL APPE-8 Elective-3

The internship in specialties in internal medicine are intended to enrich the knowledge base and develop problem-solving skills in relation to the patient management in specialties like endocrinology, gastroenterology, pulmonary medicine, nephrology, cardiology, neurology and emergency medicine from a pharmaceutical care perspective.

655 PHCL APPE-9 Elective-4

The internship in specialties in internal medicine are intended to enrich the knowledge base and develop problem-solving skills in relation to the patient management in specialties like endocrinology, gastroenterology, pulmonary medicine, nephrology, cardiology, neurology and emergency medicine from a pharmaceutical care perspective.

655 PHCL APPE-10 Elective-5

This internship course will provide the intern with the opportunity to develop skills in research and get hands on experience in application of various research methodologies that they have learned. It also helps to integrate the research with clinical practice to build scientific temper and research aptitude in the students.