



Study Plan

Bachelor of Pharmacy

“Curriculum Reform”

Period of Study

A bachelor’s degree in pharmacy is conferred upon a student if he/she completes 170 credit hours of courses, attains a minimum CGPA of 2.0, and has been recommended by the College to receive the degree. The curriculum is distributed over 10 semesters. Although the program may normally be completed in 5 academic years, the period of study in the College of Pharmacy may not exceed fifteen semesters. The curriculum is comprised of 24 credits of university requirements (UR) and 146 of college requirements (CR) including 24 credits of clinical training as indicated in the following table.

B. Pharm. (170 Credit Hours)			
	UR	CR	Total
Mandatory Courses	18	119	137
Electives Courses	6	-	6
Clinical Training		24	24
Special Topics in Pharmacy	-	3	3
Total	24	146	170

I. University Requirements and Electives

Every student is required to take 24 credit hours of general education courses (8 courses). Eighteen (18) mandatory credit hours are selected from University Compulsory Courses Group and (6) elective credit hours selected from Group 1 and Group 2 as indicated below.

University Compulsory Courses Group

0104100	Islamic Culture	3
0201102	Arabic Language	3
0202121	English For Medical Sciences 1	3
0302200	Fundamental of Innovation & Entrepreneurship	3
1501100	Introduction to IT(English)	3
0204102	UAE Society	3

University Elective Courses Group 1 (Humanities and Arts)

0203100	Islamic Civilization	3
0602246	Human Rights in Islam and International Declarations	3
0201140	Introduction to Arabic Literature	3
0203200	History of the Sciences among Muslims	3
0203102	History of the Arabian Gulf	3
0900107	History of Medical & Health Sciences	3
0710109	Arts & Medicine	3
0202130	French Language	3
0206102	Fundamentals of Islamic Education	3
0206103	Introduction to Psychology	3
0308150	Introduction to Economics	3
0302150	Introduction to Business Administration	3
0800107	Media in Modern Societies	3
0308131	Personal Finance	3
0104130	Analytical Biography of the Prophet	3
0103103	Islamic System	3

University Elective Courses Group 2 (Natural and Health Sciences)

1430101	Astronomy and Space Sciences	3
0401142	Man and the Environment	3
0507101	Health Awareness and Nutrition	3
0505101	Fitness and Wellness	3
1450100	Biology and Society	3

II. College Requirements

The College requirements consist of 119 credits of mandatory courses, 24 credits of clinical training and 3 credits of elective course chosen from a group of selected topics.

Study Plan

The Bachelor of Pharmacy program encompasses 170 Credits distributed over 10 regular semesters that can be completed in five academic years. The following study plan serves as a roadmap for a smooth progression toward graduation.

Year 1, Semester 1 (16 Credits)			
Course #	Title	Cr. Hrs.	Prerequisites
1101113	Chemistry for Pharmacy	3 (2+3)	
1103110	Pharmaceutical Calculations	1(0+3)	
1102114	Human Anatomy & Physiology I	3(3+0)	
	General Education	3(3+0)	
	General Education	3(3+0)	
	General Education	3(3+0)	

Year 1, Semester 2 (18 Credits)			
Course #	Title	Cr. Hrs.	Prerequisites
1102120	Human Anatomy & Physiology II	3(3+0)	1102114
1103121	Microbiology	3(2+3)	1102114
1101120	Organic Chemistry I	3 (3+0)	1101113
	General Education	3(3+0)	
	General Education	3(3+0)	
	General Education	3(3+0)	

Year 2, Semester 3 (17 Credits)			
Course #	Title	Cr. Hrs.	Prerequisites
1102230	Pathophysiology	3(3+0)	1102120
1101230	Organic Chemistry II	3 (2+3)	1101120
1104230	Biostatistics	2(2+0)	
1103230	Dosage Forms I	3(2+3)	1103110
	General Education	3(3+0)	
	General Education	3(3+0)	

Year 2, Semester 4 (15 Credits)			
Course #	Title	Cr. Hrs.	Prerequisites
1103240	Dosage Forms II	3(2+3)	1103230
1102240	Foundation of Pharmacology	4 (3+3)	1102230
1101240	Biochemistry	3 (2+3)	1102120 , 1101230
1104240	Introduction to Pharmacy Practice & Drug information	2(2+0)	1102230
1101249	Pharmaceutical Analysis	3(3+0)	1101230

Year 3, Semester 5 (17 Credits)			
Course #	Title	Cr. Hrs.	Prerequisites
1102350	Integrated Pharmacology & Therapeutics IA	4(4+0)	1102240, 1104240 Co-request 1104353
1102359	Integrated Pharmacology & Therapeutics IB	4(4+0)	1102240, 1104240 Co-request: 1104354
1104353	Pharmacy Skills IA	1(0+3)	1104240 Co-request: 1102350,
1104354	Pharmacy Skills IB	1(0+3)	1104240 Co-request: 1102359
1104359	Self-Care & OTC Therapy	3(3+0)	1104240
1101350	Chemical Basis of Drug Action I	3 (3+0)	1101240
1103350	Sterile Formulations	2(2+0)	1103240 & 1102114

Year 3, Semester 6 (18 Credits)			
Course #	Title	Cr. Hrs.	Prerequisites
1102360	Integrated Pharmacology & Therapeutics IIA	4(4+0)	1102240, 1104240 Co-request: 1104360
1102369	Integrated Pharmacology & Therapeutics IIB	4(4+0)	1102240, 1104240, 1103121 Co-request: 1104360
1104360	Pharmacy Skills II	1(0+3)	Co-request: 1102360, 1102369
1101360	Chemical Basis of Drug Action II	3 (3+0)	1101350
1104369	Pharmacy Management & Marketing	2(2+0)	1104240
1104364	Pharmaceutical Pharmacoeconomics	2(2+0)	1104240
1104368	Introductory Pharmacy Placement I (IPP I)	2(0+6)	1104359

Year 4, Semester 7 (17 Credits)			
Course #	Title	Cr. Hrs.	Prerequisites
1103479	Immunology and Vaccination	2(2+0)	1102230
1102470	Integrated Pharmacology & Therapeutics III	3(3+0)	1102240
1104470	Pharmacy Skills III	1(0+3)	1104360 Co-request: 1102470
1103470	Biopharmaceutics & Pharmacokinetics	3(2+3)	1103350
1104479	Pharmacy Ethics and Law	2(2+0)	1104369
1104478	Pharmacy Communication Skills	2(1+3)	1104369
1104477	Introductory Pharmacy Placement II (IPP II)	3(0+9)	1104368

Year 4, Semester 8 (18 Credits)			
Course #	Title	Cr. Hrs.	Prerequisites
1102480	Integrated Pharmacology and Therapeutics IV	3(3+0)	1102240 Co- or Pre-requisites: 1102489
1102489	Toxicology & Drug Poisoning	3(3+0)	1102240
1104480	Pharmacy Skills IV	1(0+3)	Co- or Pre-requisites: 1102489, 1102480
1103480	Pharmaceutical Biotechnology & Gene Therapy	3(3+0)	1103470
1104489	Clinical Drug literature Evaluation	2(1+3)	1104240
1101480	Phytotherapy	3(2+3)	1102240
1104488	Introductory Pharmacy Placement III (IPP III)	3(0+9)	1104477

Year 5, Semester 9 (18 Credits)			
Course #	Title	Cr. Hrs.	Prerequisites
1104590	Global Health and Health Policy in Pharmacy	2(2+0)	1104479
1101591	Drug Development and Innovation	2(2+0)	Offered only to 4 th and 5 th Year students
1104599	Simulation Pharmacy (Practical)	1(0+3)	1104470
1100599	Graduation Project	3	Completion of 131 Cr. Hrs
1104598	Informatics in Pharmacy	1(0+3)	1104489
1104597	Clinical Pharmacokinetics Skills	1(0+3)	Co- or pre-requisite: 1103470
1103590	Drug Delivery Systems	3	1103470
1104596	Pharmacogenomics & Personalized Medicine	2(2+0)	1102240
Special Topics in Pharmacy		3	Completion of 131 Cr. Hrs.
1101590	Artificial Intelligence in Drug Discovery		
1103595	Regulatory Affairs and Drug Registration		
1103599	Cosmetics & Parapharmaceuticals		
1101599	Forensic Pharmacognosy & Plant Poisoning		
1104595	Parenteral Nutrition		

Year 5, Semester 10 (16 Credits)			
Course #	Title	Cr. Hrs.	Prerequisites
1104501	Professional Experiential Placement A	4	1104488 Co-request: 1104502, 1104503, 1104504
1104502	Professional Experiential Placement B	4	1104488 Co-request: 1104501, 1104503, 1104504
1104503	Professional Experiential Placement C	4	1104488 Co-request: 1104501, 1104502, 1104504
1104504	Professional Experiential Placement D	4	1104488 Co-request: 1104501, 1104502, 1104503

Courses Description

Competency outcomes acquired in various courses will help attain sound knowledge in pharmaceutical and clinical sciences and enable the students' integration of this knowledge with practical skills needed to offer pharmaceutical care for patients. The graduates will acquire analytical thinking processes that help them in communicating within multidisciplinary teams and in making evidence-based decisions about safe, effective, and economic utilization of medications in the management and prevention of disease. As the students' progress through these courses, they transition from dependent to active self-directed learners who behave professionally according to ethical principles which governs pharmaceutical practice in their care of patients and in dealing with other professionals. Students are also introduced to different research methods used in conducting research projects along with familiarity with drug information resources available in conducting research projects and in providing patient care.

The following describes the contents of various pharmacy program courses.

Mandatory Core Courses

1101113	Chemistry for Pharmacy	2-3:3
<p>The general chemistry course introduces pharmacy students to the basic concepts of chemistry, including atomic structure; periodic table; electronic distribution of the atoms; the mole concept; stoichiometric calculations; solutions; acids and bases; buffers, chemical bonding, molecular structures and intermolecular interactions and the properties of liquids and solids. This course also includes practical experiments.</p> <p>Prerequisite: None.</p>		

1102114	Human Anatomy and Physiology I	3-0:3
<p>Human Anatomy and Physiology I is the first of a two-course sequence examining the structure, function, and interdependence of the human body systems. This course provides a comprehensive study of the cell biology, the structures and properties of the body tissue and the anatomy and physiology of organ systems including integumentary, skeletal, muscular, and lymphatic systems. In conjunction with classroom instruction, students will apply knowledge from the classroom to critical thinking application exercises.</p> <p>Prerequisites: None.</p>		

1103110	Pharmaceutical Calculations	0-3:1
<p>This course provides the student with the knowledge and skills to accurately perform a variety of pharmaceutical calculations required to prepare and dispense medications. Emphasis will be placed on basic computations, use of measuring tools, dosage computations, compounding calculation, interpreting prescriptions & medication orders and medical abbreviations & conversions. Topics covered also include electrolytes solutions, isotonic & buffer solutions, and selected calculations involving active drug moiety, contemporary compounding, intravenous infusions, and parenteral nutrition calculations.</p> <p>Prerequisites: None.</p>		

1102120	Human Anatomy & Physiology II	3-0:3
<p>Human Anatomy and Physiology II is a continuation of Human Anatomy and Physiology I examining the interdependence of the human body systems and their contribution to the maintenance of the body homeostasis. This course provides a comprehensive study of the anatomy and physiology of the nervous, cardiovascular, respiratory, endocrine, urinary, digestive, and reproductive systems. In conjunction with classroom instruction, students will apply knowledge from the classroom to critical thinking application exercises.</p> <p>Prerequisites: 1102114</p>		

1103121	Microbiology	2-3:3
<p>This course covers fundamental features of microbiology related to bacteria, viruses, fungi and protozoa, Interaction between pathogens and host responses, principles of microbial pathogenicity, epidemiology. Mechanisms of action of antimicrobial agents and antibiotic resistance will be overviewed. the course covers the microbial contamination and infection control of pharmaceutical drugs. Microbial spoilage, sources of contamination, contamination control, chemical disinfectants, antiseptics, preservatives, sterilization procedures and sterility assurance are discussed.</p> <p>Prerequisites: 1102114</p>		

1101120	Organic Chemistry I	3-0:3
<p>This course introduces students to the chemistry of organic compounds, their properties, synthesis, reactions, and nomenclature. The functional groups covered in this course include, alkane, alkyl halides, alkenes, alkynes, alcohols, ethers, aromatic compounds, aldehydes, and ketones. Moreover, chemical reaction and stereochemistry will be discussed.</p> <p>Prerequisites: 1101113</p>		

1102230	Pathophysiology	3-0:3
<p>Pathophysiology course covers the basic mechanisms of disease, specifically mechanisms of cell injury, cell death, inflammation and healing, neoplasia, fluid/electrolytes/acid-base imbalances as well as physiology of pain. These principles are then applied to dysfunction of the major organ systems (covered in the integrated therapeutic courses).</p> <p>Prerequisites: 1102120</p>		

1101230	Organic Chemistry II	2-3:3
<p>This course is a continuation of organic chemistry I. It introduces students to the chemistry of organic compounds, their properties, synthesis, reactions, and nomenclature. The functional groups covered in this course include amines, carboxylic acid, carboxylic acids derivatives as well as condensations, and substitution of carbonyl compounds; selected classes of 5 & 6-membered ring heterocyclic compounds, their reactions, synthesis, and applications in drugs. This course also introduces NMR and IR spectroscopic techniques. This course also includes practical experiments that allow students to master the synthetic methodologies related to some functional groups preparation, their purification, separation, and structure elucidation.</p> <p>Prerequisites: 1101120</p>		

1104230	Biostatistics	2-0:2
<p>This course covers the descriptive statistics and its use in medical research. Normality check and its importance. Inference statistics and hypothesis testing (t-test, paired t-test, chi square, ANOVA, etc.). Linear and logistic statistics and modeling will be also discussed. Application on real medical data using SPSS software.</p> <p>Prerequisites: None.</p>		

1103230	Dosage Forms I	2-3:3
<p>This course introduces the students to the fundamentals of physical pharmacy related to solubility and solutions, surface tension and interfacial phenomena, in addition to rheology and flow properties of liquids and semisolids. The rest of the course deals with the formulation of pharmaceutical oral solutions such as syrups and elixirs and different types of semisolid (disperse) dosage forms such as suspensions, emulsions, microemulsions, gels, ointments, creams, aerosols and foams.</p> <p>Prerequisites: 1103110.</p>		

1103240	Dosage Forms II	2-3:3
<p>This course provides the students with advanced knowledge and practical skills in pharmaceutical technology and unit operations in the manufacture of solid dosage forms. The formulation principles, role of excipients, production, manufacturing methods, machinery, stability, packaging, evaluation, and use of pharmaceutical solid dosage forms such as powders, granules, hard gelatin capsules, soft gelatin capsules, tablets, and modified-release dosage forms. The formulation of suppositories will be discussed.</p> <p>Prerequisites: 1103230</p>		

1101240	Biochemistry	2-3:3
<p>The subject will introduce the basic concepts of biochemistry and their application to biology and chemistry focused on interactions with humans or applied uses. This approach is designed to integrate the concepts of biochemistry and discourage routine learning. The specific topics that will be addressed are as follows: Structure and molecular properties of biomolecules. Receptors, hormones and signaling processes. Metabolism. Catabolic pathways, synthetic pathways, energy production, control of metabolism. Information transfer (gene structure and regulation). Protein synthesis and molecular biology. This course also includes practical experiments.</p> <p>Prerequisites: 1102120, 1101230</p>		

1102240	Foundation of Pharmacology	3-3:4
<p>This course is designed to introduce basic concepts of pharmacology and pharmacotherapy. A thorough grounding in pharmacokinetic and pharmacodynamics principles will be given. The pharmacological actions and therapeutic uses of drugs acting on the sympathetic and parasympathetic divisions of the autonomic nervous system will be discussed. Therapeutically useful neuromuscular blocking drugs and drugs used in respiratory system will be discussed as well. In addition, the course covers aspects of pharmacogenomics and pharmacogenomics. Autacoids and selected neurotransmitter substances are also covered including histamine, 5-HT, PGs, NO and endothelin. In studying pharmacotherapeutics agents, emphasis is made on their mechanisms of actions, pharmacokinetics, therapeutic indications, adverse effects, and contraindications. This course also includes practical experiments.</p> <p>Prerequisites: 1102230</p>		

1104240	Introduction to Pharmacy Practice and Drug Information	2-0:2
<p>The course provides second-year pharmacy students with important knowledge of topics related to pharmacy history, aspects of pharmacy profession practice, assessment techniques, components of patient care presentation and documentation (SOAP system), pharmaceutical care planning, types and identification of drug-therapy problems, and follow-up. Concepts of health literacy, health outcomes, and quality of life of patient, medication safety, pharmaceutical care for special populations (Pediatrics, geriatrics, and pregnant women) will also be covered. The course also includes basic skills and abilities needed to identify various pharmaceutical incompatibilities and basic techniques needed for identify different drug interactions and adverse drug effects in patient centered care in management.</p> <p>This course will include drug information, fundamentals of the practice of drug information, types of drug information resources with evaluation for each, application of drug information skills for the delivery of pharmaceutical care, understanding the practical implications of the drug information, technology of drug information, and retrieval for quality assurance.</p> <p>Prerequisites: 1102230</p>		
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1101249	Pharmaceutical Analysis	3-0:3
<p>This course introduces students to the main instrumental methods used for the separation, identification, and quantification of pharmaceutical products. The course addresses both the theoretical and practical aspects of UV-Visible Spectroscopy, Liquid Chromatography, Gas Chromatography, Mass Spectrometry and Thin Layer Chromatography. It covers also different titrimetric methods used in the analysis of drugs and the criteria used for the validation of analytical procedures.</p> <p>Prerequisites: 1101230</p>		

1102350	Integrated Pharmacology & Therapeutics IA	4-0:4
<p>This course covers the pathophysiology, pharmacology, and therapeutics of cardiovascular disorders including hypertension, coronary heart disease, heart failure, acute coronary syndrome (STMI and NSTMI), arrhythmias, hyperlipidemia, stroke, and coagulation disorders.</p> <p>Prerequisites: 1102240, 1104240.</p> <p>Co-request: 1104353</p>		

1102359	Integrated Pharmacology & Therapeutics IB	4-0:4
<p>This course covers the pathophysiology, pharmacology, and therapeutics of endocrine, renal diseases. Specifically, the course will cover the hypothalamic-pituitary-adrenal (HPA) axis, thyroid, parathyroid and adrenocortical dysfunction, diabetes, men's and women's health, acute, and chronic and drug-induced renal disease. Students will perform tasks which will foster the development of critical thinking and oral and written communication skills.</p> <p>Prerequisites: 1102240, 1104240</p> <p>Co-request: 1104354</p>		

1104359	Self-Care & OTC Therapy	3-0:3
<p>The course will describe the different ways for responding to symptoms in community pharmacy. The major classes of Over-The-Counter medications and self-care remedies (analgesics, dermal preparations, gastrointestinal medicine, vitamins, and minerals, etc.). Additionally, different OTC therapy for minor eye and respiratory conditions will be discussed in this course. The classification of OTC medicine according to FDA and scheduling of OTC will be also explained in detail. The concepts and practices of self-care via pharmaceuticals will be introduced.</p> <p>Prerequisites: 1104240</p>		

1104353	Pharmacy Skills IA (Practical)	0-3:1
<p>This course is designed to develop and practice the clinical skills needed to solve problems in patients with cardiovascular diseases by providing safe and cost-effective treatment. Students will learn how to interpret patient laboratory data related to these diseases and medical history data. The course is also intended to provide hands-on experience of a variety of pharmacological techniques using <i>in-vitro</i> and <i>in-vivo</i> simulation experiments programs. In addition to the interpretation of the charts related to the drug effect on isolated organs (Heart/Blood vessels). This course includes the use of drug information references and understanding and reading prescriptions. In addition, the students will practice providing education and counseling for patients, and role playing related to blood pressure monitor.</p> <p>Prerequisites: 1104240 Co-requisites: 1102350</p>		
1104354	Pharmacy Skills IB (Practical)	0-3:1
<p>This course is designed to develop and practice clinical skills necessary to solve problems related to supplying patients with cost-effective and safe treatment through discussion of clinical cases of patients suffering from neurologic and psychiatric diseases/disorders, endocrine, renal, and geriatric diseases. Students will learn through this course how to interpret a patient's laboratory data pertinent to these diseases and patient's medical history data. In addition, this practical course will cover topics related to patient centered care concept and pharmaceutical care process including steps for pharmaceutical care application. This course also includes preparing drug labels, and dispensing medications using a simulation dispensing program (Mydispense®).</p> <p>Prerequisites: 1104240 Co-requisites: 1102359</p>		

1101350	Chemical Basis of Drug Action I	3-0:3
<p>This course aims to introduce students to concrete knowledge about Medicinal Chemistry, drug-enzyme and drug-receptor interactions including the design and types of agonists, antagonists, inverse agonists and partial agonists, types of inhibitors, qualitative structure activity relationships, and quantitative structure-activity relationships (QSAR). Case studies in relation to qualitative and quantitative optimization of lead molecules. The medicinal chemistry aspects of metabolic biotransformation of drugs are covered in this course. Furthermore, providing information on the medicinal chemistry of adrenergic and cholinergic drugs. Classes of therapeutic agents such as angiotensin-converting enzyme (ACE) inhibitors, antianginal, antiarrhythmic,</p>		

antidiabetic, non-steroidal anti-inflammatory agents as well as hormones are covered in this course.

Prerequisites: 1101240

1103350	Sterile Formulations	2-0:2
<p>This course aims to provide the students with scientific and applied knowledge about compounding and manufacturing procedures of sterile dosage forms including formulation design, role of excipients, vehicles, stability, and quality control testing. The adjustment of isotonicity of sterile formulations, issues related to microbial contamination and physical and chemical incompatibilities of pharmaceutical sterile products will be discussed. Sterility testing and design and operation of manufacturing facilities of sterile products will be elaborated (Good Manufacturing Practices (GMPs)).</p>		
<p>Prerequisites: 1103240 & 1102114</p>		

1102360	Integrated Pharmacology & Therapeutics IIA	4-0:4
<p>This course covers the pathophysiology, pharmacology, and therapeutics of neurological, psychiatric, and geriatric diseases. Topics covered neurology include epilepsy, headache, pain management, Alzheimer's diseases, and Parkinson's disease. Topics covered in psychiatric diseases are major depression, anxiety disorders, bipolar disorders, sleep-disorders, and substance abuse. The course will provide with the ability to critically appraise therapeutic intervention. In addition, the pharmacy practice issues relating to neuropsychiatry and neurology will be addressed in a manner that highlights how neurological and psychotropic drugs can ameliorate the various disease states, and how they affect the overall condition of the patient.</p>		
<p>Prerequisites: 1102240, 1104240 Co-request: 1104360</p>		

1102369	Integrated Pharmacology & Therapeutics IIB	4-0:4
<p>This course covers the pathophysiology, pharmacology, and therapeutics of respiratory and infectious diseases. Topics covered include upper respiratory tract diseases, asthma, COPD, and Cystic fibrosis, antimicrobial regimen selection process, laboratory tests to direct antimicrobial pharmacotherapy, lower and upper respiratory tract infections, Urinary Tract Infections, Skin and Soft Tissue Infections, Central Nervous System Infections, Invasive Fungal Infections, antimicrobial stewardship, and antiviral drugs and viral infections.</p>		
<p>Prerequisites: 1102240, 1104240, 1103121 Co-request: 1104360</p>		

1104360	Pharmacy Skills II	0-3:1
<p>This course is designed to develop and practice the clinical skills needed to solve problems in patients with respiratory and infectious diseases by providing safe and cost-effective treatment. Students will learn how to interpret patient laboratory data related to these diseases and medical history data. This course includes the use of drug information references and understanding and reading prescriptions. In addition, the students will practice providing education and counseling for patients, and role playing related to asthma tools, and blood pressure monitor.</p> <p>Co-request: 1102360, 1102369</p>		

1101360	Chemical Basis of Drug Action II	3-0:3
<p>This course discusses CNS drugs including antipsychotics, antiparkinsonian, opioid analgesics, and antidepressant agents. The anti-infective agents including antibacterial, antifungal, and antiviral drugs are covered in this course in addition to the chemotherapeutic anticancer agents.</p> <p>Prerequisites: 1101350</p>		

1104369	Pharmacy Management & Marketing	2-0:2
<p>Principles and components of pharmaceutical business management in pharmacy practice and marketing are covered in this course. Management topics covered include general operations; personnel and human resource management; strategic, financial, and business planning, goods, and merchandizing; value-added services; drug utilization studies, medicine safety, prevention of medication errors and risk management. Students will be given chance to learn about the importance of strategic planning pharmacy practice and they will be asked to work in-group to develop SWOT analysis comparing different colleges of pharmacy locally and internationally. Conditions and factors relevant to employment; working effectively within an organization; planning of pharmacy services and resources; safety in the work environment will be discussed throughout the course different chapters. Pharmaceutical Marketing covering functions of pharmaceutical marketing department, selling, transport, distribution, storage and order system, principles of promotion. This prepares future pharmacy practitioners with the fundamentals of analytical and decision-making skills to create basic marketing strategies.</p> <p>Prerequisites: 1104240.</p>		

1104364	Pharmaceutical Pharmacoeconomics	2-0:2
<p>The course will describe the basic concepts in Pharmacoeconomics and its use in clinical decision making. The different types of Pharmacoeconomics analysis and its use in medical literatures. The appraisal of Pharmacoeconomics literature and the appropriate interpretation of its results will be also covered.</p> <p>Prerequisites: 1104240.</p>		

1104368	Introductory Pharmacy Placement I (IPP-I)	0-6:2
<p>Students will shadow a registered pharmacist to understand the role of community pharmacist in primary care.</p> <p>Prerequisites: 1104359.</p>		

1102470	Integrated Pharmacology & Therapeutics III	3-0:3
<p>The student will cover the pathophysiology, pharmacology, and therapeutics of immunological, joint and bone disorders, and gastrointestinal diseases. The topics covered in this course systemic Lupus Erythematosus, Drug Allergy, solid organ transplantation, gout and hyperuricemia, osteoarthritis, rheumatoid arthritis, and osteoporosis. For gastrointestinal: cirrhosis, GERD, peptic ulcer, diarrhea, constipation, IBD, and Nausea and vomiting.</p> <p>Prerequisites: 1102240</p>		

1103479	Immunology and Vaccination	2-0:2
<p>This course introduces students to the concepts of immunology and their relation to diseases and therapy. Types of vaccines and their mechanism of action. Vaccination related therapeutic implications and pharmaceutical care.</p> <p>Prerequisites: 1102230</p>		

1104470	Pharmacy Skills III	0-3:1
<p>This course is designed to develop and practice clinical skills necessary to solve problems related to supplying patients with cost-effective and safe treatment through discussion of clinical cases of patients suffering from immune, bone and joint, and gastrointestinal diseases/disorders. Through. Students will learn through this course how to interpret patient's laboratory data pertinent to these diseases and patient's medical history data. In addition, the course will involve developing students' ability of problem solving and using analytical thinking skills in pharmacy practice. This is through using problem solving techniques and effective utilization of available resources.</p> <p>Prerequisites: 1104360 Co-requisite: 1102470</p>		

1103470	Biopharmaceutics & Pharmacokinetics	2-3:3
<p>This course introduces students to the concepts of pharmacokinetics and biopharmaceutics. The course covers the structure of membranes and drug movement across membranes, distribution and absorption mechanisms and formulation factors affecting physiological outcomes in terms of bioavailability and drug product selection. The pharmacokinetics topics covered in this course include pharmacokinetics of intravenous and extravascular administrations; compartmental PK modelling; multiple dosing kinetics; hepatic and renal clearance; and bioequivalence.</p> <p>Prerequisites: 1103350</p>		

1104479	Pharmacy Ethics & Law	2-0:2
<p>The purpose of this course is to introduce pharmaceutical law and principles of ethics in pharmacy. The course covers the UAE federal law and regulations related to medical products and pharmacy profession and their impact on the practice of pharmacy. In the law section, the students will learn the legislative framework which pharmacy is practiced, as well as acquire an understanding of the laws, regulations, and the ethical responsibilities applicable to pharmacists so that they will be able to protect the public and ensure patients' well-being. It also covers the laws and regulations that control importing, exporting, storing, handling, promoting, and manufacturing of pharmaceutical products. In the ethics part, the course covers many topics in pharmacy practice such as ethical principles and ethical dilemma in pharmacy practice, code of ethics for pharmacists, professionalism, and major ethical problems in the pharmacy practice and the appropriate interventions.</p> <p>Prerequisites: 1104369.</p>		

1104478	Pharmacy Communication Skills	1-3:2
<p>The course is designed to develop and enhance students' oral communication skills (listening, speaking, questioning, and presentation) and written communication skills that are essential for the implementation of pharmaceutical care. The course aims at providing students with tools and techniques for effective interpersonal communication with introducing students to main components of communication (verbal and nonverbal). It also provides the student with professional communication skills needed to improve and utilize their skills to deal with patients in diverse pharmacy practice settings in everyday encounters. In addition, it will cover professional communications including the inter- and intra-professional communication. Moreover, the students will learn the communication skills required to provide telepharmacy services.</p> <p>Prerequisites: 1104369.</p>		

1104477	Introductory Pharmacy Placement II (IPP-II)	0-9:3
<p>Students will shadow and help a registered pharmacist to dispense OTC medications to patients in community pharmacy setting.</p> <p>Prerequisites: 1104368</p>		

1102480	Integrated Pharmacology & Therapeutics IV	3-0:3
<p>The relationship between pathophysiology, pharmacology and therapeutics of hematological disorders and oncological disorders. Hematological disorders including anemias. Oncology pharmacotherapy and the different types of tumors (solid and non-solid tumors) and their treatment protocols.</p> <p>Prerequisites: 1102240</p> <p>Co- or Pre-requisites: 1102489.</p>		

1102489	Toxicology & Drug Poisoning	3-0:3
<p>Topics covered in this course are the type and nature of the toxic materials, factors affecting toxicity, effects of toxic substances on different systems of the body and their mechanism of action and how these effects are produced, the clinical symptoms of toxicity by different chemicals and drugs, the laboratory investigations required for diagnosis of toxicity, the pharmacology of available general and specific antidotes, the general lines of treatment of toxicity. Moreover, some clinical cases of poisoning with different agents will be discussed with the students including symptoms, investigations needed and management plan.</p> <p>Prerequisites: 1102240</p>		

1104480	Pharmacy Skill IV	0-3:1
<p>This course is designed to develop and practice the clinical skills needed to solve problems in patients with hematological and oncological disorders by providing safe and cost-effective treatment. During this course, students will learn how to collect medical history data and interpret patient laboratory data related to these disorders. In addition, the students will practice providing education and counseling for patients with hematological and oncological disorders. This course also includes cases related clinical toxicology, drug poisoning and pharmacology simulation labs of patients/cases suffering from various illnesses pertaining to drug poisoning and toxicology. In addition, the course will involve developing students' ability of problem solving and using analytical thinking skills in pharmacy practice. This is through using problem solving techniques and effective utilization of available resources.</p> <p>Co- or Pre-requisites: 1102489, 1102480</p>		

1103480	Pharmaceutical Biotechnology and Gene Therapy	3-0:3
<p>Pharmaceutical biotechnology introduces the students to basic concepts, theories, and principles of biotechnology to produce therapeutic and diagnostic agents. Students will learn about various cellular and molecular biotechnology techniques such as recombinant DNA technology, polymerase chain reaction and related biotechnological processes as well as the method used in formulation and characterization of biopharmaceuticals. The recent application of biotechnology especially in treatment of infectious disease, hormone replacement therapy, immunological products, gene therapy and cell-based therapy will be discussed to increase the knowledge and expertise of pharmacy students in the development, application, and therapeutic use of 'biotech' drugs.</p> <p>Prerequisites: 1103470</p>		

1104489	Clinical Drug Literature Evaluation	1-3:2
<p>The course will describe the hierarchy and the level of evidence. How to critically appraise the literature clinical and statistically. The important parts of the literature and the importance of selecting appropriate study design. The course will also the philosophy of research, research question, research subjects, variables, sample size, exclusion/inclusion criteria, and different research methods (cohort studies, surveys, case studies, case-control studies, and randomized clinical trials etc.). The use of appropriate statistical test to analyze the results of the literature.</p> <p>Prerequisites:.1104240</p>		

1101480	Phytotherapy	2-3:3
<p>The aim of this course is to provide Pharmacy students with a descriptive knowledge of locally and internationally registered drugs from natural sources and alternative medicines used for diseases and disorder of various body systems including the cardiovascular, nervous, respiratory, GI, renal, endocrine, dermatological and musculoskeletal systems. Pharmacological properties, therapeutic uses, method and duration of use, drug interactions, and adverse effects will be covered. This course also includes practical hands-on preparations and tutorial discussion of clinical cases and suggested use of phytotherapy and alternative medicine regimen.</p> <p>Prerequisites: 1102240</p>		

1104488	Introductory Pharmacy Placement III (IPP III)	0-9:3
<p>Students will shadow and help a registered pharmacist to dispense OTC and prescription medications and counsel the patients in community pharmacy setting.</p> <p>Prerequisites: 1104477</p>		

1104590	Global Health and Health Policy in Pharmacy	2-0:2
<p>The course is intended to introduce the pharmacy students for the area of global health and international health policy. It will focus on a role of pharmacist as a healthcare professional at the global level by go in-depth in global pharmacy practice and other health professional interests through covering the following topics: the burden and distribution of disease and mortality, history and current diseases and health care problems worldwide, the determinants of global health disparities, the making of global health policies, and the outcomes of global health interventions. In addition, it covers the knowledge and skills needed to develop of tomorrow's pharmacists at local and global levels. The course also introduces the students to the environmental, social, political, and economic factors that shape patterns and experiences of illness and healthcare across societies.</p> <p>Prerequisites: 1104479</p>		

1101591	Drug Development and Innovation	2-0:2
<p>This course covers the early stages of drug development process. It includes innovative stages of drug discovery and development, and the reasons for continuous need of new drugs. Success and failure stories in drug discovery and development are taught to emphasize on importance of drug discovery and lead optimization processes for fixing the physicochemical and biopharmaceutical issues. Furthermore, importance of primary and secondary literature & patents for innovation, IND, NDA, ANDA, and CTD, market authorization approvals from different countries will be also discussed. The opportunities and challenges associated with the creation and management of entrepreneurial pharmaceutical startup and pharmacy</p>		

facility will be discussed. The course provides new ideas related to pharmaceutical products or services with the basic understanding of the processes used to translate new pharmaceutical technologies and inventions into marketable innovations and new pharmaceutical ventures. The course also provides an overview of pharmaceutical business concepts, including topics such as: theories of entrepreneurship, types and characteristics of entrepreneurship, entrepreneurial economics, accounting and financial management, intellectual properties, drug life cycle, marketing research and planning, and use of technology.

Prerequisites: Offered only to 4th and 5th Year students.

1104598	Informatics in Pharmacy	0-3:1
<p>The course will introduce the concept of informatics as they pertain to Pharmacy practice including managing medication-related information, electronic health records, pharmacy information systems, and automated systems. The course introduces the concept of automation and the use of artificial intelligence in pharmacy and how this can affect the medication dispensing pathway and improve the patient safety. Topics covered include Knowledge Management in Health Systems, computerized provider order entry, electronic prescribing in both inpatient and outpatient settings, electronic medication administration records, barcoded medication, administration, and smart pumps, management, and optimization of pharmacy automation in hospital setting, informatics for pediatrics and blockchain technology in pharmacy.</p>		
<p>Prerequisites: 1104489</p>		

1104597	Clinical Pharmacokinetics	0-3:1
<p>This course introduces students to the practical aspects of clinical pharmacokinetic (therapeutic drug monitoring) using simulation clinical cases. Clinical pharmacokinetics calculations, drug dosing for special population (renal and hepatic diseases, dialysis, and heart failure). Each session will deal with cases related to certain drug/s including antibiotics, cardiovascular agents, anticonvulsants, immunosuppressants, lithium, theophylline etc.</p>		
<p>Co- or Pre-requisites: 1103470</p>		

1104599	Simulation Pharmacy (Practical)	0-3:1
<p>This course will include practical skills required for pharmacists in clinical pharmacy. Through clinical cases and role-play, the students will practice communication with patients and healthcare professionals, while using medical data related to therapeutic treatment. In addition, this course includes Interprofessional collaborative practice with students from other medical colleges such as medicine and health sciences. Objective Structured Clinical Examination (OSCE) will be used in this course as part of student's</p>		

assessment. The course involves using simulating programs such Med+Safe, and MyDispense.

Prerequisites: 1104470

1100599	Graduation Project	3-0:3
<p>This course provides the students with skills needed to deal with a scientific problem and how to solve it (or write a review article with updated information about a specific problem). It consists of a literature review, the proper use of equipment and instruments, performing an experiment that deals with the research topic, analyzing the data obtained from the experiments, writing the dissertation and presenting a seminar about the work which is evaluated by faculty members.</p> <p>Prerequisites: Completion of 131 credit hours.</p>		

1103590	Drug Delivery Systems	3-0:3
<p>The course covers topics related to novel drug delivery systems. The course focuses on the novel aspects in drug formulation designs and administrations such as controlled drug delivery by different routes of administration such as per oral, parenteral, transdermal, vaginal, ocular, and pre-gastric routes. The course also covers novel approaches for the development of novel delivery systems such as nano and microencapsulation, liposomes, and resealed erythrocytes for the targeted delivery of small and large molecules.</p> <p>Prerequisites: 1103470</p>		

1104596	Pharmacogenomics and Personalized Medicine	2-0:2
<p>Introduction of the theory and concepts of pharmacogenomics and personalized medicine for professional pharmacy students. The applications of pharmacogenomics knowledge into pharmacy practice and comprehensive pharmaceutical care.</p> <p>Prerequisites: 1102480.</p>		

1104501	Professional Experiential Placement A	0-12:4
<p>This training course should provide B. pharm students a structured, supervised program of participation in the practice of pharmacy. Students gain experience in problem solving and providing patient care services while applying the basic and pharmaceutical sciences learned in the classroom and practice laboratories. Under the supervision of faculty and selected preceptors, the student learns to make decisions based on professional knowledge and judgment. Broad exposure to as many pharmacy activities as possible, as well as significant personal study and reflection, facilitate this transition.</p> <p>Prerequisites: 1104488 Co-requisites: 1104502, 1104503, 1104504.</p>		

1104502	Professional Experiential Placement B	0-12:4
<p>This training course should provide B. pharm students a structured, supervised program of participation in the practice of pharmacy. Students gain experience in problem solving and providing patient care services while applying the basic and pharmaceutical sciences learned in the classroom and practice laboratories. Under the supervision of faculty and selected preceptors, the student learns to make decisions based on professional knowledge and judgment. Broad exposure to as many pharmacy activities as possible, as well as significant personal study and reflection, facilitate this transition.</p> <p>Prerequisites: 1104488. Co-requisites: 1104501, 1104503, 1104504.</p>		

1104503	Professional Experiential Placement C	0-12:4
<p>This training course should provide B. pharm students a structured, supervised program of participation in the practice of pharmacy. Students gain experience in problem solving and providing patient care services while applying the basic and pharmaceutical sciences learned in the classroom and practice laboratories. Under the supervision of faculty and selected preceptors, the student learns to make decisions based on professional knowledge and judgment. Broad exposure to as many pharmacy activities as possible, as well as significant personal study and reflection, facilitate this transition.</p> <p>Prerequisites: 1104488 Co-requisites: 1104501, 1104502, 1104504</p>		

1104504	Professional Experiential Placement D	0-12:4
<p>This training course should provide B. pharm students a structured, supervised program of participation in the practice of pharmacy. Students gain experience in problem solving and providing patient care services while applying the basic and pharmaceutical sciences learned in the classroom and practice laboratories. Under the supervision of faculty and selected preceptors, the student learns to make decisions based on professional knowledge and judgment. Broad exposure to as many pharmacy activities as possible, as well as significant personal study and reflection, facilitate this transition.</p> <p>Prerequisites: 1104488. Co-requisites: 1104501, 1104502, 1104503</p>		

Special Topics in Pharmacy

1101590	Artificial Intelligence in Drug Discovery	3-0:3
<p>This course introduces students to new approaches of drug discovery. The course addresses the molecular modeling tools that are used in drug discovery and design with the emphasis on the application of computational software to simulate different bioprocesses, which include creating and modifying starting structures for computation, visualizing protein-ligand interactions, docking to determine Protein-Ligand poses (activity scoring), ligand-based virtual screening, combining modeling and experimental data for SAR development, quantitative structure-activity relationship (QSAR) analysis, <i>de novo</i> drug design, <i>in silico</i> evaluation of absorption, distribution, metabolism, excretion and toxicity (ADME/T) properties, and Drug Discovery Case Studies.</p> <p>Prerequisites: Completion of 131 credit hours.</p>		

1101599	Forensic Pharmacognosy & Plant Poisoning	3-0:3
<p>The course is designed to provide the student with the basic knowledge about different chemical classes of natural medicines/ toxins and their botanical sources. Furthermore, it will provide the students with brief methods of production, pharmacological activities and abuse. This also includes methods of extraction, characterization, and detection either <i>ex vivo</i> from medicinal plants or as pure chemicals. The course also aims at providing the pharmacy students with sufficient knowledge concerning the investigation of a crime scene and intoxication caused by natural toxins. In addition, methods related to examination and identification of the collected evidence are provided, real-life applications will be discussed.</p> <p>Prerequisites: Completion of 131 credit hours.</p>		

1103599	Cosmetics and Parapharmaceuticals	3-0:3
<p>The course is designed to provide the students with the knowledge of the science and technology of cosmetic and personal care products. Theoretical lectures focus on the cosmetic ingredients and active substances and the technology used in formulation and characterization of cosmetic products. Cosmetic GMP standards and requirements for optimal and sustainable quality control and management will be also covered as the quality and safety of these products used in our daily routine is essential for human safety.</p> <p>Prerequisites: Completion of 131 credit hours.</p>		

1103595	Regulatory Affairs and Drug Registration	3-0:3
<p>This course will cover fundamentals and concepts of regulation of pharmaceuticals prevailing in different countries. The course will introduce major international and local regulatory agencies like FDA, EMA, and MOHAP and their regulatory roles. The course will focus on the different types of applications including IND, NDA, ANDA, and CTD to obtain market authorization approvals from different countries. Regulations and requirements for non-clinical studies, clinical trials, submission and review processes, and current good manufacture practice (cGMP) will be discussed.</p> <p>Prerequisites: Completion of 131 credit hours.</p>		

1104595	Parenteral Nutrition	3-0:3
<p>This course covers concepts in parenteral nutrition. The importance of feeding routes & feeding methods and nutritional support, enteral nutrition, parenteral nutrition, indications for uses & contraindication. This course also will introduce the role of enteral formulas leading to better health outcomes and improved quality of life. The course focuses on the advantages of enteral feeding over parenteral feeding. It also provides students with the knowledge needed to complete some nutritional calculations and reduce and managing complications of nutritional support, enteral nutrition, and parenteral nutrition.</p> <p>Prerequisites: Completion of 131 credit hours.</p>		
