Undergraduate Catalogue 2014

Faculty of

PHARMACY

Faculty Administration

Dean	Prof. Abdalla El-Lakany
Assistant Dean	Dr. Lama Soubra
Faculty Secretary	Pharmacist Hanadi Jazi

Academic Staff

Professors	Dr. Abdalla El Lakany, Dr. Maha Aboul Ela, Dr. Hoda El Maradny, Dr. Azza Ghazi, Dr. Hania Nakkash.
Associate Professors	Dr. Amal Galal, Dr. Asser Ghoneim, Dr. Khaled Abdel Galil
Assistant Professors	Dr. Doaa Issa, Dr. Karim Raafat, Dr. Lama Soubra, Dr. Mohammad Issa, Dr. Mohammad Mehanna, Dr. Suzanne Nasser.
Lecturers	Dr. Thuraya Domiati, Dr. Dima Rahmeh, Pharmacist May Saab, Pharmacist Mohammad Ali Hijazi, Pharmacist Marwa Al Jamal, Pharmacist Safaa Hammoud.
Part-time Lecturers	Dr. Olfat Osta, Dr. Katia Iskandar, Pharmacist Rabih Hassouneh, Pharmacist Bassam Hneiny.

History

The Faculty of Pharmacy at Beirut Arab University was established in 1986, in Beirut, the capital of Lebanon. The undergraduate program at the Faculty of Pharmacy started with six scientific departments and progressed to include another four scientific departments, as follows:

1. Pharmaceutical Sciences
2. Pharmacology and Therapeutics
3. Pharmacy Practice
4. Pharmaceutical Technology

The Faculty of Pharmacy has observed considerable growth in the number of its students that increased from a total of 115 in 1991 to a total of 475 in the academic year 2014-2015. The main objective of the Faculty is to prepare competent pharmacists for career opportunities in different pharmacy domains and promote their role as healthcare providers, within the frame of the code of ethics.

In 2002, the Faculty expanded its curriculum to incorporate postgraduate programs including Master and PhD Degrees, in addition to the two-year Pharm. D program.

Since its establishment, the Faculty had adopted the extended academic year system, and in 1999 it moved to the two academic terms scheme. In 2002, the Faculty updated the academic programs and adopted the rules and regulations of the credit hour system.

The implementation of the "Experiential Training" program for Pharmacy students was achieved in the academic year 2009-2010, and it became an integral part of the curriculum aiming to allow students acquire the required skills and competencies.

In the academic year 2009-2010, a Pharm. D program (One-year duration) was established and at the same time Pharmacotherapeutics I and II were added to the fifth level elective courses, in order to raise the number of the Pharmacotherapeutics courses in the "Clinical Pharmacy" modules.

In the academic year 2010-2011, the addition of four faculty elective courses, pharmacotherapeutics III-VI, was accomplished as a step forward to enable students to enroll in the Pharm. D. program.
In the year 2011-2012, pharmacotherapeutics I-VI became core courses, and two faculty elective courses, "Pharmaceutical Marketing and Management" and "Communication Skills For Health Professionals", were added to the curriculum.

Moreover, the Faculty established the "Pharmaceutical Continuing Education Program" which includes short courses, seminars and presentations in the various pharmaceutical fields that offer graduates and the community a venue for maintaining up-to-date knowledge.

The Canadian Council for Accreditation of Pharmacy Programs (CCAPP) conducted a pre-accreditation site visit to the Faculty of Pharmacy from the 7th till the 10th of May 2012, for the accreditation of the Pharmacy Program at BAU. The Faculty modified its curriculum as follows:

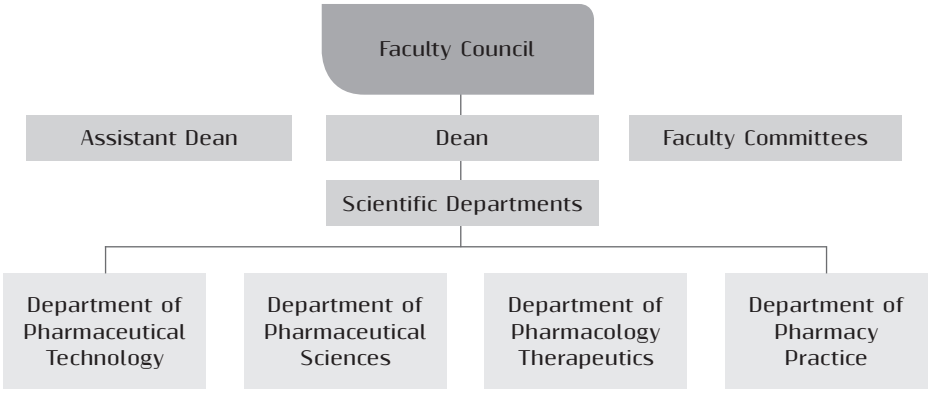
In the academic year 2012-2013, the Faculty of Pharmacy established a Pharmacy Practice Department that offers courses specifically designed to achieve the Canadian Professional Competencies for pharmacists upon entry to practice. The courses offered at early levels (Professional Communication Skills, Pharmacy Practice Management, Pharmacy Practice One, Pharmaceutical Calculations) serve as a solid foundation for the subsequent courses offered at higher levels. The Pharmacy practice courses are interspersed in the faculty curriculum in concordance with other relevant courses (Biochemistry, Pharmacology, Therapeutics and Pharmaceutics) to achieve optimal learning outcomes.

Moreover, a series of Integrated Case-Based Learning (ICBL) courses in addition to an Interprofessional Education (IPE) course were included to promote pharmaceutical care practice as well as inter-professional collaborative patient-centered practice.

Moreover, the faculty applies new assessment methodologies including OSCE and OSPE.

Organizational Structure

The Faculty of Pharmacy constitutes the following Departments: Pharmaceutical Technology, Pharmaceutical Sciences, Pharmacology and Therapeutics, and Pharmacy Practice.
The organizational chart of the Faculty is as follows:



Vision

The Faculty of Pharmacy, at BAU, envisions itself as a premier academic institution in pharmacy education, research and community involvement.

Mission

The Faculty of Pharmacy, at BAU, is an academic institution founded in 1986 to provide high quality pharmacy education and scientific research. The Faculty educational program was designed and developed to prepare competent pharmacists able to effectively participate in the advancement of the pharmacy profession, nationally and internationally. The Faculty supports the role of its graduates as health care providers in the frame of professional ethics. The Faculty seeks to establish a well-built relation with peer institutions and the surrounding society. To accomplish its mission, the Faculty relies on qualified staff members, laboratory facilities and educational tools.

Objectives

- Preparing pharmacists who are able to apply their unique knowledge and skills during their professional practice, and are committed to the code of ethics, and dedicated to life-long learning.
- Continuous development of the curriculum to keep up with the global changes and to cope with the growing professional and community needs.
- Enhancing the intended outcomes and competencies necessary to attain the international

standards of the pharmacy profession.
- Advancement of professional training programs for pharmacy students and graduates to maintain high quality pharmaceutical care.
- Enhancement of the scientific research at the Faculty and supporting the collaboration with local and international peer institutions.
- Providing the community with research experts capable of effective participation in the advancement and preservation of the environment.
- Supporting the collaboration with regulatory authorities, pharmaceutical and health care settings, and other community sectors.

Academic Program

The Faculty offers a Bachelor Degree "B.Sc. in Pharmacy", where the standard duration of study is ten semesters.

Admission Requirements

To be accepted for an undergraduate degree, applicants must:
- Hold the official Lebanese Secondary School Certificate in a branch relevant to the chosen undergraduate field of specialization, or an official equivalent;
- Successfully pass an Entrance Exam to measure the level of Proficiency in **English Language, an aptitude test (thinking skills, scientific knowledge: Biology, Physics and Chemistry), as well as attend a Personal Interview.**

Learning Outcomes

The pharmacy program provides opportunities for students to develop and demonstrate fundamental knowledge and understanding skills, supported by other professional and practical skills appropriate for attaining a Bachelor Degree in Pharmacy.

After completing the academic program all graduates will be able to:

- Practice Pharmaceutical Care
- Assume ethical, legal, and professional responsibilities
- Access, retrieve, evaluate and disseminate relevant information
- Communicate and educate effectively
- Manage drug distribution
- Apply practice management knowledge and skills
- Demonstrate the ability to work in a pharmaceutical plant
- Practice rational distribution and manufacturing of drugs from natural sources

Career Opportunities

The diversity of pharmacy domains is one of its chief strengths, and in diversity lies the opportunity. In Lebanon, the vast majority of pharmacists practice in the community, pharmaceutical industries or hospital pharmacies. The remainder follow one or another of the special fields. The opportunity for success in any of these fields is wide open for men and women with ability, education and imagination.

Career opportunities for pharmacy graduates are:

Community pharmacists, Hospital pharmacists, Health care centers, Pharmaceutical industry, Pharmaceutical promotion, Academia, Regulatory affairs, Clinical Pharmacy settings, Pharmaceutical public sector, International organizations, Military/governmental hospitals.

Graduation Requirements

To receive a Bachelor Degree in the Pharmacy program, a student must satisfactorily complete 180 credit hours with an overall minimum grade point average (GPA) of 2.0 + ICDL (International Computer Driving License). The **Student's Study Plan** is given to every Pharmacy student upon his/her enrollment. The following table summarizes the number of credits required for each bachelor-granting program at the Faculty:

Program	*University Requirements + ICDL		Program Requirements		Total Credit Hours
	Mandator Courses	Elective Courses	Major Core Courses	Free and Major Elective Courses	
PHAR	**5**	**9**	- Basic Sciences Courses: **20** - Professional courses (Pharmaceutical Courses, Medical Courses, Pharmacy Practice): **140** **Total: 160**	**6**	**180**
PHAR: Pharmacy					

* A total of 14 credits is required as General University Requirements; 5 credits are selected from the University Mandatory courses list including: ARAB 001 (2Cr.), ENGL 001 (2Cr.), BLAW 001 (1Cr.) and another 9 credits are selected from the University Elective courses list + ICDL.

Major Core Courses

Courses			crs.	Pre/Co-requisites
PHAR	131	Pharmaceutical Physical Chemistry	2	
PHAR	132	Introduction to Pharmacognosy	3	
PHAR	133	Pharmaceutical Organic Chemistry I	3	
PHAR	134	Human Biology	2	
PHAR	135	Anatomy and Histology	3	
PHAR	136	Pharmaceutical Analytical Chemistry I	3	
PHAR	137	Pharmacognosy I	3	Pre: PHAR 132
PHAR	138	Pharmaceutical Organic Chemistry II	3	Pre: PHAR 133
PHAR	139	Physiology I	2	
PHAR	140	Pharmacy Practice Management	1	
PHAR	141	Professional Communication Skills In Pharmacy Practice	2	
PHAR	142	Pharmacy Practice Experience I	2	Pre: PHAR 140 PHAR141
PHAR	231	Pharmaceutical Analytical Chemistry II	3	Pre: PHAR 136
PHAR	232	Introduction to Pharmaceutics	2	
PHAR	233	Pharmacognosy II	3	Pre: PHAR 137
PHAR	234	Pharmaceutical Organic Chemistry III	3	Pre: PHAR 138
PHAR	235	Physiology II	2	Pre: PHAR 139
PHAR	236	Pharmacy Practice I	2	Pre: PHAR 141
PHAR	237	Pharmaceutical Analytical Chemistry III	2	Pre: PHAR 231
PHAR	238	Physical Pharmacy	3	Pre: PHAR 232
PHAR	239	Modern Separation and Isolation Techniques	2	Pre: PHAR 233
PHAR	240	Pharmaceutical Microbiology I	3	Pre: PHAR 134
PHAR	241	Biochemistry I	3	Pre: PHAR 234 PHAR 235
PHAR	242	Pharmaceutical Calculations	2	
PHAR	243	Pharmacy Practice Experience II	4	Pre: PHAR 233, PHAR 236, PHAR 238
PHAR	331	Pharmaceutics	3	Pre: PHAR 238
PHAR	332	Pharmaceutical Microbiology II	3	Pre: PHAR 240
PHAR	333	Medicinal Chemistry I	3	Pre: PHAR 234, PHAR 237

PHAR	334	Biochemistry II	3	Pre: PHAR 241
PHAR	335	Basic Pharmacology	2	Pre: PHAR 241
PHAR	336	Instrumental Analysis	2	Pre: PHAR 237
PHAR	337	Pharmacy Practice II	2	Pre: PHAR 141
PHAR	338	Drug Delivery Systems	3	Pre: PHAR 331
PHAR	339	Medical Microbiology	2	Pre: PHAR 332
PHAR	340	Medicinal Chemistry II	3	Pre: PHAR 333
PHAR	341	Pharmacology I	1	Pre: PHAR 335
PHAR	342	Pharmacotherapeutics I	2	Co-req.: PHAR 341
PHAR	343	Intergrated Case-Based Learning (ICBL) I	2	Co-req.: PHAR 342
PHAR	344	Pharmacy Practice Experience III	6	Pre: PHAR 343, PHAR 338
PHAR	431	Biopharmaceutics	2	Pre: PHAR 338
PHAR	432	Phytochemistry I	2	Pre: PHAR 239, PHAR 234
PHAR	433	Medicinal Chemistry III	3	Pre: PHAR 333
PHAR	434	Pharmacology II	1	Pre: PHAR 335
PHAR	435	Pharmacotherapeutics II	2	Pre: PHAR 434
PHAR	436	Pharmacy Practice III	2	Pre: PHAR 337, Co-req.: PHAR 437
PHAR	437	Integrated Case-Based Learning (ICBL) II	2	Pre: PHAR 435, PHAR 436
PHAR	438	Pharmaceutical Manufacturing	3	Pre: PHAR 338
PHAR	439	Phytochemistry II	3	Pre: PHAR 432
PHAR	440	Pharmacology III	1	Pre: PHAR 335
PHAR	441	Pharmacotherapeutics III	2	Pre: PHAR 339, PHAR 440
PHAR	442	Pharmacotherapeutics IV	2	Co-req: PHAR 440
PHAR	443	Pharmacy Practice IV	2	Pre: PHAR 141
PHAR	444	Integrated Case-Based Learning (ICBL) III	2	Co-req: PHAR 441, PHAR 442
PHAR	445	Pharmacy Practice Experience IV	6	Pre: PHAR 437, PHAR 443, PHAR 444
PHAR	536	Public Health	1	Pre: PHAR 339
PHAR	537	Pharmacokinetics	2	Pre: PHAR 431
PHAR	538	Pharmacology IV	1	Pre: PHAR 335
PHAR	539	Pharmacotherapeutics V	2	Co-req: PHAR 538

PHAR	540 541	Pharmacy Practice Experience V Pharmacy Practice Experience VI	6	Pre: PHAR 445
PHAR	542	Inter Professional Education (IPE)	1	Pre: PHAR 445
PHAR	543	Toxicology	3	Pre: PHAR 434, PHAR 538
PHAR	544	Pharmacology V	1	Pre: PHAR 335
PHAR	545	Pharmacotherapeutics VI	2	Pre: PHAR 544
PHAR	546	Pharmaceutical Legislations	1	Pre: PHAR 236
PHAR	540 541	Pharmacy Practice Experience V Pharmacy Practice Experience VI	6	Pre: PHAR 445

Description of Major Core Courses

PHAR 131 PHARMACEUTICAL PHYSICAL CHEMISTRY (2Cr.:2Lec):
Introduction, binding forces, states of matter (gas, liquid, solid and mesophase); solutions of non-electrolytes and their colligative properties; osmolality and tonicity, theory of strong electrolytes, ideal and real solutions, thermodynamics; dynamic equilibrium and catalysis, and chemical kinetics.

PHAR 132 INTRODUCTION TO PHARMACOGNOSY (3Cr.:2Lec,2Lab):
Full insights into the history of pharmacognosy, importance of medicinal plants in the body's heath care systems, morphology and histological characteristics, patient centered, primary and bioactive secondary metabolites, and the medicinal values of some common plants.

PHAR 133 PHARMACEUTICAL ORGANIC CHEMISTRY I (3Cr.:2Lec,2Lab):
Introductory concepts followed by stereochemistry and its effect on drug receptor interaction. Physical and chemical characters of alkanes, unsaturated compounds, alkyl halides, alcohols, ethers and their application in pharmaceutical industry. Basic knowledge about the phenomena of aromaticity.

PHAR 134 HUMAN BIOLOGY (2Cr.:2Lec):
Study of science and the scientific method, characteristics of life, metabolism and energy, macromolecules, prokaryotic and eukaryotic cells, cell membrane and organelles, cell division, unity and diversity of living forms, genetic basis of inheritance, Mendelian genetics, exceptions and deviations, and male and female reproductive systems.

PHAR 135 ANATOMY AND HISTOLOGY (3Cr.:2Lec,2Lab):
Skeleton and joints, cardiovascular system, respiratory system, digestive system urogenital system, CNS and endocrine system. The cell, epithelium, connective tissue proper, blood, cartilage, muscular tissue, nervous tissue, the lymphatic system and the digestive tract.

PHAR 136 PHARMACEUTICAL ANALYTICAL CHEMISTRY I (3Cr.:2Lec,2Lab):
Atomic structure and periodicity, solubility product, complexation reactions, qualitative analysis of certain pharmaceutical inorganic salts and their mixtures.

PHAR 137 PHARMACOGNOSY I (3Cr.:2Lec,2Lab):
Important official drugs derived from flowers, leaves, herbs, barks. Active constituents, medicinal uses and qualitative chemical tests. Diagnostic macro- and microscopic characteristics, detection of adulteration. Patient care, possible drug-herbs interactions, contraindications, side effects to provide medication-related care that improve patients quality life.
Pre-req: PHAR 132.

PHAR 138 PHARMACEUTICAL ORGANIC CHEMISTRY II (3Cr:2Lec,2Lab):
Basic knowledge of the different organic functional groups including aldehydes, ketones, carboxylic acids and their derivatives, nitrogenous compounds, phenols, alicyclic compounds and their application in basic synthetic methods used in pharmaceutical industry. Pre-req: PHAR 133

PHAR 139 PHYSIOLOGY I (2Cr.:2Lec):
Introduction to physiology, Blood, Autonomic nervous system, Excitable system, and Endocrine system.

PHAR 140 PHARMACY PRACTICE MANAGEMENT (1Cr.:1Lec):
Selected basic principles and skills required for effective management in various settings of pharmacy practice, including human and financial resources management, strategic and operations planning, managing professional productivity and work systems, entrepreneurship, purchasing and inventory control.

PHAR 141 PROFESSIONAL COMMUNICATION SKILLS IN PHARMACY PRACTICE (2Cr.: 1Lec, 2Lab.):
The course is designed to develop and enhance students' different communication skills (listening, questioning and presentation) essential for the implementation of pharmaceutical care, selection of effective tools and techniques for effective interpersonal communication. The course also aims at introducing the students to the basic components of communication (verbal, nonverbal and paraverbal).

PHAR 142 PHARMACY PRACTICE EXPERIENCE I (2cr.:90 Contact Hours):
This experiential course is conducted in a community practice settings as well as other practice settings. Through active participation in day to day services, students will have the opportunity to apply knowledge and skills previously introduced in courses relevant to the experience. Pre-req: PHAR140, PHAR141.

PHAR 231 PHARMACEUTICAL ANALYTICAL CHEMISTRY II: (3Cr.:2Lec,2Lab):
Principles of basic and pharmaceutical analytical chemistry such as fundamentals of acid-base, complexation and precipitimetric titrations as well as the gravimetric analysis, and explaining the application of these principles in the pharmaceutical analysis of drug substances. Pre-req: PHAR 136.

PHAR 232 INTRODUCTION TO PHARMACEUTICS (2Cr:1Lec,2Lab):
Introduction to the science of pharmaceutics and the pharmacist role as a health care provider and a medication therapy expert, the principles of different pharmaceutical techniques. Different routes of drug administration, pharmaceutical and medical terminology, in addition to the basic skills required for compounding liquid dosage forms and their patient counseling tips.

PHAR 233 PHARMACOGNOSY II (3Cr:2Lec,2Lab):
Sedatives, anti-inflammatory, antioxidants and other drugs derived from fruits, seeds and subterranean organs. Diagnostic macro- and microscopic characteristics. Active constituents, medicinal uses and qualitative chemical tests. Unorganized drugs, medicinal uses, herbal remedies and patient counseling, surgical dressings and sutures. Misuse of herbs, interactions, contraindications and the role of pharmacist in pharmaceutical care. Pre-req: PHAR 137.

PHAR 234 PHARMACEUTICAL ORGANIC CHEMISTRY III (3Cr:2Lec,2Lab):
Knowledge of natural molecules such as carbohydrates, amino acids, peptides and proteins, specialized knowledge of polynuclear hydrocarbons, heterocyclic chemistry and their applicability in the field of synthesis of medicinal drugs, in addition to adequate knowledge of different spectroscopic techniques. Pre-req: PHAR 138.

PHAR 235 PHYSIOLOGY II (2Cr.:2Lec):
The physiology of cardiovascular system, gastrointestinal system, respiratory systems, renal system and central nervous system. Pre-req: PHAR 139.

PHAR 236 PHARMACY PRACTICE I (2Cr:1Lec,2Lab):
The course introduces students to the various aspects and dimensions of the pharmacy profession. Emphasis is placed on history of pharmacy profession, ethical, legal and professional standards. Through interactive sessions and case scenarios, students will be able to develop their critical thinking and decision-making skills. Pre-req: PHAR 141.

PHAR 237 PHARMACEUTICAL ANALYTICAL CHEMISTRY III (2Cr.:1Lec,2Lab):
Principles of basic and pharmaceutical analytical chemistry such as fundamentals of oxidation-reduction and electrochemical techniques appropriate for the modern chemical analysis laboratory. Application of these principles in the pharmaceutical analysis of drug substances. Pre-req: PHAR 231.

PHAR 238 PHYSICAL PHARMACY (3Cr.:2Lec,2Lab):
Introduction to the various applications of physical chemistry in the pharmacy domains, the concepts of use of solubilizers, co-solvents, surface active agents and suspending agents for proper design and formulation of safe, efficient, stable and patient-acceptable poly-phasic drug delivery systems in addition to their patient counseling guidelines. Pre-req: PHAR 232.

PHAR 239 MODERN SEPARATION AND ISOLATION TECHNIQUES (2Cr.:1Lec,2Lab):
Full insights of the main chromatographic types and the latest techniques of separation of chemical constituents from their natural sources. Practicing quality control of herbs and gaining knowledge of herbal preparations and phytopharmaceuticals, production of active constituents from medicinal plants, spectroscopic identification of some classes of bioactive natural products. Pre-req: PHAR 233.

PHAR 240 PHARMACEUTICAL MICROBIOLOGY I (3Cr.:2Lec,2Lab):
General microbiology. Sterilization of pharmaceuticals; methods of sterilization, validation of sterilization methods, and sterility testing. Mechanism of microbial resistance, and chemotherapeutic agents. Pre-req: PHAR 134.

PHAR 241 BIOCHEMISTRY I (3Cr.:2Lec,2Lab):
Definition of biochemistry, biomolecules and metabolism; enzymes: classification, kinetics, regulation of enzyme activity, co-enzymes (water-soluble vitamins). Bioenergetics and the role of ATP; The citric acid cycle (Krebs cycle); the electron transport chain. Carbohydrates: structure; digestion, absorption, metabolism: glycolysis, gluconeogenesis, pentose phosphate pathway, catabolism of fructose and galactose, glycogen metabolism; energy metabolism in the well-fed state, fasting and diabetes mellitus. Pre-req: PHAR 234, PHAR 235.

PHAR 242 PHARMACEUTICAL CALCULATIONS (2Cr.:2Lec) :
Measuring systems and inter-systems conversions, ratio and proportion, dosing calculation, reducing and enlarging formulas, dilution and concentration, specific gravity and density and other relevant topics.

PHAR 243 PHARMACY PRACTICE EXPERIENCE II (4Cr.:180 Contact Hours):
This experiential course is conducted in a community practice settings as well as other practice settings. Through active participation in day to day services, students will have the opportunity to apply knowledge and skills previously introduced in courses relevant to the experience. Pre-req: PHAR 233, PHAR 236, PHAR 238.

PHAR 331 PHARMACEUTICS (3Cr.:2Lec,2Lab):
Formulation and quality control aspects of tablets, capsules, suppositories, parenterals, ophthalmic, and semisolid products. Pre-req: PHAR 238.

PHAR 332 PHARMACEUTICAL MICROBIOLOGY II (3Cr.:2Lec,2Lab):
A survey of the immune system and immune response with special emphasis on vaccine development. Evaluation of disinfectants and antiseptics. Pharmaceutical industrial microbiology . Microbial genetics and advanced DNA technology in drug discovery. Pre-req: PHAR 240.

PHAR 333 MEDICINAL CHEMISTRY I (3Cr.:2Lec,2Lab):
Fundamentals of medicinal chemistry and an introduction to the physiochemical properties of drugs relative to their biological effects. Chemical and biochemical aspects of certain drug categories including: Drugs affecting neurotransmission (cholinergic agonists and antagonists, adrenergic agonist and antagonists, serotonin receptor drugs), local anesthetics, drugs used to treat respiratory tract disorders, gastrointestinal drugs and drugs used to treat neuromuscular disorders. Satisfactory awareness with the chemistry of antibiotics, antibacterial sulfonamides, quinolones, antimycobacterial agents is also undertaken. Pre-req: PHAR 234, PHAR 237.

PHAR 334 BIOCHEMISTRY II (3Cr.:2Lec,2Lab):
Lipids: classification, digestion and absorption; lipid transport and storage. Fatty acids: de-novo synthesis and β-oxidation; cholesterol and the fat-soluble vitamins. Protein structure and function; fate of the amino group nitrogen (Urea cycle); fate of the carbon skeleton of amino acids; conversion of amino acids to specialized products. Informational biomolecules (nucleotides), nucleic acid structure and function, protein synthesis and the genetic code. Pre-req: PHAR 241.

PHAR 335 BASIC PHARMACOLOGY (2Cr.:1Lec, 3Lab):
Pharmacokinetic and pharmacodynamic principles of drugs, signal transduction and receptor types. The Basic knowledge of the mode of action, pharmacokinetics, side effects, drug interactions and uses of Drugs acting on the Autonomic Nervous System. Cholinergic and Adrenergic Agonists and Antagonists. The practical use of different animal models, both in vivo and in vitro, for the identification of the site and the mechanism of action of drugs. Pre-req: PHAR 241. Pre-req: PHAR 141.

PHAR 336 INSTRUMENTAL ANALYSIS (2Cr.:1Lec,2Lab):
The theoretical aspects of spectrophotometry, spectrofluorimetry and atomic spectrometric analytical techniques. and applications in the analysis of different pharmaceutical drug substances. Pre-req: PHAR 237.

PHAR 337 PHARMACY PRACTICE II (2Cr.:1Lec,2Lab):
The course introduces students the basic principles and components of pharmaceutical care and drug information resources. Emphasis is also placed on relevant communication skills that are essential for building relationships with patients and other health care providers. Through a combination of lectures, laboratory simulations, patient case scenarios and individual work, students will be able to develop their drug information skills as well as skills required to gather patient information. Pre-req: PHAR 141

PHAR 338 DRUG DELIVERY SYSTEMS (3Cr.:2Lec,2Lab):
Principle of design and formulation problems encountered with the different types of dosage forms, and modified release drug delivery systems.
Pre-req: PHAR 331.

PHAR 339 MEDICAL MICROBIOLOGY (2Cr.:1Lec,2Lab):
The etiology, pathogenesis, clinical picture, epidemiology, treatment with emphasis on prevention and control of common infectious diseases caused by bacteria, fungi, parasites and viruses. Implementation of the clinical guidelines in the diagnosis of infectious diseases.Pre-req: PHAR 332.

PHAR 340 MEDICINAL CHEMISTRY II (3Cr.:2Lec,2Lab):
Chemical and biological aspects of certain drugs including: Drugs used to treat pain, inflammation and arthritis, opioid analgesics and antagonists, drugs affecting the immune system (antihistamines, H2-receptor antagonists), steroids and related drugs, calcium homeostasis. Antiparasites, antifungal and antiinfective agents are likewise included. Pre-req: PHAR 333

PHAR 341 PHARMACOLOGY I (ICr.:1Lec):
The basic knowledge and understandings of the mode of action, pharmacokinetics, side effects, drug interactions and uses of Drugs Acting on the Respiratory System and the Gastrointestinal System. Autacoids including eicosanoids, histamine, serotonin and the Autacoid Antagonists including the Non-Steroidal Anti-Inflammatory Drugs. Pre-req: PHAR 335.

PHAR 342 PHARMACOTHERAPEUTICS I (2Cr.:2Lec):
The epidemiology, etiology, pathophysiology, relevant laboratory data, signs and symptoms, treatment options and guidelines of the following disorders:
Respiratory disorders: Asthma, Chronic Obstructive Pulmonary Disease. Gastrointestinal disorders: Peptic Ulcer disease, Gastro-oesophageal Reflux Disease, Inflammatory Bowel Disease, Liver Diseases, Nausea, Vomiting, Diarrhea and Constipation. Bone and joint disorders: Osteoporosis, Rheumatoid Arthritis, Osteoarthritis, Gout and Hyperuricemia. Ophthalmologic disorders. Co-req: PHAR 341.

PHAR 343 INTIGRATED CASE-BASED LEARNING (ICBL) I (2Cr.):
This course is designed to enable students to integrate and apply concepts from pathophysiology, pharmacology, clinical biochemistry, and therapeutics to selected patient case scenarios. While using the pharmaceutical care model, students will develop skills in critical appraisal, patient assessment, and clinical problem-solving. Team skills are also developed as students will work in small groups during case preparation and discussion. Emphasis is put on health promotion and disease management. Selected Topics are: Asthma, COPD, Peptic Ulcer (H.Pylori), Gastro-Esophageal Reflux Disorder, Nausea /Vomiting, Diarrhea, Constipation, Osteoarthritis/ Rheumatoid arthritis, Osteoporosis. Co-req: PHAR 342.

PHAR 344 PHARMACY PRACTICE EXPERIENCE III (6Cr.:270 Contact Hours):
This experiential course is conducted in a community practice settings as well as other practice settings. Through active participation in day to day services, students will have the opportunity to apply knowledge and skills previously introduced in courses relevant to the experience. Pre-req: PHAR 343, PHAR 338.

PHAR 431 BIOPHARMACEUTICS (2Cr.:1Lec, Lab):
Factors affecting the performance of various drug dosage forms in vitro and in vivo, the impact of route of administration, formulation, physicochemical and biological factors on the drug release and bioavailability of pharmaceutical products. Pre-req: PHAR 338.

PHAR432 PHYTOCHEMISTRY I (2Cr.:1Lec,2Lab):
Classes of bioactive constituents from natural sources (carbohydrates, glycosides, essential oils, and miscellaneous natural products), definition, classification, preparation, molecular structure, stability in extracts and interactions with other ingredients in pharmaceutical preparations, physical and chemical characteristics, pharmacological effects, SAR, and methods of quantification. Pre-req: PHAR 239, PHAR 234.

PHAR 433 MEDICINAL CHEMISTRY III (3Cr.:2Lec,2Lab):
Chemical and biological attributes governing the properties of some drug categories including: Drugs acting on CNS (depressants and stimulants), cardiovascular drugs, diuretics, insulin and oral hypoglycemics, thyroid drugs. The chemotherapeutic characteristics of antineoplastic, antiviral, and diagnostic agents are reasonably discussed in relevance to drug development. Pre-req: PHAR 333.

PHAR434 PHARMACOLOGY II (1Cr.:1Lec):
The basic knowledge and understandings of the mode of action, pharmacokinetics, side effects, drug interactions and uses of Drugs Acting on the Cardiovascular-Renal System, including Blood Drugs. Pre-req: PHAR 335.

PHAR435 PHARMACOTHERAPEUTICS II (2Cr.:2Lec):
The epidemiology, etiology, pathophysiology, relevant laboratory data, signs and symptoms, treatment options and guidelines of the following disorders:
Cardiovascular disorders: Hypertension, Dyslipidemia, Ischemic Heart Disease, Heart Failure, Arrhythmias, Thromboembolism, Stroke. Hematologic diseases: Anemias, Hematopoiesis, Coagulation Disorders. Renal disorders: Acute Renal Failure, Chronic Kidney Disease, Electrolyte and Acid-Base Disorders. Urologic disorders: Erectile Dysfunction, Management of Benign Prostatic Hyperplasia, Urinary Incontinence. Co-req: PHAR 434.

PHAR436 PHARMACY PRACTICE III (2Cr.:1Lec,2Lab):
The course explores the various aspects and dimensions of professional practice. These include the pharmaceutical care process, health promotion and collaboration with other health care providers. The course will also focus on the use of evidence-based approach when making clinical decisions about patient medications. Through a combination of lectures, laboratory simulations, patient case scenarios and individual work, students will be able to develop their knowledge, skills and attitudes required to practice pharmaceutical care in different settings. Pre-req: PHAR 337 , Co-req: PHAR 437.

PHAR437 INTIGRATED CASE-BASED LEARNING (ICBL) II (2Cr.:):
This course is designed to enable students to integrate and apply concepts from pathophysiology, pharmacology, clinical biochemistry, and therapeutics to selected patient case scenarios. While using the pharmaceutical care model, students will develop skills in critical appraisal, patient assessment, and clinical problem-solving. Team skills are also developed as students will work in small groups during case preparation and discussion. Emphasis is put on health promotion and disease management. Selected Topics are: Hypertension, Dyslipidemia, Acute Coronary Syndrome, Heart failure, Atrial fibrillation, Venous Thromboembolism, Renal Failure, Benign prostatic, hyperplasia. Co-req: PHAR 435, PHAR 436.

PHAR438 PHARMACEUTICAL MANUFACTURING (3Cr.:2Lec,2Lab):
Basic unit operations and their applications in pharmaceutical industry (drying, mixing, size reduction, filtration, centrifugation and emulsification), manufacturing techniques and equipment used in the production of pharmaceuticals (granules, tablets, tablets coating, capsules, creams, ointments and suppositories), and aerosol components. Pre-req: PHAR 338.

PHAR439 PHYTOCHEMISTRY II (3Cr.:2Lec,2Lab):
Study of medicinal plant alkaloids, chromones and coumarins, extraction, separation and quantitation, stability in pharmaceutical preparations, structure activity relationship of bioactive compounds, tissue culture and cell suspension techniques and application for production of bioactive natural products. Pre-req: PHAR432.

PHAR440 PHARMACOLOGY III (1Cr.:1Lec):
The basic knowledge and understandings of the mode of action, pharmacokinetics, side effects, drug interactions and uses of Antimicrobial Drugs, in addition to, the Drugs Affecting the Endocrine System. Pre-req: PHAR 335.

PHAR441 PHARMACOTHERAPEUTICS III (2Cr.:2Lec):
The epidemiology, etiology, pathophysiology, relevant laboratory data, signs and symptoms, treatment options and guidelines of the following Infectious Diseases: Central Nervous System Infections, Upper Respiratory Tract Infections, Lower Respiratory Tract Infections, Skin and Soft-Tissue Infections, Tuberculosis, Endocarditis, Intra-abdominal Infections, Urinary Tract Infections and Prostatitis, Sexually Transmitted Diseases, Sepsis and Septic Shock, Surgical Prophylaxis, Superficial Fungal Infections and Invasive Fungal Infections, Viral infections, Human Immunodeficiency Virus Infection, Parasitic Diseases.
Pre-req: PHAR 339, Co-req: PHAR 440.

PHAR442 PHARMACOTHERAPEUTICS IV (2Cr.:2Lec):
Epidemiology, etiology, pathophysiology, relevant laboratory data, signs and symptoms, treatment options and guidelines of the following areas:
Endocrinologic disorders: Diabetes Mellitus, Thyroid Disorders, Adrenal Gland Disorders. Gynecologic and Obstetric Disorders: Pregnancy and Lactation, Contraception, Menstruation-Related Disorders. Co-req: PHAR 440.

PHAR443 PHARMACY PRACTICE IV (2Cr.:1Lec,2Lab):
The course further explores the various aspects and dimensions of professional practice. The course covers drug distribution process, patient self-care therapeutics (OTC) and patient counseling. Through a combination of lectures, laboratory simulations, patient case scenarios and individual work, students will be able to develop their knowledge, skills and attitudes required to practice in different settings. Pre-req: PHAR 141.

PHAR444 INTIGRATED CASE-BASED LEARNING (ICBL) III (2Cr.:):
This course is designed to enable students to integrate and apply concepts from pathophysiology, pharmacology, clinical biochemistry, and therapeutics to selected patient case scenarios. While using the pharmaceutical care model, students will develop skills in critical appraisal, patient assessment, and clinical problem-solving. Team skills are also developed as students will work in small groups during case preparation and discussion. Emphasis is put on health promotion and disease management. Selected topics are: CAP, UTI Meningitis, Diabetic foot ulcer, Otitis Media, Pharyngitis, Abdominal infection, Superficial fungal infections, Sepsis/septic shock. Co-req: PHAR 441, PHAR 442.

PHAR 445 PHARMACY PRACTICE EXPERIENCE IV (6Cr.:270 Contact Hours):
This experiential course is conducted in a community practice settings as well as other practice settings. Through active participation in day to day services, students will have the opportunity to apply knowledge and skills previously introduced in courses relevant to the experience. Pre-req: PHAR 437, PHAR 443, PHAR 444.

PHAR536 PUBLIC HEALTH (1Cr:1Lec):
Protecting and improving the health of community, preventative medicine, health education, control of communicable diseases, application of sanitary measures, and monitoring of environmental hazards. Pre-req: PHAR 339.

PHAR537 PHARMACOKINETICS (2Cr.:2Lec):
Application of compartmental models to determine various pharmacokinetic parameters including; absorption, distribution, apparent volume of distribution and elimination, following single and multiple IV and oral doses, fundamental pharmacokinetic principles and quantitative relationships are used to individualized dosage regimens, the study of bioavailability and bioequivalence testing. Pre-req: PHAR431.

PHAR538 PHARMACOLOGY IV (1Cr.:1Lec):
The basic knowledge and understandings of the mode of action, pharmacokinetics, side effects, drug interactions and uses of Drugs Acting on the CNS, including antidepressant, antipsychotic, anticonvulsant drugs, anxiolytics and hypnotics, antiepileptic drugs and drugs for Parkinsonism, CNS stimulants, general and local anesthetics. Pre-req: PHAR 335.

PHAR539 PHARMACOTHERAPEUTICS V (2Cr.:2Lec):
Epidemiology, etiology, pathophysiology, relevant laboratory data, signs and symptoms, treatment options and guidelines of the following areas:
Neurologic disorders: Epilepsy and Status Epilepticus, Parkinson's Disease, Pain Management and Headache Disorders. Psychiatric disorders: Childhood Disorders, Eating Disorders, Alzheimer's, Schizophrenia, Depressive Disorders, Anxiety and Sleep Disorders, Substance-Related Disorders. Co-req: PHAR 538.

PHAR 540 PHARMACY PRACTICE EXPERIENCE V (6Cr., 270 Contact Hours):
This course is conducted in an in-patient care settings and other practice settings. Through active participation in day to day services, students will have the opportunity to apply knowledge and skills previously introduced in courses relevant to the experience. Pre-req: PHAR445.

PHAR 541 PHARMACY PRACTICE EXPERIENCE VI (6Cr., 270 Contact Hours):
This experiential course is conducted in a community practice settings as well as other practice settings. Through active participation in day to day services, students will have the opportunity to apply knowledge and skills previously introduced in courses relevant to the experience. Pre-req: PHAR445.

PHAR542 INTER PROFESSIONAL EDUCATION (IPE) (1Cr.:1Lec):
This course is designed to provide health professional students with the knowledge, skills and attitudes necessary for collaborative interprofessional practice. Through interprofessional discussions of patient cases and projects, students will gain interprofessional collaborative competencies. Emphasis is put on team building, conflict resolution and role clarification as well as ethical principles. Students will have the chance to reflect upon their learning through written reports. Pre-req: PHAR 445.

PHAR 543 TOXICOLOGY (2Cr.:2Lec):
Concepts of general and clinical toxicology, toxicology of prescription and non-prescription medications, substances of abuse, common environmental and food toxins and toxicants, and the toxic responses of different organs. Pre-req: PHAR 434, PHAR538.

PHAR 544 PHARMACOLOGY V (1Cr.:1Lec):
The basic knowledge and understandings of the mode of action, pharmacokinetics, side effects, drug interactions and uses of Anticancer Drugs and Immunosuppressants. Pre-req: PHAR335.

PHAR 545 PHARMACOTHERAPEUTICS VI (2Cr.:2Lec):
Epidemiology, etiology, pathophysiology, relevant laboratory data, signs and symptoms, treatment options and guidelines of the following areas:
Oncologic disorders: Cancer Treatment and Chemotherapy, Breast Cancer, Lung Cancer, Colorectal Cancer, Prostate Cancer, Ovarian Cancer, Lymphomas, Leukemias, Myeloma. Immunologic disorders: Systemic Lupus Erythematosus, Allergic Drug Reactions, Organ Transplantation. Dermatologic disorders: Psoriasis, Drug-induced skin reactions, Dermatitis. Co-req: PHAR544.

PHAR 546 PHARMACEUTICAL LEGISLATIONS (1Cr.:1Lec.):
Lebanese laws and legislations that control the pharmacy profession as essential elements of good pharmacy practice. Pre-req: PHAR 236.

Major Elective Courses

Courses		crs.	Pro/Co-requisites
PHAR 564	Pharmaceutical Biotechnology and Genetic Engineering	2	Pre: PHAR 334, PHAR 240
PHAR 565	Pharmaceutical Industry and GMP	3	Pre: PHAR 438
PHAR 566	Natural Dietary Supplements and Health Products	2	Pre: PHAR 233
PHAR 567	Recent Approaches In Phytotherapy	2	Pre: PHAR 239
PHAR 568	Drug Design	2	Pre: PHAR 340, PHAR 433
PHAR 569	Microbiological Quality Control	2	Pre: PHAR 332
PHAR 570	Physicochemical Quality Control	2	Pre: PHAR 336
PHAR 571	Pharmacoeconomics	2	
PHAR 572	Project and Seminar	2	
PHAR 573	Introduction to Biostatistics	1	
PHAR 574	Direct Reading and Research	1	
PHAR 575	Hospital Pharmacy	3	
PHAR 576	Pharmaceutical Marketing	2	

Description of Major Elective Courses

PHAR 564 PHARMACEUTICAL BIOTECHNOLOGY AND GENETIC ENGINEERING (Cr.:2Lec):
Basis of genetic engineering and DNA cloning, applications of recombinant DNA technology. An introduction to the development of proteins and peptide, vaccines and other drug produced by biotechnological techniques involving cell culture and molecular biology. Biotechnology; safety, social, and ethical considerations. Pre-req: PHAR 334, PHAR 240.

PHAR 565 PHARMACEUTICAL INDUSTRY AND GMP (3Cr.:2Lec,2Lab.):
Principles of QA/QC and GMP of pharmaceuticals, pharmaceutical process validation, basic knowledge of pharmaceutical layout , principal manufacturing techniques of pellets, microencapsulation, parenterals and aerosols, some selected unit operations (heat flow, evaporation, crystallization, extraction). Pre-req: PHAR 438.

PHAR 566 NATURAL DIETARY SUPPLEMENTS AND HEALTH PRODUCTS (2Cr.:2Lec):
Chemistry, classification, distribution, pharmaceutical and clinical use of Natural Dietary Supplements and Health Products, possible interactions with other drugs, self-medication, restrictions before use, national and international regulations, public awareness and role of pharmacists. Pre-req: PHAR 233.

PHAR 567 RECENT APPROACHES IN PHYTOTHERAPY (2Cr.:2Lec):
Recent trends in use, application, clinical significance of new discovered drugs from natural origin. Strategies to discover new bioactive compounds from plants with a selection of in vitro and in vivo test systems essential for active principles. Pre-req: PHAR 239.

PHAR 568 DRUG DESIGN (2Cr.:2Lec):
Introduction to the fundamentals of drug design and computer aided drug design. Selected topics in medicinal chemistry, the subject matter being drawn from the current literature. Pre-req: PHAR 340, PHAR433.

PHAR 569 MICROBIOLOGICAL QUALITY CONTROL (2Cr.:1Lec,2Lab):
Analytical procedures performed on pharmaceutical product in order to test for conformity to specifications of microbiological quality. Such quality control procedures are “destructive tests” and are hence applied to a “sample” of a batch, presumed to represent the entire batch. Pre-req: PHAR 332.

PHAR 570 PHYSICOCHEMICAL QUALITY CONTROL (2Cr.:1Lec,2Lab):
Control charts, methods assessment and selection, types of error, quality control of chemical drugs and bio-products, monographs (chemical) from recent pharmacopoeia. Pre-req: PHAR 337.

PHAR 571 PHARMACOECONOMICS (2Cr.:2Lec):
Economical aspects of the pharmaceutical sector including: introduction to economic analysis, financial aspects of drug utilization, assessment models, the economics of the development of new drugs, and economic models of the pharmacist labor market, improving the health management system, the role of the government in monitoring the performance of the pharmaceutical market and resources allocation.

PHAR 572 PROJECT AND SEMINAR (2Cr.:2Lec).

PHAR 573 INTRODUCTION TO BIOSTATISTICS (1Cr.:1Lec):
Principles of statistical methods for pharmacists, types of data, collection, presentation, organization, analysis and interpretation of numerical and categorical data, measures of central tendency and dispersion of data, confidence interval, hypothesis testing for parametric and non-parametric data, correlation analysis and simple linear regression, statistical techniques, application of biostatistics principles to cases encompassing drug design, drug effects and clinical trials.

PHAR 574 DIRECT READING AND RESEARCH (1Cr.:1Lec):
This course is based on assignments which reflect the interest of both the student and the tutor in a research area aiming to formulate an original research project.

PHAR 575 HOSPITAL PHARMACY (3Cr.:2Lec,3Lab):
Principles of different Pharmaceutical technical services implemented in hospitals including, preparation of IV admixtures and TPN, handling of cytotoxic and radioactive products. Identification and correction of irrational prescription and causes of medication errors. The administrative role of pharmacists in hospital (knowledge related to hospital pharmacist activities).

PHAR 576 PHARMACEUTICAL MARKETING (2Cr.:2L):
Marketing management, Analysis of Marketing opportunities, developing market strategies, shaping the market offering, Managing and delivering marketing programs, Lebanese Pharmaceutical Market.

Study Plan

Bachelor Degree (B.Sc.) in Pharmacy (180 Credits)

First Semester (17 Credits)			Crs.	Pre-/co-requisites
PHAR	131	Pharmaceutical Physical Chemistry	2	
PHAR	132	Introduction to Pharmacognosy	3	
PHAR	133	Pharmaceutical Organic Chemistry I	3	
PHAR	134	Human Biology	2	
PHAR	135	Anatomy and Histology	3	
		Elective (General)[1]	4	

Second Semester (18 Credits)			Crs.	Pre-/co-requisites
PHAR	136	Pharmaceutical Analytical Chemistry I	3	
PHAR	137	Pharmacognosy I	3	Pre: PHAR 132
PHAR	138	Pharmaceutical Organic Chemistry II	3	Pre: PHAR 133
PHAR	139	Physiology I	2	
PHAR	140	Pharmacy Practice Management	1	
PHAR	141	Professional Communication Skills in Pharmacy Practice	2	
		Elective (General)[1]	4	

Summer (2 Credits)

PHAR	142	Pharmacy Practice Experience I	2	Pre: PHAR 141

Third Semester (18 Credits)			Crs.	Pre-/co-requisites
PHAR	231	Pharmaceutical Analytical Chemistry II	3	Pre: PHAR 136
PHAR	232	Introduction to Pharmaceutics	2	
PHAR	233	Pharmacognosy II	3	Pre: PHAR 137
PHAR	234	Pharmaceutical Organic Chemistry III	3	Pre: PHAR 138
PHAR	235	Physiology II	2	Pre: PHAR 139
PHAR	236	Pharmacy Practice I	2	Pre: PHAR 141
		Elective (General)[1]	3	

Fourth Semester (18 Credits)			Crs.	Pre-/co-requisites
PHAR	237	Pharmaceutical Analytical Chemistry III	2	Pre: PHAR 231
PHAR	238	Physical Pharmacy	3	Pre: PHAR 232
PHAR	239	Modern Separation and Isolation Techniques	2	Pre: PHAR 233
PHAR	240	Pharmaceutical Microbiology I	3	Pre: PHAR 134
PHAR	241	Biochemistry I	3	Pre: PHAR 234, PHAR 235
PHAR	242	Pharmaceutical Calculations	2	
		Elective (General)[1]	3	

Summer (4 Credits)

PHAR	243	Pharmacy Practice Experience II	4	Pre: PHAR 233 PHAR 236 PHAR 238

Fifth Semester (16 Credits)			Crs.	Pre-/co-requisites
PHAR	331	Pharmaceutics	3	Pre: PHAR 238
PHAR	332	Pharmaceutical Microbiology II	3	Pre: PHAR 240
PHAR	333	Medicinal Chemistry I	3	Pre: PHAR 234 PHAR 237
PHAR	334	Biochemistry II	3	Pre: PHAR 241
PHAR	335	Basic Pharmacology	2	Pre: PHAR 241
PHAR	336	Instrumental Analysis	2	Pre: PHAR 237
PHAR				

Sixth Semester (15 Credits)			Crs.	Pre-/co-requisites
PHAR	337	Pharmacy Practice II	2	Pre: PHAR 141
PHAR	338	Drug Delivery Systems	3	Pre: PHAR 331
PHAR	339	Medical Microbiology	2	Pre: PHAR 332
PHAR	340	Medicinal Chemistry II	3	Pre: PHAR 333
PHAR	341	Pharmacology I	1	Pre: PHAR 335
PHAR	342	Pharmacotherapeutics I	2	Co-req: PHAR 341
PHAR	343	Integrated Case-Based Learning (ICBL) [1]	2	Co-Pre: PHAR 342

Summer (6 Credits)

PHAR	343	Pharmacy Practice Experience III	6	Pre: PHAR 343 PHAR 338

Seventh Semester (14 Credits)			Crs.	Pre-/co-requisites
PHAR	431	Biopharmaceutics	2	Pre: PHAR 338
PHAR	432	Phytochemistry I	2	Pre: PHAR 239 PHAR 234
PHAR	433	Medicinal Chemistry III	3	Pre: PHAR 333
PHAR	434	Pharmacology II	1	Pre: PHAR 335
PHAR	435	Pharmacotherapeutics II	2	Pre: PHAR 434
PHAR	436	Pharmacy Practice III	2	Pre: PHAR 337 Co-req: PHAR 437
PHAR	437	Integrated Case-Based Learning (ICBL) II	2	Co-req: PHAR 435 PHAR 236

Eighth Semester (15 Credits)			Crs.	Pre-/co-requisites
PHAR	438	Pharmaceutical Manufacturing	3	Pre: PHAR 338
PHAR	439	Phytochemistry II	3	Pre: PHAR 432
PHAR	440	Pharmacology III	1	Pre: PHAR 335
PHAR	441	Pharmacotherapeutics III	2	Pre: PHAR 339 Co-req: PHAR 440
PHAR	442	Pharmacotherapeutics IV	2	Co-req: PHAR 440
PHAR	443	Pharmacy Practice IV	2	Pre: PHAR 141
PHAR	444	Integrated Case-Based Learning (ICBL) III	2	Co-req: PHAR 441 PHAR 442

Summer (6 Credits)

PHAR	445	Pharmacy Practice Experience IV	6	Pre: PHAR 437 PHAR 443 PHAR 444

Ninth Semester (16 Credits)			Crs.	Pre-/co-requisites
PHAR	536	Public Health	1	Pre: PHAR 339
PHAR	537	Pharmacokinetics	2	Pre: PHAR 431
PHAR	538	Pharmacology IV	1	Pre: PHAR 335
PHAR	539	Pharmacotherapeutics V	2	Co-req: PHAR 538
PHAR PHAR	540 541	Pharmacy Practice Experience V Pharmacy Practice Experience VI	6	Pre: PHAR 445
PHAR	542	Inter Professional Education (IPE)	1	Pre: PHAR 445
		Elective[2]	3	

Tenth Semester (15 Credits)			Crs.	Pre-/co-requisites
PHAR	543	Toxicology	2	Pre: PHAR 434 PHAR 538
PHAR	544	Pharmacology V	1	Pre: PHAR 335
PHAR	545	Pharmacotherapeutics VI	2	Pre: PHAR 544
PHAR	546	Pharmaceutical Legislations	1	Pre: PHAR 236
PHAR PHAR	540 541	Pharmacy Practice Experience V Pharmacy Practice Experience VI	6	
		Elective[2]	3	Pre: PHAR 445

1) A total of 14 credits is required as general University requirements; 5 credits are University mandatory courses which are: ARAB 001 (2Cr.), ENGL 001 (2Cr.) and BLAW 001 (1Cr.), and another 9 credits which are to be selected from the University Elective course list + ICDL.

- The list of University Requirement courses and their descriptions are presented in the introductory pages of this catalogue.

2 To be selected from the Faculty Elective Courses list offered by the Faculty, which is subject to change according to the number of students enrolled in the elective course.