

ISTINYE UNIVERSITY
FACULTY OF PHARMACY
DEPARTMENT OF PHARMACY
COURSE DESCRIPTIONS

1st SEMESTER

PHAR111 Mathematics (203)

Within the framework of Calculus, the students have fundamental mathematical concepts and mathematical skills in order to be able to analyze and to make necessary calculations the events of single degree of freedom.

PHAR112 Physics and Biophysics (213)

This course will focus on the physical quantities, unit systems, measurement, chaotic theory, forces, weight, biomechanics, compressive and tensile forces, stress and strain, shear force, biomechanical properties of the bone, movement system, muscle and joint biomechanics, bioenergetics and thermodynamic laws, energy flow in living organisms, diffusion, osmosis and membrane transport systems, electricity, bioelectric potentials, action potentials, Bernoulli and Poiseuille Laws, fluid mechanics, viscosity, circulation dynamics, body pumping systems, surface tension, respiratory dynamics, optics, hearing and vision mechanisms.

PHAR113 General Chemistry (213)

At the completion of General Chemistry, the students develop the basic knowledge and ability of comprehension of the core concepts of general chemistry. The students will have developed a set of fundamental skills that can be applied to various chemical situations. They will be able to identify the essential parts of a problem and formulate a strategy for solving the chemical problem. They will be able to estimate the solution to a problem, apply appropriate techniques to arrive at a solution, test the correctness of their solution, interpret their results.

PHAR114 Biology, Molecular Biology and Genetics (213)

This course covers cell and functions of organelles, the characteristics and functions of chromosomes, DNA and RNA, Mendelian genetics, transcription and its control, the genetic code and protein synthesis, post-translational modifications, mitosis and meiosis, cell cycle phases and checkpoints, DNA replication, relationship between mutations and DNA repair mechanisms, cell death and its mechanisms, stem cells and their importance, the immune system's mechanism and regulation.

PHAR115 First-Aid and Basic Medical Skills (112)

This course is designed to help students avoid life-threatening situations by lifting life-threatening dangers, maintaining vital functions, preventing worsening of the patient's condition, facilitating healing, saving lives, or deteriorating the condition until helped by health workers and also it includes non-medicinal applications with existing tools and equipment, without seeking medical equipment with the aim of preventing the situation from getting worse.

PHAR116 Problem Solving, Research Techniques and Writing Skills (112)

Pharmacists must be able to use very effectively problem solving, research techniques and writing skills especially for the benefit of patients.

PHAR117 History of Pharmacy and Pharmacy Today (112)

After completion of pharmacy course, students learn the reasons for the emergence of their profession with the development of early ages in their lifetime. Departing from the concept of physicianpharmacist, they learn the birth of the profession of pharmacy, and students understand the historical basic concepts of their jobs for the future. They pass through these acquisitions while practicing their profession. Students learn a wide range of information about the pharmacist's position in the healthcare sector and in the scientific world where the pharmaceutical industry develops rapidly.

PHAR118 Basics of Eight-star and Evidence Based Pharmacy (101)

To be effective healthcare team members, pharmacists need skills and abilities enabling them to assume many different functions. The concept of the "seven-star pharmacist" was introduced by WHO and adopted by FIP in 2000 in its policy statement on Good Pharmacy Education Practice to cover the roles of caregiver, decision-maker, communicator, manager, life-long learner, teacher and leader. The function of the pharmacist as a researcher has since been added and all these have been addressed in the competence standards as «Eight star pharmacist» (8*P). The pharmacist must make evidence based decisions and be able to use the evidence base (e.g., scientific, pharmacy practice, health system) effectively in order to advise on the rational use of medicines in the healthcare team.

ESP101 English for Specific Purposes I (404)

At the end of this course, students will read short and simple texts understand general information in simple everyday texts such as advertisements, manuals, menus and timelines, and understand short personal letters. They can use a number of phrases to describe his family and other people, their living conditions, their educational background, and their final job etc.

PHAR191 Graduation Project I (011)

In this course, students are given a research topic to work on throughout their 5-year education. Students are expected to complete their literature search, laboratory work, ideally publish their work in a scientific journal, and finally submit their research report before they graduate.

Foreign Language (Elective) (- - 6)

Pharmacy students taking this course are eligible to learn a foreign language, other than English, such as Spanish, Italian and French.

2nd SEMESTER

PHAR122 Physiology (203)

Introduction to physiology, homeostasis, cell and structure, cell potentials, skeletal physiology, smooth muscle physiology, blood physiology, cardiopulmonary physiology, coronary and peripheral circulation, peripheral nervous system, parasympathetic nervous system.

PHAR123 Biochemistry (203)

This course includes the structure and function of proteins and amino acids, evaluation of proteins and amino acids in biochemistry laboratory, bioenergetics and carbohydrate metabolism, lipid metabolism, evaluation of lipids in biochemistry laboratory, storage and expression of genetic information, nitrogen metabolism, integration of metabolism, vitamins, enzymes, minerals, body fluids, urine and their laboratory evaluation.

PHAR124 Microbiology and Immunology (203)

In this course students learn bacterial cell structure, classification of bacteria, bacterial growth, bacterial metabolism, normal body flora, bacterial pathogenesis, sterilization and disinfection, Gram positive bacterial infections, Gram negative bacterial infections, antibiotic susceptibility tests, fungal cell structure, fungal infections, and immunologic defence against bacterial and viral infections.

PHAR125 Basics of Community and Hospital Pharmacy (123)

Business management and communication techniques are aimed to teach to the pharmacy students. Students will learn their position as pharmacist within the distribution channel of the hospital. Students will know optimum human, material and money management.

PHAR126 Medical Communication Skills (112)

In this course, students will have the knowledge of professional communication, including gathering, organizing, conveying and documenting patient-related information. The courses emphasize a patientcentered approach to communication and cover social factors such as health literacy, barriers to communication and cultural competency and will develop professional behaviors and attitudes in pharmacy practice.

PHAR127 Anatomy (213)

This course gives general information about human anatomy, systematic anatomy, digestive system, circulation-excretion system, urogenital system, respiratory system and nervous system.

PHAR128 Histology (202)

This course gives general information about histological methods and microscopy, cytology, histology of connective tissue, bone, muscle and body systems.

ESP102 English for Specific Purposes II (404)

In this course, students will write short, simple notes and messages. He will write very short personal letters like a thank you note.and understand patterns associated with some topics and frequently used words. They also will understand the basic idea of short, clear, simple message and announcement.

PHAR192 Graduation Project II (011)

In this course, students are given a research topic to work on throughout their 5-year education. Students are expected to complete their literature search, laboratory work, ideally publish their work in a scientific journal, and finally submit their research report before they graduate.

Foreign Language Elective II (- - 6)

In this course students learn a foreign language other than English.

Summer Semester

PHAR131 Apprenticeship I (Community Pharmacy I) (0 160 5)

PHAR132 Apprenticeship II (Hospital Pharmacy I) (0 80 3)

3rd SEMESTER

PHAR211 Organic Chemistry (225)

At the completion of Organic Chemistry, the students will understand the classification, structure, nomenclature, reactions, reaction mechanisms, and synthesis of carbon compounds including halocarbons, alkenes, and alcohols. Students will demonstrate their understanding by solving problems about the knowledge and ability of their comprehension of the core concepts of organic chemistry. The students will have developed a set of fundamental skills that can be applied to various chemical situations. Students also use their chemical knowledge about organic chemistry on laboratory applications.

PHAR212 Analytical Chemistry I (225)

This course gives an introduction to analytical chemistry and an overview of important analytical methods and their range of application within detection of chemical compounds. Important analytical quantitative techniques from classical methods, electrochemical methods, spectrophotometric methods, and separation techniques are reviewed. The course gives an overview of important use of selected classical and instrumental chemical quantitative analytical methods and their basic theory.

PHAR213 Biostatistics (224)

At the end of this course the students will gain the knowledge about the pharmacoeconomics and evaluation processes of pharmacy in hospital pharmacy, to gain basic statistical notion in post pharmacy practice fields after graduation, to foresee statistical concepts to be encountered after pharmacy education and to gain knowledge to work in pharmacy production, license and clinical research units.) Students will learn the Basic Concepts and Definitions in Biostatistics, Descriptive Sample Statistics, Probability Theory and Chance Variables, Statistical Interpretation, Relations Between Variables, and concepts of Regression and Correlation.

PHAR214 Public Health and Epidemiology (214)

Definition and history of public health and epidemiology, the role of pharmacist in public health and epidemiology related services; basics and applications of clinical research and screening in communicable and non-communicable diseases; nutrition, exercise and environmental/infrastructural issues as determinants of public health; vaccination programs, occupational health; accidents and awareness programs.

Foreign Language (Elective) (- - 6)

Pharmacy students taking this course are eligible to learn a foreign language, other than English, such as Spanish, Italian and French.

PHAR291 Graduation Project III (011)

In this course, students are given a research topic to work on throughout their 5-year education. Students are expected to complete their literature search, laboratory work, ideally publish their work in a scientific journal, and finally submit their research report before they graduate.

ATA111 Atatürk's Principles and History of Turkish Revolution I (202)

This course gives the reasons leading to the collapse of the Ottoman Empire, the efforts to stop the collapse and the quest for reform, the reasons leading to World War I, the participation in the war and its consequences, the Mondros Armistice, the Societies, the beginning of the National Struggle.

TURK111 Turkish Language I (202)

The course aims at helping students improve their skill in written and oral narration, by teaching them features and rules of the language

ISU281 Manifest of Intinye I (011)

Activities to be held to improve the knowledge, skills and competencies of our students in fields such as art, sports, culture and social responsibility will be announced at the beginning of each semester. It is necessary for the student to actively participate in the announced schedule and to participate in more than half of the activities.

Foreign Language Elective III (- - 6)

In this course students learn a foreign language other than English.

4th SEMESTER

PHAR221 Physiopathology and Pathology (213)

This course includes general physiology, cell physiology, blood physiology, muscle physiology, membrane potentials and action potentials, sensory organs, nervous physiology, autonomic nervous system physiology, respiratory physiology, circulatory physiology, liver physiology, digestive and excretion physiology. Within the course of pathology, basic pathological concepts will be studied in order to understand pathological diagnoses and clinical information found in cell, tissue and organ damage mechanisms, structural changes and pathology reports.

PHAR222 Analytical Chemistry II (225)

This course gives an introduction to analytical chemistry and an overview of important analytical methods and their range of application within detection of chemical compounds. Important analytical quantitative techniques from classical methods, electrochemical methods, spectrophotometric methods, and separation techniques are reviewed. The course gives an overview of important use of selected classical and instrumental chemical quantitative analytical methods and their basic theory.

PHAR223 Clinical Biochemistry (225)

In this course, the definition of clinical biochemistry, regulation of glucose, cardiac damage indicators, cholesterol and triglyceride metabolism, hormone regulation and secretion mechanisms, clinical enzymes used in diagnosis of diseases, liver function tests, renal function tests, specific plasma proteins, tumor markers and hematological tests. The main function of clinical biochemistry applications is to ensure that patients are properly tested for the diagnosis and treatment. Within this course, the pharmacist candidates learn how to use and interpret biochemical tests with a pharmacist's point of view.

PHAR224 Clinical and Pharmaceutical Microbiology (225)

This course teaches students clinical and preclinical cases with the focus on bacterial and viral infection as well as the immune system in health and disease. At the end of the course, students are expected to have knowledge on virulence factors, bacterial as well as fungal infections, etc.

PHAR225 Pharmacokinetics and Pharmacodynamics (202)

This course is designed to introduce the student to mechanisms of drug action. This includes an understanding of: (1) the location of the site of drug action; (2) the cellular or molecular mechanism of drug action; (3) the relationship between dose-response functions and biologic action, and (4) the fate of drugs in the body.

PHAR226 The Basics of Drug Development (224)

This course will inform students on computational drug design and development methods, receptor-ligand interactions, functional groups used in the design of novel ligands, bioinformatics, computational pharmacogenomics, solubility of drugs (LogP)

PHAR292 Graduation Project IV (011)

In this course, students are given a research topic to work on throughout their 5-year education. Students are expected to complete their literature search, laboratory work, ideally publish their work in a scientific journal, and finally submit their research report before they graduate.

ATA121 Atatürk's Principles and History of Turkish Revolution II (202)

The other revolutions that effected Turkish revolution; The aim of Turkish revolution: Democratic Law State; Establishment of secular Turkish secular law system; Establishment of Turkish secular education system Reconstruction of Turkish economy, national economic and globalization; Novelties that made the Turkish society contemporary General quality of Kemalist principles and republicanism; Nationalism; Etatism and Populism; Secularism; Revolutionism; Criticisms against Kemalist ideology and answers to them.

TURK121 Turkish Language II (202)

The course aims at helping students improve their skill in written and oral narration, by teaching them features and rules of the language.

ISU282 Manifest of Istinye II (011)

Activities to be held to improve the knowledge, skills and competencies of our students in fields such as art, sports, culture and social responsibility will be announced at the beginning of each semester. It is necessary for the student to actively participate in the announced schedule and to participate in more than half of the activities.

Summer Semester

PHAR231 Apprenticeship III (Community Pharmacy II) (0 160 5)

PHAR232 Apprenticeship IV (Clinical Pharmacy I) (0 80 3)

5th SEMESTER

PHAR311 Pharmaceutical/Medicinal Chemistry I (235)

The Department of Medicinal Chemistry is part of the highly collaborative, interdisciplinary subdivision of the Professional Pharmacy Division of Pharmacy. In this course, students are thought a broad spectrum of medicinal chemistry topics including computer assisted drug discovery, anticancer drug development, synthesis and characterization of chemicals bioactive against cancer, neurodegenerative diseases, bacteria, fungi, viruses, etc. Drug-receptor interactions and personalized drug development issues are also thought in this course .

PHAR312 Pharmacology I (315)

The Department of Pharmacology is at the forefront of research into the effects of drugs and other molecules on biological systems with a view to understanding the mechanisms of the human body. Pre-clinical research in the Department aims to examine cellular and molecular pathways in living systems as the first step towards a greater understanding of disease and effective treatment. In this course, students are thought pharmacokinetics of drugs, principals of drugs actions and mechanisms, drug indications and side effects.

PHAR313 Pharmaceutical Technology I (235)

The content of this course includes pharmacopoeias, prescription and dose calculations, pharmaceutical water, basic processes, solutions, colloids, suspensions, emulsions, extraction enzyme and hormone preparations, aerosols. Students will learn; about the preparation, administration routes and controls of radiopharmaceuticals; formulation, quality control and packaging of injection dosage forms and other sterile dosage forms; contamination, sterilization and sterilization methods.

PHAR314 Pharmaceutical Botany (225)

The courses gives an introduction to the fundamental principles of pharmaceutical botany and the plant sciences. It includes terminology and morphology belonging medicinal plants, binary nomenclature of plants and drugs, monographs, kingdom plantae, classification based on plants' similarities and differences, identification of the pharmaceutical plants due to their characteristics, medicinal plants of Turkey, their distribution and way of uses and ethnobotany. The main aim of this course is to provide knowledges useful to recognize the most used medicinal plants.

PHAR315 Pharmacognosy I (235)

The course comprises natural products with usage as drugs and other bioactive molecules from nature, their origin, identification, development, production, control and usage. Lectures include methods for extraction, characterization, detection of active ingredient in medicinal plants, complementary and alternative medicine (CAM), pharmacologically active compounds which are obtained from natural origin mainly plant origin, secondary metabolite as alkaloids, cardiac glycosides and cannabinoids,

natural products as drug precursors. At laboratory sessions students own will take part in extraction, usage of chromatographic methods used in isolation, methods of detection of secondary metabolites in medicinal herbs.

Area Elective I (- - 3)

Pharmacy related elective course focused to specific areas in pharmacy.

PHAR391 Graduation Project V (011)

In this course, students are given a research topic to work on throughout their 5-year education. Students are expected to complete their literature search, laboratory work, ideally publish their work in a scientific journal, and finally submit their research report before they graduate.

ISU381 Manifest of Istinye III (011)

Activities to be held to improve the knowledge, skills and competencies of our students in fields such as art, sports, culture and social responsibility will be announced at the beginning of each semester. It is necessary for the student to actively participate in the announced schedule and to participate in more than half of the activities.

6th SEMESTER

PHAR321 Pharmaceutical/Medicinal Chemistry II (235)

The Department of Medicinal Chemistry is part of the highly collaborative, interdisciplinary subdivision of the Professional Pharmacy Division of Pharmacy. In this course, students are thought a broad spectrum of medicinal chemistry topics including computer assisted drug discovery, anticancer drug development, synthesis and characterization of chemicals bioactive against cancer, neurodegenerative diseases, bacteria, fungi, viruses, etc. Drug-receptor interactions and personalized drug development issues are also thought in this course

PHAR322 Pharmacology II (315)

The Department of Pharmacology is at the forefront of research into the effects of drugs and other molecules on biological systems with a view to understanding the mechanisms of the human body. Pre-clinical research in the Department aims to examine cellular and molecular pathways in living systems as the first step towards a greater understanding of disease and effective treatment. In this course, students are thought pharmacokinetics of drugs, principals of drugs actions and mechanisms, drug indications and side effects.

PHAR323 Pharmaceutical Technology II (235)

In this course supplying information about solid dosage forms (powders, capsules, tablets, coated dosage forms), ointments, gels and suppositories, stability, controlled dosage forms, dosage forms used in veterinary and packaging will be covered. Students will learn; good manufacturing practices (GMP); validation and types of validation.

PHAR324 Pharmacognosy II (235)

The course comprises natural products with usage as drugs and other bioactive molecules from nature, their origin, identification, development, production, control and usage. Lectures include methods for extraction, characterization, detection of active ingredient in medicinal plants, complementary and

alternative medicine (CAM), pharmacologically active compounds which are obtained from natural origin mainly plant origin, secondary metabolite as alkaloids, cardiac glycosides and cannabinoids, natural products as drug precursors. At laboratory sessions students own will take part in extraction, usage of chromatographic methods used in isolation, methods of detection of secondary metabolites in medicinal herbs.

PHAR325 Basics of Clinical Pharmacy (112)

Clinical Pharmacy lectures aim to train pharmacists providing patient care that optimizing the use of medication and promoting health, wellness, and disease prevention. Introduction to clinical pharmacy gives to the fundamental principles of the field. It provides a comprehensive study of patient education, drug and treatment supervision, rational drug usage.

PHAR326 Symptoms and Clinical Conditions (101)

Dry mouth, anemia, fever, dizziness, headache, sore throat, nausea-vomiting, nasal discharge and obstruction, dyspepsia, diarrhea, hypertension, hypotension, anorexia, constipation, abdominal pain, itching, obesity, weight loss, cough, polydipsia, polyuria, pollacuria, nocturia, animal bites, jaundice, paresthesia, hydrophobia, fotophobia, loss of senses, delirium.

PHAR327 Medical Communication Skills (112)

In this course, students will have the knowledge of professional communication, including gathering, organizing, conveying and documenting patient-related information. The courses emphasize a patientcentered approach to communication and cover social factors such as health literacy, barriers to communication and cultural competency and will develop professional behaviors and attitudes in pharmacy practice.

Area Elective II (- - 3)

Pharmacy related elective course focused to specific areas in pharmacy.

PHAR392 Graduation Project VI (011)

In this course, students are given a research topic to work on throughout their 5-year education. Students are expected to complete their literature search, laboratory work, ideally publish their work in a scientific journal, and finally submit their research report before they graduate.

ISU382 Manifest of Istinye IV (021)

Activities to be held to improve the knowledge, skills and competencies of our students in fields such as art, sports, culture and social responsibility will be announced at the beginning of each semester. It is necessary for the student to actively participate in the announced schedule and to participate in more than half of the activities.

Summer Semester

PHAR331 Apprenticeship V (Community Pharmacy III) (0 160 5)

PHAR332 Apprenticeship VI (Clinical Pharmacy II) (0 80 3)

7th SEMESTER

PHAR411 Clinical Pharmacy I (235)

Laboratory medicine plays an integrated role in public health. Students that have learned the fundamentals of clinical pharmacy will take another step further with the courses. It includes rational drug use, pharmaceutical care, role of clinical pharmacist in the treatment of acute and chronic diseases, role of pharmacist in public health. With the help of this lectures students become more competent pharmacists.

PHAR412 Pharmacotherapy I (235)

Students are assigned in groups to interact with a volunteer patient. Fundamental interview and physical assessment skills are introduced. As a group, students conduct health care screenings in retail areas in the community under the supervision of pharmacists. In addition, students present case studies that integrate subject matter from didactic courses in the first professional year. Students are also assigned to shadow senior pharmacy students in patient care areas.

PHAR413 General Toxicology (235)

The general toxicology course will teach students the major toxicological adverse effects of chemicals on the human body, the major type of adverse effects of chemicals on important target organs, important mechanisms and modes of action of toxic chemicals underlying the adverse effects observed, the latest developments in the field of toxicology and risk assessment, and important toxic chemicals in food and the environment and their adverse health effects.

PHAR414 Self Care, Non-Prescription Drug Use (OTC) (202)

The aim of the program is main concept of self-care and non-prescription drugs, classification of OTC and BTC drugs, methods of preparing herbal teas and medicines. Regulations and applications of nonprescription drug use around the world and in our country will be discussed.

PHAR415 Evidence-Based Traditional Medicinal Medicine and Phytotherapy (213)

In this course students will learn dosage, toxicity, side effects, interaction and evidence based symptoms of herbal drugs.

PHAR416 Pharmacy Management (212)

In this course, students will learn the application of business knowledge and skills to the field of pharmacy. At the completion of this course, the students will understand the pharmacy management issues in the context of good pharmacy practices and prepare themselves for pharmacy pharmacy. Students will also learn characteristics of Pharmacy, Health Sector and Pharmacy Business and pharmacy sales ability of purchasing and marketing practices and profitability analysis and also will learn Health Institutions and Organizations with which the pharmacy is affiliated, and Consultation Services.

PHAR417 Interpretation of Diagnostic Tests (011)

Literacy of common laboratory tests (biochemistry, microbiology, microscopic pathology, molecular, radiologic, USG, EEG, EMG etc.); statistical principles of interpretation of diagnostic tests, truth table, precision, accuracy, ROC curve, preanalytical/analytical/postanalytical laboratory errors.

Area Elective III (- - 3)

Pharmacy related elective course focused to specific areas in pharmacy.

PHAR491 Graduation Project VII (011)

In this course, students are given a research topic to work on throughout their 5-year education. Students are expected to complete their literature search, laboratory work, ideally publish their work in a scientific journal, and finally submit their research report before they graduate.

Out of Area Elective I (- - 3)

A topic selected out of pharmacy is covered in this course.

8th SEMESTER

PHAR421 Clinical Pharmacy II (235)

This course aims to enable students to take their role in oncology pharmacy, hospital pharmacy, drug side effects, efficacy comparisons.

PHAR422 Pharmacotherapy II (235)

Students are expected to learn dispensing procedures and other operations necessary for the successful delivery of pharmaceutical services in these practice environments. Students are assigned to a community pharmacy for one semester and to a hospital pharmacy in another semester. Case studies sessions are held that integrate subject matter in didactic coursework in the second professional year.

PHAR423 Pharmaceutical Toxicology (235)

This course teaches students the toxic effects of chemical substances on living organisms and to define their harmless limits in animal models, cellular systems as well as in human. Students are also taught about genetic polymorphism, genotoxicity and cytogenetic techniques, biological macromolecules, xenobiotic biotransformation, drug safety, environmental and clinical biomarkers, environmental exposure, bioconcentration and bioaccumulation, food toxicology and natural toxins, occupational toxicology is the main research area of our department.

PHAR424 Radiopharmacy and Biopharmaceuticals (202)

Basic information about radiopharmaceuticals and Biopharmaceutics; their use, side effects and drug interactions will be covered during this course. Safe and efficient use of these drugs is the main objective of this course.

PHAR425 Basics of Drug Engineering and Pharmaceutical Biotechnology (112)

This course gives a basic knowledge of the history of the pharmaceutical industry, the definition of pharmaceutical biotechnology, the role of pharmaceutical biotechnology in drug production and development, related basic concepts and applications, knowledge of drug development processes, drug delivery systems, drug administration routes, biopharmaceuticals, advantages of using protein therapeutics and parameters affecting drug performance.

PHAR426 Processing of Prescriptions and Dispensing (011)

The course objective is classification of prescriptions, practice of prescription receiving techniques, good communication with the patient. Students will learn how to dispense drugs to the patients with prescription.

PHAR427 Placebo Effect (101)

This course gives general information about complementary medicine branches, their application areas, how they applied and used in other countries as evidence based treatment and its place in our country, what is placebo effect and how it is can be used during treatments.

PHAR428 Pharmacoeconomy (112)

The aim of the program is covering the types of costs and benefits in health issues, the methodologies of pharmaco-economic analysis, cost-minimization, cost-benefits, cost-effectiveness and cost-utility analysis, as well as its main characteristics, advantages, disadvantages and applicability.

Area Elective IV (--3)

Course related to a field not directly related to pharmacy.

PHAR492 Graduation Project VIII (011)

In this course, students are given a research topic to work on throughout their 5-year education. Students are expected to complete their literature search, laboratory work, ideally publish their work in a scientific journal, and finally submit their research report before they graduate.

Out of Area Elective II (- - 3)

A topic selected out of pharmacy is covered in this course.

Summer Semester

PHAR431 Apprenticeship VII (Community Pharmacy IV) (0 80 3)

PHAR432 Apprenticeship VIII (Clinical Pharmacy III) (0 160 5)

PHAR433 Apprenticeship IX (Industrial Pharmacy) (0 80 3)

9th SEMESTER

PHAR511 Drug Development and Pharmacovigilance (202)

The safety of drugs both in their development and their clinical use is of paramount importance. This course provides an introduction to Pharmacovigilance including key definitions and the nature and burden of adverse drug reactions (ADRs). It covers safety monitoring in clinical trials, what ADRs this will detect and its limitations. It will look at the methods for post-marketing surveillance, introduces patient risk management and relevant guidelines.

PHAR512 Drug Interactions, Adherence and Patient Safety (213)

In this course, drug interactions and adherence will be discussed in terms of patient safety.

PHAR513 Health Promotion and Healthy Aging (202)

Personalized medicine, also referred to as precision medicine, holds great promise to improve healthcare. As the cost of genetic analysis decreases and research advances, it is becoming increasingly possible to include the genetic make-up of a person in the repertoire of tools that inform his or her healthcare. This lesson gives students to delve into the hopes and challenges of personalized medicine and to consider the practical applications of genetic analysis in medicine. Pharmacogenomics module teach to students learn about the concept of personalized medicine; how differences in genes affect whether a drug treatment will be successful or have serious side effects, and how they can use this information to customize treatments for individual patients. This course aims to another substantial area that improves the health of the student by understanding the concepts related to health, the dimensions of health, evaluating the conditions affecting health, understanding the importance of protecting and developing health in human life, learning the responsibilities of pharmacist in health protection and developing health awareness in individuals.

PHAR514 Cosmetology (213)

The course objective is to design, good manufacturing and quality controlling of cosmetic formulations, regulations of cosmetology, to teach the detailed anatomical and physiological hair, skin and oral structure to the pharmacy students.

PHAR515 Community/Hospital/Clinical/Industrial Pharmacy Seminars (011)

Pharmacists must be able to learn with literacy of common about herbal products in this seminar lecture. Pharmacists can be studied with herbal products in free pharmacies, hospital pharmacies, pharmaceutical and cosmetic industries in this course and they must be able to carries out independent work on an advanced level of knowledge. This course includes takes responsibility as a pharmacist in cooperation with other occupational groups working on free pharmacies, hospital pharmacies, pharmaceutical and cosmetic industries.

PHAR516 Medical Data Mining and Bioinformatics (123)

Introduction to medical data mining, bioinformatics and system biology, software programs used in bioinformatics, usage area of software programs, general information about phyton, matlab, R programs, how to combine biology and software programs.

PHAR517 Environmental and Global Issues/Occupational Health and Safety / Occupational Pharmacy (212)

This course will focus on the historical development of occupational health and safety, occupational accidents and occupational diseases and cost, concept of occupational safety, importance of occupational safety in terms of workforce productivity, basic elements of occupational safety, sources of danger, occupational health concept, psychosocial risk factors, organizations concerned with international occupational health and safety aim to inform the student in the ILO directives. Within this course, student can be able to acquire the knowledge and skills necessary to develop the health of the individual, family and society by learning the basic concepts related to the development of the health and health of the student. Other aim of this course is to raise the attention of the international community to environmental issues and to ensure the development of national and international environmental policy and law.

PHAR518 Leadership and Management (202)

The Leadership and management course offers resources for both new and seasoned pharmacist leaders to become more adept at developing pharmacy business, inspiring and guiding teams, managing change, and effectively influencing employees across an organization.

Area Elective V (--3)

Pharmacy related elective course focused on specific areas in pharmacy

PHAR591 Graduation Project IX (026)

In this course, students are given a research topic to work on throughout their 5-year education. Students are expected to complete their literature search, laboratory work, ideally publish their work in a scientific journal, and finally submit their research report before they graduate.

Out of Area Elective III (- - 3)

A topic selected out of pharmacy is covered in this course.

10th SEMESTER

PHAR521 Expanded Education Program (EEP) Certificate (024)

This course ensures that pharmacy students complete all requirements to receive a certificate of Expanded Education Program.

PHAR522 Eight Star Pharmacy Certificate (011)

This course ensures that pharmacy students complete all requirements to receive a certificate of Eight-Star Pharmacy.

PHAR523 Legislation, Pharmaceutical Licensing and Patent (202)

Issues regarding patenting and licensing of drug candidates in clinical trials as well as in research are covered in this course.

PHAR524 Biomedical and Medical Products / Agricultural and Veterinary Medicines (213)

This course gives an introduction to properties and compatibility of the metal, ceramics, polymers, composites in contact with biological fluids, human and animal tissue. In addition, this course gives a basic knowledge to agricultural and veterinary drugs, agricultural drug development rules, toxicity tests, application and control tests, classification of agricultural pesticides and concentrations of contamination.

PHAR525 Professional Ethics, Deontology and Malpractice (202)

Ethical concepts and approaches, basic ethical principles, autonomy principle, utility principle, do not harm principle, examining the ethical systems and the factors that play a role in the formation of morality, ethics of profession, social responsibility concept.

PHAR526 Entrepreneurship Certificate and Project Writing (224)

In this course, students will learn conceptual framework of entrepreneurship, approaches, functions, process, and also will have a knowledge about the culture of entrepreneurship, international context and ethics of entrepreneurship.

PHAR527 Social Responsibility Project (011)

Students will have knowledge of the basic concepts of community and collective service practices and social responsibility projects, the importance of collective service practices and social responsibility projects. In addition, they will be able to identify the target audience problem and produce a solution proposal for the identified problems. They also will learn the collective service applications about public service organizations and social responsibility projects.

PHAR528 Art Literacy (011)

At the end of this course students will acquire artistic knowledge. They will be able to transfer the artistic knowledge to their performance skills and thus contribute to art literacy studies.

Area Elective VI (- - 3)

Pharmacy related elective course focused to specific areas in pharmacy

PHAR592 Graduation Project X (026)

In this course, students are given a research topic to work on throughout their 5-year education. Students are expected to complete their literature search, laboratory work, ideally publish their work in a scientific journal, and finally submit their research report before they graduate.

Out of Area Elective IV (- - 3)

A topic selected out of pharmacy is covered in this course.