DOCTOR OF PHARMACY (PRACTICING DOCTORATE)

Main Language of Instruction:
French ☑ English ○ Arabic ○

Campus Where the Program Is Offered: CSM

OBJECTIVES

The Faculty aims to train health professionals specializing in medications and health products. It provides a strong academic and scientific foundation that helps students succeed and excel in this multidisciplinary field. This program prepares students for all aspects of professional practice, applying scientific knowledge with integrity and professionalism. It focuses on developing competent specialists who contribute positively to society, emphasizing ethics and respect for human values.
Through a diverse program, students receive a comprehensive education that allows them to specialize in various fields, including community pharmacy, industry, hospital and clinical pharmacy, medical analysis laboratories, pharmaceutical marketing, and biological and pharmaceutical research.
In addition to lectures and seminars, this program includes practical work sessions and internships in different sectors, such as experimental pharmacy, community pharmacy, hospitals, medical laboratories, industry, and research teams. This approach aims to deepen students' scientific, medical, and pharmaceutical knowledge while developing the practical skills necessary for effective application in their future careers.

PROGRAM LEARNING OUTCOMES (COMPETENCIES)

C 1- Provide pharmaceutical care within a pharmacy and dispense medications and health products.
C 2- Manage a pharmacy.
C 3- Provide pharmaceutical care within a hospital.
C 4- Contribute to the development of pharmaceutical products (production, marketing, quality control).
C 5- Ensure compliance with laws in both public and private sectors (Ministry of Public Health, State EmPLO yees Cooperative, National Social Security Fund, insurance companies, etc.).
C 6- Act with ethics and professionalism.
C 7- Participate in the advancement of research in pharmaceutical fields, innovation, and entrepreneurship.
C 8- Engage in health promotion.

PROGRAM REQUIREMENTS

360 credits: Required courses (303 credits), Institution's elective courses (12 credits), Open elective courses (10 credits), USJ General Education Program (35 credits)
USJ General Education Program (35 credits)
English (4 Cr.)
English (4 Cr.)
Arabic (4 Cr.)
Arabic Language and Culture (2 Cr.)
Arabic Language and Media (2 Cr.)
Other course taught in Arabic (2 Cr.)
Social Legislation (2 Cr.)

Humanities (9 Cr.)
Ethics (3 Cr.)
Professional Ethics in Pharmacy (3 Cr.)
Civic and Citizen Engagement (2 Cr.)
Addictive Behaviors and Dependencies (2 Cr.)
Other (2 Cr.)
Psychology (2 Cr.)
USJ Values (2 Cr.)

Social Sciences (6 Cr.)

Professional Insertion and Entrepreneurship: (2 Cr.)
Work Ready Now (4 Cr.)

Other (4 Cr.)
Sociology of Health (2 Cr.)
Creativity in Sustainable Development (2 Cr.)

Communication Techniques (6 Cr.)
Expression Techniques (3 Cr.)
Communication (3 Cr.)

Quantitative Techniques (6 Cr.)
Mathematics + Statistics (4 Cr.)
Computer Science (2 Cr.)

Fundamental Courses (315 Cr.)
Required Courses (303 Cr.)
Regulatory and Industrial Affairs (2 Cr). Human Anatomy and Physiology I (4 Cr). Human Anatomy and Physiology II (5 Cr). Practical Approaches in Pharmacy (2 Cr). Quality Assurance of Health Products (3 Cr). Foundations of Healthy Nutrition (2 Cr). Clinical Biochemistry (3 Cr). Metabolic Biochemistry (4 Cr). Structural Biochemistry (3 Cr). Cell Biology + Practical Work (3 Cr). General Biology (3 Cr). Molecular Biology + Practical Work (4 Cr). Biopharmacy (2 Cr). Biophysics + Practical Work (3 Cr). Biostatistics (2 Cr). Medical Biotechnology (2 Cr). Analytical Chemistry (4 Cr). General Chemistry (3 Cr). Heterocyclic Organic Chemistry (3 Cr). Inorganic Chemistry + Practical Work (2 Cr). Organic Chemistry I (4 Cr). Organic Chemistry II (3 Cr). Therapeutic Chemistry I (2 Cr). Therapeutic Chemistry II (3 Cr). Communication (2 Cr). Communication and Methodology (3 Cr). Endocrinology (2 Cr). Integrated Teaching (2 Cr). Integrated Teaching (1 Cr). Entrepreneurship in Pharmacy (2 Cr). Genetics (3 Cr). Management and Accounting (2 Cr). Hematology + Pathology + Practical Work (4 Cr). Hydrology (1 Cr). Hygiene (2 Cr). Immunology + Pathology + Practical Work (4 Cr). Introduction to Occupational Therapy (2 Cr). Introduction to Pharmacy Internship I-II (5 Cr). Interactions (2 Cr). Introduction to Pharmacy (3 Cr). Introduction to Market Access (2 Cr). Introduction to Food (2 Cr). Pharmaceutical Legislation (2 Cr). The Microbial World (3 Cr). Marketing (2 Cr). Dissertation (8 Cr). Special Microbiology (4 Cr). Special Microbiology + Practical Work (2 Cr). USJ Elective Course - Medical Law (2 Cr). USJ Elective Course - Pharmaceutical Ethics (2 Cr). USJ Elective Course - Plant Kingdom + Practical Work (4 Cr). FEC - Advanced Article Analysis (2 Cr). FEC - Health Economics (2 Cr). FEC - Genomics and Medical Applications (2 Cr). FEC - Article Reading and Analysis (2 Cr). FEC - Mechanisms of Toxic Action, Carcinogenesis, and Regulation (2 Cr). FEC - Molecular Pharmacology and Biostatistics (2 Cr). FEC - Orthopedics and Medical Device Orthotics (2 Cr). Nutrition (3 Cr). Parasitology - Mycology + Practical Work (4 Cr). Personal Skills (2 Cr). Clinical Pharmacy (3 Cr). Clinical Pharmacy (3 Cr). Clinical Pharmacy I (3 Cr). Clinical Pharmacy II (3 Cr). Experimental Pharmacy + Validation (5 Cr). Experimental Pharmacy + Validation (5 Cr). Experimental Pharmacy + Validation (5 Cr). Pharmaceutical Formulation (4 Cr). Pharmaceutical Formulation (4 Cr). Pharmaceutical Formulation (2 Cr). Pharmacokinetics (4 Cr). Pharmacognosy (4 Cr). General Pharmacology (4 Cr). Special Pharmacology (4 Cr). Special Pharmacology I (4 Cr). Special Pharmacology II + Oncology (4 Cr). Physics (3 Cr). Phytotherapy and Aromatherapy (2 Cr). Public Health (2 Cr). First Aid (2 Cr). Pathological Semiology (4 Cr). Dental Care (2 Cr). Clinical Biology Internship + Report (6 Cr). Hospital Internship (11 Cr). Pharmacy Internship III, Pharmacy Follow-up, and Report (6 Cr). Pharmacy Internship II, Pharmacy Follow-up, and Report (6 Cr). Pharmacy Internship I, Pharmacy Follow-up, and Report (6 Cr). Pharmacy or Industrial Internship (1 Cr). Integrated Syntheses (3 Cr). Care Techniques (2 Cr). Toxicology (4 Cr). Emergency Toxicology (3 Cr). Biochemistry Practical Work (1 Cr). Analytical Chemistry Practical Work (2 Cr). Organic Chemistry Practical Work (2 Cr). Special Microbiology Practical Work (1 Cr). Pharmaceutical Formulation Practical Work + Integrated Syntheses Practical Work (1 Cr). Industrial Pharmacy Practical Work (1 Cr). Special Pharmacology Practical Work (1 Cr). Toxicology Practical Work (1 Cr). Laboratory Internship Validation (0 Cr). Pharmacy Internship Validation (0 Cr). Virology (2 Cr).

Institution's Elective Courses (12 Cr.)
Risk Assurance Elements (2 Cr). FEC - Advanced Dietetics and Nutrition (2 Cr). FEC – Over The Counter Medication (OTC) (2 Cr). FEC - Cellular and Integrated Pharmacology in Neurosciences and Infectiology (2 Cr). FEC - Cell Signaling, Therapeutic Targets in Metabolic, Cardiovascular, and Immunotoxicology Disorders (2 Cr). FEC - Research Internship (Biochemistry, Molecular Biology, Microbiology, Pharmacology, Toxicology) (4 Cr). FEC - Internship in Pharmaceutical Firms or Industries (4 Cr). FEC - Sales Techniques (2 Cr). FEC - Innovative Therapies: From Patent to Commercialization (2 Cr). FEC - Clinical and Experimental Toxicology (2 Cr).

Open Elective Courses (10 Cr.)

SUGGESTED STUDY PLAN

Semester 1

Code	Course Name	Credits
004BIOLI1	Cell Biology + Practical Work	3
004CHGEI1	General Biology	3
004CHIOI1	Inorganic Chemistry + Practical Work	2
004COMEI1	Communication and Methodology	3
004SANEI2	Hygiene	2
435LALML2	Arabic Language and Media	2
004MASTI1	Mathematics + Statistics	4
004PHIII1	Physics	3
004EXPCI1	Expression Techniques	3
	Open Elective Course	2
	Total	**27**

Semester 2

Code	Course Name	Credits
004ANPHI2	Human Anatomy and Physiology I	5
004BALSI2	Foundations of Healthy Nutrition	2
004BLGEI1	General Biology	3
004CHIIII2	Organic Chemistry I	3
004GENEI1	Genetics	3
004FONII2	Computer Science	2
004NOMPI2	Introduction to Pharmacy	3
008PSKLL3	Personal Skills	2
004SOLOI2	USJ Elective Course – Sociology of Health	2
004REGVI2	USJ Elective Course – Plant Kingdom	4
004EVENI2	FEC Creativity in Sustainable Development	2
004LADAI2	FEC Article Reading and Analysis	2
	Total	**33**

Summer Term I

Code	Course Name	Credits
004PEVAI2	Practical Approaches in Pharmacy	2
004INSPI2	Introduction to Pharmacy Internship I-II	5
004SOFRI2	Pharmacy Internship I, Pharmacy Follow-up, and Report	6
004SOPRI4	Dental Care	2
	Total	**15**

Semester 3

Code	Course Name	Credits
004ANHUI3	Human Anatomy and Physiology II	4
004AGI3I3	English	4
004BIOMI2	Structural Biochemistry	3
004MOLBI3	Molecular Biology + Practical Work	4
004BIPHI3	Biophysics + Practical Work	3
004CANAI3	Analytical Chemistry	4
004CHORI3	Organic Chemistry I	4
004LEMII3	The Microbial World	3
004PACII3	Pharmacokinetics	4
	Total	**33**

Semester 4

Code	Course Name	Credits
004QLTEI4	Quality Assurance of Health Products	3
004CEORI4	Heterocyclic Organic Chemistry	3
004IALII4	Introduction to Food	2
004PHQEI4	Pharmaceutical Formulation	2
004PSYCI4	Psychology	2
004HYSAI4	Public Health	2
004CHTPI4	Organic Chemistry Practical Work	2
004TPCAI4	Analytical Chemistry Practical Work	2
018EPFPL2	Professional Ethics in Pharmacy	3
004TEVEI4 004ELASI4	Institution's Elective Courses: FEC Sales Techniques (2 Cr.) FEC Risk Assurance Elements (2 Cr.)	2
	Open Elective Course II	2
	USJ Values	2
	Total	**27**

Summer Term II

Code	Course Name	Credits
494INERL3	Introduction to Occupational Therapy	2
004PHEVI4	Experimental Pharmacy + Validation	5
004SUOFI4	Pharmacy Internship II, Pharmacy Follow-up, and Report	6
005TSPHL2	Care Techniques	2
	Total	**15**

Semester 5

Code	Course Name	Credits
004BTSQS1	Biostatistics	2
004BITHS1	Medical Biotechnology	2
004HEMAS1	Hematology + Pathology + Practical Work	4
004MSPES1	Special Microbiology + Practical Work	2
004PAMYS1	Parasitology - Mycology + Practical Work	4
004PAGAS1	Pharmaceutical Formulation	4
004PHAMS1	General Pharmacology	4
004SEPAS1	Pathological Semiology	4
004SYINS1	Pharmaceutical Formulation Practical Work + Integrated Syntheses Practical Work	1
004 LCADS1	USJ Elective Course – Addictive Behaviors and Dependencies	2
004UVESS1	FEC Health Economics	2
	Open Elective Course III	2
	Total	**33**

Semester 6

Code	Course Name	Credits
004BIOMS2	Metabolic Biochemistry	4
004BORIS2	Biopharmacy	2
004CHITS2	Therapeutic Chemistry	3
004ENINS2	Integrated Teaching	1
004 HYDOS2	Hydrology	1
004IPEAS2	Immunology + Pathology + Practical Work	4
004PHMES2	Pharmacognosy	4
004PHLES2	Special Pharmacology	4
004TPBIS2	Biochemistry Practical Work	1
004IELES2	Industrial Pharmacy Practical Work	1
004DIONS2 004UVPCS1	Institution's Elective Course FEC- Advanced Dietetics and Nutrition (2 Cr.) FEC Over the Counter Medication (OTC) (2 Cr.)	2
	Total	**27**

Summer Term III

Code	Course Name	Credits
004COMUS2	Communication	2
004IMACS2	Introduction to Market Access	2
004PHEXS2	Experimental Pharmacy + Validation	5
004SUIOS2	Pharmacy Internship III, Pharmacy Follow-up, and Report	6
	Total	**15**

Semester 7

Code	Course Name	Credits
004SBLGS3	Clinical Biochemistry	3
004CHT3S3	Therapeutic Chemistry	2
004ETPHS3	Entrepreneurship in Pharmacy	2
004MIBOS3	Special Microbiology	4
004PHAGS3	Pharmaceutical Formulation	4
004PECLS3	Clinical Pharmacy	3
004PHSOS4	Special Pharmacology II + Oncology	4
004SECOS3	First Aid	2
004TOXIS3	Toxicology	4
004TPMIS3	Special Microbiology Practical Work	1
004TOXXS4	Toxicology Practical Work	1
	Open Elective Course IV	2
	Total	**32**

Semester 8

Code	Course Name	Credits
004ENLOS4	Endocrinology	2
004ENITS4	Integrated Teaching	2
004INTES4	Interactions	2
004NUTRS4	Nutrition	3
004TEQES4	Clinical Pharmacy	3
004 PHSPS3	Special Pharmacology I	4
004PHYTS4	Phytotherapy and Aromatherapy	2
004TODUS4	Emergency Toxicology	3
004PHAPS3	Special Pharmacology Practical Work	1
004VIROS4	Virology	2
004GEAMM1	Common FEC – Genomics and Medical Applications	2
004 MATCM1	Common FEC – Mechanisms of Toxic Action, Carcinogenesis, and Regulation	2
004PHMBM1	Common FEC – Molecular Pharmacology and Biostatistics	2
	Total	**30**

Summer Term IV

Code	Course Name	Credits
004PAEXS4	Experimental Pharmacy + Validation	5
004STBCS4	Clinical Biology Internship + Report	6
   004SCCTM1 004TIBCM1 004TCEXM1 004PCINM1 004STDEM1 004STPHM1	Institution's Elective Courses "Specific Courses": **Choose 2 out of 4:** FEC- Cell Signaling, Therapeutic Targets in Metabolic, Cardiovascular, and Immunotoxicology Disorders (2 Cr.) FEC Innovative Therapies: From Patent to Commercialization (2 Cr.) FEC- Clinical and Experimental Toxicology (2 Cr.) FEC- Cellular and Integrated Pharmacology in Neurosciences and Infectiology (2 Cr.) **Options:** FEC - Research Internship (Biochemistry, Molecular Biology, Microbiology, Pharmacology, Toxicology) (4 Cr.) FEC - Internship in Pharmaceutical Firms or Industries (4 Cr.)	8
	Total	**19**

Semester 9

Code	Course Name	Credits
004COMES5	Regulatory and Industrial Affairs	2
004COMMS5	Communication	3
004GESTS5	Management and Accounting	2
004LEPHS5	Pharmaceutical Legislation	2
004LEGSS5	Social Legislation	2
004MARKS5	Marketing	2
004PHACS5	Clinical Pharmacy I	3
004PHACCS6	Clinical Pharmacy II	3
004DRMES5	USJ Elective Course – Medical Law	2
004HIQMS5	USJ Elective Course – Pharmaceutical Ethics	2
004ANPAS5	FEC- Advanced Article Analysis	2
004WORNS6	FEC WRN: Work Ready Now	2
	Open Elective Course V	2
	Total	**29**

Semester 10

Code	Course Name	Credits
004MMOIS6	Dissertation	8
004STAHS6	Hospital Internship	11
004STAGS6	Pharmacy or Industrial Internship	1
004SYNIS5	Integrated Syntheses	3
004VSLAS6	Laboratory Internship Validation	0
004VSOFS6	Pharmacy Internship Validation	0
004OTMES5	FEC Orthopedics and Medical Device Orthotics	2
	Total	**25**

COURSE DESCRIPTION

004COMES5 Regulatory and Industrial Affairs 2 Cr.

Part: Quality in the Pharmacy – Educational Objectives:
- Reinforce the fundamental principles of the community pharmacy profession for future pharmacists and introduce them to new pharmacy activities.
- Equip students with initial training in quality assurance in the pharmacy and best practices, particularly in dispensing healthcare products.

Acquired Competencies:
by the end of this course, students will be able to:
- Implement a quality assurance approach in the pharmacy, from reception to dispensing and providing advice.
- Generate and implement documentation related to quality assurance in the pharmacy.
- Evaluate the quality of pharmaceutical practice.

This course provides a foundation for training as a community pharmacist. It requires prior knowledge of quality assurance taught in the second year and prepares students for professional practice while adhering to regulatory obligations for quality assurance of pharmaceutical products and services.
This course develops competencies in initiating and evaluating a quality assurance system in the pharmacy.
Part: Regulatory Affairs – Course Objectives:
- Understand the basics of quality.
- Understand the fundamentals of regulatory affairs.
- Comprehend standards, standardization bodies, and good manufacturing and distribution practices.
- Understand the regulatory framework.
- Apply this knowledge practically in production and distribution.

004ANHUI3 Human Anatomy and Physiology I 4 Cr.

This course provides students with a solid understanding of the human body, offering a foundational knowledge of the relationship between structure and function, essential for careers in health sciences.
- Anatomy: The study of the body's structure and how its parts are interconnected.
- Physiology: The functioning of the body's systems to sustain life. Relevant clinical cases are introduced to highlight normal body functions.

Competency Framework:
C.3.1. Assess the patient's pharmacological and biological condition.
RAP3.1.1. Assess the patient's medical history, lab tests, and diagnostic results.
This course aims to understand the body as a dynamic system of interrelated parts, rather than isolated units.

004ANPHI2 Human Anatomy and Physiology II 5 Cr.

This course provides students with a solid understanding of the human body, offering a foundational knowledge of the relationship between structure and function, essential for careers in health sciences.
- Anatomy: The study of the body's structure and how its parts are interconnected.
- Physiology: The functioning of the body's systems to sustain life. Relevant clinical cases are introduced to highlight normal body functions.

Competency Framework:
C.3.1. Assess the patient's pharmacological and biological condition.
RAP3.1.1. Assess the patient's medical history, lab tests, and diagnostic results.
This course aims to understand the body as a dynamic system of interrelated parts, rather than isolated units.

004AGI3I3 English 4 Cr.

This course provides students with a deep understanding of language proficiency.

004PEVAI2 Practical Approaches in Pharmacy 2 Cr.

This course introduces and trains students in practical pharmacy approaches, aiding in the development of skills during pharmacy internships.

004QLTEI4 Quality Assurance of Health Products 3 Cr.

This course serves as a foundation for training as a pharmacist. It requires no prerequisites and aims to familiarize students with the vocabulary used in the field of quality while introducing them to quality assurance in pharmaceutical production and services. It contributes to the development of the following competencies:

- Understand the concepts of quality and the quality approach in pharmacy.
- Explain the principles of quality management, including ISO standards and pharmaceutical references.
- Assess the effectiveness of various approaches implemented to ensure the traceability of healthcare products.

By the end of this course, students will be able to:

- Evaluate active substances and select the technical means for formulating medications.
- Assess the performance of developed medications in vitro and in vivo.

004BALSI2 Foundations of Healthy Nutrition 2 Cr.

This course covers introductory concepts related to nutritional sciences and food.

004SBLGS3 Clinical Biochemistry 3 Cr.

This unit enables students to:

- Evaluate biochemical and pathophysiological parameters, homeostasis, and the regulatory mechanisms of carbohydrate, lipid, and protein metabolism, as well as liver and kidney functions, and electrolyte and phosphocalcium balance, including blood gases.
- Recognize the biochemical parameters of a healthy individual, and physiological variations for the aforementioned functions, as well as biochemical abnormalities.
- Select and apply biochemical assay methods, identify interferences, evaluate markers, particularly tumor and cardiac markers, interpret results, identify associated pathological disorders, and provide clinical-biological advice to enhance diagnostic and preventive management.
- Master major pathologies, their risk factors, and methods of biochemical, biological, and molecular diagnosis, including disorders of carbohydrate, lipid, and protein metabolism, cancer, cardiac, liver, kidney diseases, electrolyte and phosphocalcium imbalances, uric acid disorders, and blood gases.

004BIOMS2 Metabolic Biochemistry 4 Cr.

This course consists of two main parts. The first part covers enzymology, analyzing the mechanisms of enzyme function in biology, identifying suitable kinetic models, understanding inhibitions and activations, and their applications in pharmacy and metabolic biochemistry. The second part exPLO res catabolic and anabolic reactions within major metabolic pathways (carbohydrates, lipids, amino acids, nucleic acids). It details the energy balance of essential metabolic pathways for humans, regulatory mechanisms, and homeostasis, along with their pathophysiological implications. This course also enables students to recognize key inborn errors of metabolism and major metabolic diseases and their causes.

004BIOMI2 Structural Biochemistry 3 Cr.

This course describes organic constituents and explains anabolism, catabolism, transformation reactions, and changes during pathological conditions. It consists of five chapters, following an introductory section that covers carbohydrates, lipids, proteins, and nucleic acids.

The first chapter introduces biochemistry and emphasizes its connection to physiology, pathology, and medicine. It reviews key concepts related to chemical elements, reactions, and chemical bonds, highlighting the importance of chemical groups in the functioning of biological molecules.

The second chapter focuses on carbohydrates, exPLO ring their structural representations, isomerism, derived molecules, and biological roles.

The third chapter examines lipids, concentrating on fatty acids, triglycerides, phospholipids, glycosphingolipids, steroids, and vitamins. It also provides an overview of bioactive lipids, their derivatives, and their significance as pharmaceutical targets.

The fourth chapter studies proteins, starting with the structure of the twenty amino acids that make up proteins, followed by peptides and their structures, and finally the primary, secondary, tertiary, and quaternary structures of proteins. It also discusses amino acid-derived molecules and their relevance as pharmaceutical targets.
The fifth and final chapter addresses the structure of nucleic acids (DNA and RNA), their biological roles, and their properties.

004BIOLI1 Cell Biology + Practical Work 3 Cr.

This course covers the study of cells, which are essential to living biological systems, in nine chapters.
The first chapter introduces the main classes of biological macromolecules: carbohydrates, lipids, proteins, and nucleic acids.
The second chapter examines the similarities and differences among various cell types (eukaryotic, prokaryotic, and acaryotic).
The in-depth exPLO ration of the cell begins in the third chapter with the study of cell membranes.
The fourth chapter discusses the organization of the extracellular matrix.
The fifth chapter exPLO res the nucleus of the eukaryotic cell, the cell cycle, and the molecular regulatory mechanisms governing it.
The sixth chapter focuses on the intracellular membrane network, including the smooth and rough endoplasmic reticulum, Golgi apparatus, lysosomes, and vacuoles.
The seventh chapter investigates the cytoskeleton, covering microtubules, microfilaments, and intermediate filaments.
The eighth chapter exPLO res the ability of mitochondria and chloroplasts to convert energy from one form to another, as well as the role of peroxisomes as oxidative organelles.
The ninth chapter examines apoptosis by studying the intracellular and extracellular pathways of programmed cell death.

004BLGEI1 General Biology 3 Cr.

This course covers comparative anatomy in vertebrates, reproduction, fertilization, and embryology, providing general concepts related to the living world. Its aim is to familiarize students with fundamental notions in general biology, particularly in animal biology and developmental biology.

04MOLBI3 Molecular Biology + Practical Work 4 Cr.

This course introduces students to the fundamentals of molecular biology, covering genetic information transmission, DNA, replication, transcription, translation, variations, mutation mechanisms, and their implications in pathologies. It addresses the tools used for gene exPLO ration and various methods for studying these variations and genetic diagnostics, ranging from classical methods to next-generation sequencing. This unit is a prerequisite for medical and pharmaceutical biotechnology.

004BORIS2 Biopharmacy 2 Cr.

This course serves as a foundation for pharmacy education and requires essential prerequisites in human anatomy and physiology, general chemistry, pharmacokinetics, pharmaceutical formulation, and mathematics and statistics.
It contributes to the development of the following skills:

- Determining and utilizing the physicochemical and biological characteristics of active substances in drug development.
- Selecting the appropriate pharmaceutical form and technology for each active principle.

By the end of this course, students will be able to:

- Evaluate active substances and choose the technical means to formulate them into medications.
- Assess the performance of the developed drug in vitro and in vivo.

004BIPHI3 Biophysics + Practical Work 3 Cr.

The course "Elements of Biophysics" complements the "Physics" course by applying physical principles and laws to interpret and explain biological phenomena occurring in the human body, which is essential for students in medical sciences. This course covers:

- The electrolytic properties of aqueous ionic solutions and their applications in iontophoresis.
- The concepts of acid-base balance in the human body, including buffer systems, regulation, and disorders.
- The fundamentals of the interaction between electromagnetic radiation and matter, including dosimetry and radiotherapy.

Practical work manipulations illustrate these concepts.

004BTSQS1 Biostatistics 2 Cr.

The biostatistics course enables students to:

- Understand the primary statistical methods for analyzing clinical data.
- Learn the principles of clinical and pharmacoepidemiological intervention studies.
- Utilize IBM SPSS for standard statistical analyses of data.
- Critically evaluate the statistical methodology and study protocols in scientific articles.

004BITHS1 Medical Biotechnology 2 Cr.

This course covers advanced knowledge in genetic engineering and biotechnology, focusing on pharmaceutical applications and therapeutic innovations in the field, including:

- Gene therapy
- Recombinant proteins and molecular cloning
- Drug synthesis processes via genetic engineering
- Biosimilars and regulations
- Gene-drug interactions
- New therapeutic strategies based on innovative pharmaceutical biotechnologies.

004CANAI3 Analytical Chemistry 4 Cr.

This course equips students with essential theoretical concepts for the functional analysis of major classes of biomolecules and pharmaceutical active substances while deepening their understanding of the most commonly used spectroscopic methodologies in the laboratory. Numerous applications will be presented. By the end of this course, students will be able to:

- Mobilize theoretical concepts in chemistry and the structure-property relationship to design an experimental method for drug analysis.
- Extract maximum information regarding the physicochemical properties and predictable chemical behavior of organic molecules through an informed reading of the corresponding formulas and structures.
- Apply acquired knowledge in chemistry to major classes of pharmacological molecules.
- Understand chromatographic methods and applications.
- Characterize organic compounds structurally using complementary information from SM, NMR, and IR analyses.

004CHGEI1 General Chemistry 3 Cr.

This course enables students to establish the essential chemical foundation necessary for future studies while fostering critical and scientific thinking. The initial chapters help students consolidate their knowledge regarding the study of matter composed of atoms and the bonds present within them. Subsequently, the focus shifts to chemical reactions and equilibria, allowing students to grasp the fundamental principles of chemistry.

004CEORI4 Heterocyclic Organic Chemistry 3 Cr.

This course provides an in-depth study of reaction mechanisms and their applications in the organic synthesis of heterocyclic compounds. It includes studies of retrosynthetic analysis and the synthesis of bioactive molecules, highlighting the issues of chemoselectivity and regioselectivity encountered. The overall goal is to develop reasoning based on the molecular structure of active ingredients. By the end of this course, students will be able to:

- Predict and explain the expected outcomes of the main types of reactions of carbonyl derivatives, linking them to their mechanisms.
- Name heterocyclic compounds.
- Perform retrosynthetic analysis.
- Establish and master classical and modern methods for synthesizing common nitrogenous, oxygenous, and sulfurous aromatic heterocycles.
- Apply these methods in the total synthesis of bioactive molecules.

004CHIOI1 Inorganic Chemistry + Practical Work 2 Cr.

This course introduces the organometallic chemistry of transition metals. It covers the theories of chemical bond formation in inorganic compounds, as well as the fundamental concepts of coordination chemistry from the perspective of structure, physicochemical properties, and reactivity. Practical application of these theoretical concepts occurs during laboratory sessions, where students will learn to use laboratory equipment and instruments and will document their experimental results in writing.
By the end of this course, students will be able to:

- Identify and analyze the mechanisms of action of inorganic complexes and chelating agents that play a significant role in pharmacology.
- Recognize the essential properties in descriptive chemistry of elements.
- Analyze current issues (environmental chemistry, catalysis, bioinorganic chemistry, therapeutic chemistry).
- Apply safety guidelines in a chemistry laboratory.
- Perform volumetric titration in solution.
- Understand the principles of and perform spectrophotometric analysis.

004CHORI3 Organic Chemistry I 4 Cr.

This course complements the previous instruction on the fundamental principles of organic chemistry. It focuses on and further develops the reactions (nomenclature, formulas, chemical properties, mechanisms, synthesis, and pharmaceutical roles) of carbonyl compounds, carboxylic acids and their derivatives, amines, and aromatic compounds. This course also covers the various protective groups for organic functions and the different types of reactions (oxidation and reduction) necessary for obtaining a specific molecule.

By the end of this course, students will be able to identify and master the functional groups in organic chemistry, as well as a range of concepts, principles, and methods from fundamental sciences. This knowledge will not only enhance the critical and scientific thinking of future pharmacists but also assist them in their practical laboratory work.

004CHIII2 Organic Chemistry II 3 Cr.

The course introduces the fundamental concepts of structure, nomenclature, stereochemistry, and reaction mechanisms, providing students with a sufficient mastery of the corresponding terminology. Additionally, it aims to integrate these concepts into the explanation of reaction mechanisms in organic chemistry and the study of various elimination and substitution reactions.

004CHT3S3 Therapeutic Chemistry I 2 Cr.

This course aims to understand, consolidate, and expand knowledge across all therapeutic classes, focusing on:

- Molecular structure.
- Physicochemical properties and their implications for formulation, kinetics, and metabolism.
- Structural adaptations that influence interactions with receptors and enzymes.
- Analogies among various structures and their physiological, metabolic, kinetic, and pharmacological consequences.
- Development opportunities arising from these structures and innovative molecular design approaches.
- Synthetic pathways to access these molecules.

004CHITS2 Therapeutic Chemistry II 3 Cr.

This course covers:
- Molecular structure.
- Physicochemical properties and their implications for formulation, kinetics, and metabolism.
- Structural properties affecting receptor and enzyme interactions.
- Analogies among structures and their therapeutic implications.
- Development opportunities and innovative molecular design.
- Synthetic pathways for accessing these molecules.

004COMMS5 Communication 3 Cr.

This course introduces students to professional career development. By the end of this course, students will be able to:
- Understand human resources (HR) policies.
- Comprehend the evolution of HR management.
- Utilize HR management tools effectively.
- Recognize their role as transformation leaders.
- Conduct a realistic assessment of necessary leadership skills.
- Identify and define their personal leadership style.
- Foster collaboration within their future teams.
- Enhance their leadership performance.
- Understand themselves better as leaders.
- Position themselves according to their dominant leadership style.
- Cultivate the qualities of a motivated and motivating leader.
- Manage their emotions and those of others effectively.

004COMUS2 Communication 2 Cr.

This course introduces students to the professional field.

004COMEI1 Communication and Methodology 3 Cr.

By the end of this course, students will be able to:
- Identify principles and applications of various microscopes.
- Recognize different types of X-ray-based medical imaging.
- Explain principles and applications of MRI, ultrasound, and echodoppler.
- Determine principles and applications of nuclear medicine for diagnostics and therapeutics.
- Describe flow cytometry principles and analyze results.
- Recognize principles of cell culture.
- Understand the western blot technique.
- Describe production and applications of monoclonal antibodies in diagnostics and therapeutics.

004ENLOS4 Endocrinology 2 Cr.

This course covers the study of hormones, metabolism, hormonal dysfunctions, and regulation of secretions.

004ENITS4 Integrated Teaching 2 Cr.

This course integrates various resources to enhance learning in pharmacology, clinical pharmacy, therapeutic chemistry, and pharmaceutical formulation, fostering interaction among these fields.

004ENINS2 Integrated Teaching 1 Cr.

Integrated Teaching

004ETPHS3 Entrepreneurship in Pharmacy 2 Cr.

The course "From Idea to Startup," guides students through the entrepreneurial journey, focusing on the essential steps to develop a business project in the health innovation sector. It covers key topics such as:

- What it takes to become an entrepreneur
- The process of developing a startup
- Financing for startups
- Business models
- Market research
- Go-to-market strategies
- Pitching to investors

018EPFPL2 Professional Ethics in Pharmacy 3 Cr.

This course exPLO res the challenges of living in a world where references and values are fragmented, and norms are relative to individual beliefs. It addresses common questions that resonate with everyone: What actions can truly promote humanization for oneself and others? How can one lead a good, happy, and responsible life?

004GÉNÉI1 Genetics 3 Cr.

This course, part of the first semester for first-year pharmacy students, exPLO res clinical genetics and its significance in medical practice.
It begins with the molecular foundations of genetics, defining key terms and discussing the transfer of genetic information from DNA to protein, alongside the impact of nucleotide variations on human diseases.
This course then examines various genetic disorders, focusing on chromosomal and monogenic diseases. A major component involves analyzing family pedigrees to illustrate Mendelian inheritance patterns, including autosomal dominant, autosomal recessive, and X-linked inheritance.
Students will exPLO re genetic diseases from molecular and clinical perspectives, covering transmission concepts like penetrance, expressivity, de novo mutations, mosaicism, and consanguinity, along with cancer genetics and population genetics.

004GESTS5 Management and Accounting 2 Cr.

This course presents the essential characteristics, objectives, economic roles, and structure of businesses.
Objectives:

- Understand the fundamentals of accounting as a management tool for businesses.
- Familiarize with banking and various financial instruments.
- Learn about different business structures.
- Comprehend the purchasing and sales system.

004HÉMAS1 Hematology + Pathology + Practical Work 4 Cr.

This course contributes to developing competencies in studying blood components and applying theoretical knowledge in hematology within a medical biology laboratory.

004HYDOS2 Hydrology 1 Cr.

This course enhances students' knowledge of public health concerning water, emphasizing transmissible diseases and necessary individual and community measures.

004SANEI2 Hygiene 2 Cr.

This course aims to:

- Familiarize students with the principles, practices, and hygiene rules essential for preserving and improving health.
- Implement hygiene measures according to specific protocols across various applications, including the hygiene of premises, equipment, individual hygiene, and food hygiene, to prevent transmissible diseases in communities and combat contamination sources.

004IPEAS2 Immunology + Pathology + Practical Work 4 Cr.

This course studies the foundations of physiological and pathological humoral and cellular immunity, including diagnostic methods.

004FONII2 Computer Science 2 Cr.

This course contributes to the development of the following competencies and learning outcomes:
- C1: Provide pharmaceutical care within a pharmacy and dispense medications and health products.
- C2: Manage a pharmacy.
- C3: Provide pharmaceutical care in a hospital setting.
- C4: Contribute to the development of pharmaceutical products (production, marketing, quality control).
- C7: Participate in research development in the pharmaceutical field, innovation, and entrepreneurship.

Learning Outcomes:
- PLO 1.3: Interpret requested biological results and participate in patient orientation.
- PLO 2.1: Manage the pharmacy.
- PLO 3.3: Ensure the follow-up of pharmaceutical care and its documentation.
- PLO 4.4: Inform, promote, and respond to health professionals' inquiries within marketing and regulatory affairs teams.
- PLO 7.1: Apply knowledge, information-seeking skills, and professional judgment in decision-making processes.
- PLO 7.2: Collaborate in the development of fundamental and applied research in pharmaceutical, biological, and health fields.

494INERL3 Introduction to Occupational Therapy 2 Cr.

This course familiarizes students with common health issues faced by communities and their consequences. It is structured around practical workshops where students will engage in dynamic and playful scenarios. This approach encourages future pharmacists to reflect on the dimensions of individuals, their environments, and their activities to understand the interactions and impacts on quality of life. Real-life simulations and field visits will provide students with the opportunity to learn and apply various methods for assisting these individuals.

004INSPI2 Introduction to Pharmacy Internship I-II 5 Cr.

Introductory internship.

004INTES4 Interactions 2 Cr.

This course provides a foundation for pharmacy training and is part of the Bachelor and Master programs.
By the end of this course, students will be able to:
- Analyze a prescription, identify, and describe potential interactions.
- Assess interactions and determine their severity.
- Inform patients about possible drug interactions.
- Explain to patients the measures to take to avoid interactions.

004NOMPI2 Introduction to Pharmacy 3 Cr.

This course covers pharmacy professions.

004IMACS2 Introduction to Market Access 2 Cr.

Introduction to market access.

004IALII4 Introduction to Food 2 Cr.

This course provides an approach to nutrients through basic foods, dishes, and common meals.

004LEPHS5 Pharmaceutical Legislation 2 Cr.

This course is aimed at pharmacy students to clarify the primary purpose of the profession: protecting patient health. It emphasizes several key principles: the pharmacist operates as an independent professional and is subject to regulations that define practice conditions to ensure patient and medication safety.
This course highlights the professional culture of pharmacists, who view medications as healthcare products, patients as individuals requiring care, and themselves as the only experts on medications. This perspective contrasts sharply with a mercantilist approach that treats health as a business, viewing medications as consumer goods, patients as customers, and pharmacists as mere salespeople.

435LALML2 Arabic Language and Media 2 Cr.

This course provides students with an engaging and flexible way to exPLO re the Arabic language and its rich culture. It offers insights into the use of Arabic in various forms of media, including visual, audio, and written journalism, as well as in advertisements across these formats. Through this course, students will develop practical linguistic skills in both oral and written communication, enhancing their proficiency and appreciation of the language.

004LÉGSS5 Social Legislation 2 Cr.

This course aims to:
- Familiarize students with the administrative structure of the National Social Security Fund, including the Board of Directors, Technical Committee, and General Secretariat.
- Learn the steps and areas of application, including the various branches and the subjects involved.
- Understand the different benefits provided by the National Social Security Fund, such as health and maternity insurance, workplace accidents and occupational diseases, family and school benefits, and end-of-service indemnities.

004LEMII3 The Microbial World 3 Cr.

This course introduces students to the microbial world and develops the following competencies:
- Recognizing the various mechanisms of bacterial, viral, parasitic, and fungal infections.
- Identifying cross-infections relevant to pharmacists and the most prevalent infections worldwide.
- Acquiring the necessary knowledge and prerequisites for the special microbiology course.

004MARKS5 Marketing 2 Cr.

This course aims to:
- Understand the purpose of pharmaceutical logistics and marketing.
- Learn the organization and functioning of the pharmaceutical industry.
- Acquire the fundamentals of pharmaceutical marketing and its various management styles.

004MASTI1 Mathematics + Statistics 4 Cr.

This course provides essential mathematical and statistical foundations for students in medical sciences, equipping them to understand the mathematical formulations encountered during their studies and subsequent research. The teaching approach includes:
- An in-depth exPLO ration of mathematical functions used in medical sciences, such as logarithms, exponentials, and hyperbolic functions, along with a study of phenomena like bacterial growth, hyperglycemia tests, and drug elimination.
- Fundamental concepts in statistics and biostatistics, offering healthcare specialists the general knowledge needed to effectively tackle survey problems and statistical testing.

004MMOIS6 Dissertation 8 Cr.

Writing a dissertation involves conducting a bibliographic work with or without practical application on a topic related to pharmaceutical studies.

004MIBOS3 Special Microbiology 4 Cr.

This course introduces infectious pathologies of bacterial origin in humans, whether strictly human or zoonotic. It contributes to the development of the following competencies:

- Identify different pathogenic bacteria in humans and recognize the clinical signs of the infections they cause.
- Gain initial skills in identifying bacteria responsible for infections and their sensitivity to antibiotics.
- Understand various antibiotic treatments appropriate for each infection based on factors such as location and age.
- Acquire essential knowledge for differential diagnosis with viral infections to provide effective advice to patients in a pharmacy setting.

004MSPES1 Special Microbiology + Practical Work 2 Cr.

This course describes the main pathogenic bacteria affecting humans and the fundamental aspects of infectious pathology associated with each microorganism. It contributes to the development of the following competencies:

- Recognizing the primary bacteria involved in human pathology (Gram-positive and Gram-negative cocci), their diagnosis, and treatment.
- Identifying the bacteria responsible for infections in humans.

Practical work complements the theoretical and oral instruction provided. This course supports the competency of applying knowledge in bacteriology within a medical biology laboratory and enhances the theoretical and oral teachings received during practical sessions. The practical training is not intended to transform students into bacteriologists; rather, it aims to provide an overview of conventional bacteriological diagnostic methods.
By the end of this course, students will be able to:

- Perform basic microbiology techniques, including direct examination and Gram staining, culture on solid and liquid media, and slide agglutination tests.
- Use biochemical identification galleries and biochemical tests for bacterial identification.
- Conduct an antibiogram through diffusion on agar medium, interpret results, and select effective antibiotics for treating infections.

FEC- Advanced Article Analysis
By the end of this course, students will be able to:

- Recognize the various stages required for establishing a research project and publication.
- Utilize the main bibliographic data search engines (e.g., PubMed, Em-premium, clinical trials).
- Understand the methodology of epidemiological studies and identify their different types.
- Analyze figures from original scientific articles and scientific reviews.
- Formulate a research hypothesis and support it with relevant bibliographic references.
- Draft and/or evaluate a brochure for a new medication.

004EVENI2 FEC Creativity in Sustainable Development 2 Cr.

This course exPLO res how to optimize the balance between the environmental challenges of an event and its effectiveness. It covers key concepts in event management and provides strategies for integrating sustainable practices into event planning and execution.

004DIONS2 FEC- Advanced Dietetics and Nutrition 2 Cr.

This course aims to deepen students' understanding of nutrition and its relationship with chronic diseases. Each chapter introduces essential concepts, focusing on the benefits and drawbacks of specific food components. Students will learn how to manage various diets throughout different life stages and their connections to chronic health issues.

004UVESS1 FEC- Health Economics 2 Cr.

This elective course allows students to deepen their foundational knowledge in chosen disciplines, gradually preparing them for specialized professional practice.

004ELASI4 FEC Risk Assurance Elements 2 Cr.

This course introduces key concepts of insurance.

004GEAMM1 FEC- Genomics and Medical Applications 2 Cr.

By the end of this course, students will be able to:
- Identify different genome sequencing methods.
- Apply exome, genome, and genetic analyses in medicine and pharmacy.
- Integrate gene expression analysis and quantification techniques for research and diagnostics.
- Understand transgenic animal models and their applications in gene studies or therapeutic target research.

004LADAI2 FEC- Article Reading and Analysis 2 Cr.

By the end of this course, students will be able to:
- Recognize the key steps required for setting up a research project and/or publication.
- Use primary search engines for bibliographic data (Pubmed, Em-premium, Scopus).
- Understand the methodology of epidemiological studies and identify their various types.
- Analyze figures in original scientific articles and review papers.

004MATCM1 FEC- Mechanisms of Toxic Action, Carcinogenesis, and Regulation 2 Cr.

This course provides an in-depth understanding of clinical and experimental toxicology. By the end of this course, students will be able to:
- Describe the fate of toxins in the body (toxicokinetics, biotransformations, cellular and molecular toxic mechanisms).
- Apply the principles of cell culture.
- Identify the various toxicity studies and tests required for new drug marketing authorization.
- Determine the basis of carcinogenesis, mutagenesis, teratogenesis, and immunotoxicity.
- Recognize the fundamentals of pharmacovigilance.
- Apply the principles of scientific article analysis.

004UVPCS1 FEC- Over The Counter Medication (OTC) 2 Cr.

This elective course allows students to deepen their foundational knowledge in chosen disciplines while gradually preparing them for a specific professional practice. By the end of this course, students will be able to:
- Identify key pathologies encountered in the pharmacy, understand the algorithm for managing them with OTC treatments, and recognize cases to refer to a physician, including the role of each molecule.
- Provide the best possible advice to patients.

004PCINM1 FEC- Cellular and Integrated Pharmacology in Neurosciences and Infectiology 2 Cr.

Cellular and Integrated Pharmacology in Neuroscience and Infectiology.

004PHMBM1 FEC- Molecular Pharmacology and Biostatistics 2 Cr.

This biostatistics course enables students to:
- Recall key statistical methods for clinical data analysis.
- Understand principles of clinical intervention and pharmacoepidemiological studies.
- Critique statistical methodologies in scientific articles.
- Analyze survival data.
- Understand regression models.
- Grasp principles of systematic reviews and meta-analysis.
- Build a database for statistical analysis (e.g., dissertation).
- Use IBM SPSS for standard statistical analyses.

004OTMES5 FEC- Orthopedics and Medical Device Orthotics 2 Cr.

This course covers orthopedics and medical device orthotics.

004STPHM1 FEC- Internship in Pharmaceutical Firms or Industries 4 Cr.

Introductory internship and training within pharmaceutical firms or industries.

004STDEM1 FEC- Research Internship (Biochemistry, Molecular Biology, Microbiology, Pharmacology, Toxicology) 4 Cr.

Research Internship (Biochemistry, Molecular Biology, Microbiology, Pharmacology, Toxicology).

004SCCTM1 FEC- Cell Signaling, Therapeutic Targets in Metabolic, Cardiovascular, and Immunotoxicology Disorders 2 Cr.

This course covers cell signaling, therapeutic targets in metabolic, cardiovascular, and immunotoxicology disorders.

004TEVEI4 FEC- Sales Techniques 2 Cr.

This course covers sales techniques.

004TIBCM1 FEC- Innovative Therapies: From Patent to Commercialization 2 Cr.

This course covers innovative therapies from patent to commercialization.

004TCEXM1 FEC- Clinical and Experimental Toxicology 2 Cr.

This course provides an in-depth understanding of clinical and experimental toxicology. Upon completion, students will be able to describe the toxic effects of:

- Toxic agents affecting the liver.
- Toxic agents affecting the kidneys.
- Toxic substances on the central nervous system (CNS).
- Mycotoxins.
- Phycotoxins.
- Pesticides.

004WORNS6 MOF - WRN: Work Ready Now 2 Cr.

WRN: Work ready now

004DRMES5 USJ Elective Course - Medical Law 2 Cr.

This course enables students to:

- Understand the fundamental principles of civil rights, including extrapatrimonial, patrimonial, real accessory, personal, and intellectual rights.
- Learn the sources of obligations.
- Gain insight into emPLO yment contracts.

004HIQMS5 USJ Elective Course - Pharmaceutical Ethics 2 Cr.

This course encourages students to reflect on aspects of pharmaceutical practice related to professional confidentiality and patient information. It aims to:

- ExPLO re the foundations of the healing art.
- Understand key concepts in contemporary moral philosophy, particularly in applied ethics and bioethics.
- Examine the Universal Declaration of Human Rights (1948).

004LCADS1 USJ Elective Course - Addictive Behaviors and Dependencies 2 Cr.

This required course addresses the increasing issue of substance abuse among youth. By the end of this course, students will be able to:

- Identify the mechanisms involved in pharmacological dependence on psychoactive substances.
- Recognize the toxic effects induced by major drugs, including cannabis, opioids, cocaine, amphetamines, and GHB.
- Report the experiences of specialized physicians (psychiatrists, emergency doctors) and representatives from NGOs focused on drug management and addiction prevention in Lebanon.

004REGVI2 USJ Elective Course - Plant Kingdom + Practical Work 4 Cr.

This required course is taught in the second semester of the first year of the pharmacy program. It consists of lectures and practical work, enabling students to understand the taxonomic, structural, and morphological diversity of plants and fungi, as well as their ecology and developmental cycles.

004SOLOI2 USJ Elective Course - Sociology of Health 2 Cr.

Optional Course: sociology of health

004NUTRS4 Nutrition 3 Cr.

This course introduces nutrition, defining key concepts, the nutritional status of individuals, and human nutritional behavior. It covers fundamental nutrition principles and addresses obesity and its therapeutic approaches.

004PAMYS1 Parasitology - Mycology + Practical Work 4 Cr.

This course enables students to deepen their understanding of the diagnostic approach in parasitology, mycology, and medical entomology.

008PSKLL3 Personal Skills 2 Cr.

This course equips students with the essential skills for today's workforce, while cultivating leadership qualities. It streamlines the transition from academia to the professional world by focusing on practical applications of theoretical concepts and enhancing the learning experience through role-playing and case studies.

004PECLS3 Clinical Pharmacy 3 Cr.

This course equips students with the essential knowledge to understand major pathologies, their complications, and the biological tests for diagnosis and monitoring. It enables students to actively participate in therapeutic decision-making and select optimal treatments, including treatment selection, dosage adjustments, dosage form choices, and understanding precautions, contraindications, and potential side effects.

004TEQES4 Clinical Pharmacy 3 Cr.

This course helps students deepen their knowledge and assess their understanding of infectiology and neurology. It focuses on improving patient management, monitoring, and optimizing pharmaceutical care plans.

004PHACS5 Clinical Pharmacy I 3 Cr.

This course equips students with essential knowledge in various clinical areas, including oncology, pulmonology, gastroenterology, dermatology, allergology, ophthalmology, and nephrology. Students will learn about international treatment guidelines and will be able to evaluate pharmacotherapy regarding appropriate treatments, potential side effects, strategies to minimize them, possible drug interactions, and dosage adjustments. This course aims to establish a Pharmaceutical Care Plan (PCP) for individual patients in both hospital and community settings, emphasizing that the pharmacist's approach should remain consistent regardless of the environment. This course also aims to ensure the provision of high-quality pharmaceutical care within a hospital setting.

004PHCCS6 Clinical Pharmacy II 3 Cr.

This course is designed for fifth-year pharmacy students who have preferably completed pharmacology in their third year and clinical pharmacy in their fourth year. Students will conduct their hospital clinical internship, focusing on optimizing the care of patients with conditions encountered during their placements. This course enhances students' knowledge primarily in cardiology and rheumatology, enabling them to analyze the best possible patient care, follow-up, and optimization of the pharmaceutical care plan.
By the end of this course, students will be able to:

- Recognize key aspects of cardiac and rheumatic pathologies and understand the overall management algorithm.
- Explain the role of each medication class discussed within the therapeutic arsenal and identify the specific position of each drug within the same class.
- Provide effective advice to patients.

004PHEVI4 Experimental Pharmacy + Validation 5 Cr.

This course provides students with practical pharmacy training in real-life settings, enabling them to learn how to offer accurate pharmaceutical advice to patients effectively.

004PHEXS2 Experimental Pharmacy + Validation 5 Cr.

This course involves practical pharmacy training, where students engage in real-life scenarios to learn how to provide accurate pharmaceutical advice to patients and analyze prescriptions. It is part of the Experimental Pharmacy III program and includes validation.

004PAEXS4 Experimental Pharmacy + Validation 5 Cr.

This course places students in real-life situations to learn how to provide accurate pharmaceutical advice to patients and analyze prescriptions. These simulation exercises enhance the acquisition of essential skills.

004PHAGS3 Pharmaceutical Formulation 4 Cr.

This course focuses on innovative pharmaceutical forms and those under development for various routes of administration, including biologic medications.
Program Learning Outcomes:

- Collaborate within a team to develop a pharmaceutical product.
- Participate in the manufacturing of a pharmaceutical product.
- Ensure quality control of pharmaceutical products according to established standards.
- Inform, promote, and address inquiries from healthcare professionals within marketing and regulatory affairs teams.

004PAGAS1 Pharmaceutical Formulation 4 Cr.

This course covers the formulation, manufacturing, and quality control of pharmaceutical forms.

004PHQEI4 Pharmaceutical Formulation 2 Cr.

This course focuses on the key packaging articles and excipients used in pharmaceutical forms.
Program Learning Outcomes:

- Develop a pharmaceutical product as part of a team.
- Participate in the manufacturing of a pharmaceutical product.
- Ensure quality control of pharmaceutical products according to standards.
- Inform, promote, and address inquiries from healthcare professionals within marketing and regulatory affairs teams.

004PACII3 Pharmacokinetics 4 Cr.

This course serves as a foundation for pharmacist training and is required for second-year pharmacy Bachelor and Master students.

By the end of this course, students will be able to:

- Interpret how drugs behave in the body.
- Analyze pharmacokinetic phases (ADME).
- Identify and calculate key pharmacokinetic parameters.
- Recommend suitable drug administration routes and forms for patients.
- Develop optimal therapeutic regimens and dosages (including dose and frequency).

004PHMES2 Pharmacognosy 4 Cr.

This course focuses on studying natural raw materials for medical use, including their botanical characteristics, chemical properties, physiological activities, therapeutic applications, and control methods. It also covers the monographs of carbohydrate drugs, lipid plants, essential oil plants, and alkaloids.

004PHAMS1 General Pharmacology 4 Cr.

This course provides students with essential knowledge in pharmacokinetics and pharmacodynamics through three main parts:

- The first part covers the pharmacological development of drugs, including the stages of experimental and clinical research.
- The second part focuses on pharmacokinetics, explaining the four key phases: absorption, distribution, biotransformation, and elimination.
- The third part examines pharmacodynamics, including drug receptors, mechanisms of action, drug interactions, and variations in sensitivity.

The course involves lectures and practical sessions.

004PHLES2 Special Pharmacology 4 Cr.

This course provides students with key knowledge about mediators, receptors, and transporters in the central nervous system and gastroenterology. Understanding these concepts enables students to anticipate therapeutic effects and side effects of medications, allowing them to create tailored care programs in pharmacies and hospitals. This foundational knowledge is essential for succeeding in future clinical pharmacy courses, focusing on delivering pharmaceutical care effectively.

Program Learning Outcomes (PLO)

This course supports PLO 1.2: Addressing patient needs for pharmaceutical care, which involves:

- Listening to patient concerns.
- Gathering relevant information about the patient's condition.
- Analyzing the situation's severity:
- Emergency: Provide first aid and refer to a hospital.
- Beyond competence: Refer to a healthcare professional.
- Within competence: Manage the situation, dispense medications, and give appropriate advice.

Course Learning Outcomes (CLO)

The special pharmacology course consists of two modules:

Neuropharmacology Module:

- Autonomic nervous system (sympathetic and parasympathetic)
- Dopaminergic system (Parkinson's disease, psychoses, treatments)
- Serotonergic system (depression, migraines, treatments)
- GABAergic system (epilepsy, anxiety disorders, treatments)

Gastroenterology Module:

- Ulcers and reflux treatments
- Constipation and laxatives
- Diarrhea and anti-diarrheals
- Irritable bowel syndrome management

004PHSPS3 Special Pharmacology I **4 Cr.**

This course explores the hormonal and endocrine systems, emphasizing the function of antibiotics, their practical indications, and potential patient issues.
By the end of this course, students will be able to:
- Explain the main mechanisms of action of the medications studied.
- Identify potential adverse effects of the drug classes covered.
- Understand the implications of side effects and methods to avoid them.
- Define the therapeutic indications for the drug families discussed.

004PHSOS4 Special Pharmacology II + Oncology **4 Cr.**

This course covers the mediators, receptors, transporters, and targets involved in cancer and anticancer treatments. Understanding the expected therapeutic effects and potential side effects enables students to develop tailored care and advice programs, particularly in oncology. This course is essential for preparing students for the subsequent clinical pharmacy course in their fifth year and for their practical clinical internship at the hospital. This course aims to provide pharmaceutical care within a hospital or pharmacy setting by dispensing medications and health products.

004PHIII1 Physics **3 Cr.**

This course covers the study of mechanics, electricity, fluid mechanics, vibrational phenomena, optics, atomic physics, spectroscopy, and radiation (including laser, X-rays, UV, IR, and NMR) with applications in the medical field. It is designed for first-year pharmacy students and is part of the required Bachelor program. It contributes to the development of competencies and program learning outcomes (PLO), specifically:
C1. Provide pharmaceutical care within a pharmacy by dispensing medications and health products.
PLO 1.3. Interpret requested biological results and participate in patient orientation, including:
- Understanding different types of samples
- Grasping the fundamentals of basic biology
- Comprehending the basics of clinical biology
- Knowing the physiological and pathological values of common markers
- Familiarity with methods for analyzing biological media
- Understanding the basic analyses conducted in a clinical biology laboratory during internships.

004PHYTS4 Phytotherapy and Aromatherapy **2 Cr.**

Expected Learning Outcomes:
- Define phytotherapy and explain its relationship to other medical and pharmaceutical disciplines, covering its history, evolution, and essential concepts such as active ingredients, synergy of action, totum, and traditional and modern pharmaceutical forms.
- Understand medicinal plants, including their origins, active components, therapeutic properties, methods of use, side effects, potential drug interactions, and usage guidelines. This knowledge will be applied to provide effective pharmaceutical care for patients with various health conditions.

004PSYCI4 Psychology **2 Cr.**

This course introduces the fundamentals of psychology and its applications in health psychology. It aims to:
- Understand the interplay between biological and psychological factors.
- Explore how thoughts, behaviors, and emotions function.
- Acquire foundational concepts in health psychology to enhance public health education.
- Learn how to approach patients based on psychological health theories.

004HYSAI4 Public Health **2 Cr.**

This course explores public health education, the recommendations of the WHO, and the issues of environment and pollution.

004SECOS3 First Aid 2 Cr.

This course covers the history and organization of the Red Cross, focusing on emergency care and appropriate responses to various situations.

004SEPAS1 Pathological Semiology 4 Cr.

This course includes:

- Discussion of major medical syndromes
- Detailed clinical aspects and complications
- Therapeutics and practical pharmacology of diseases
- Emphasis on clinical signs, medical semiology, and physical examination
- A focus on synthesis in course delivery

004SOPRI4 Dental Care 2 Cr.

This course expands students' understanding of hygiene and dental care, equipping them to offer informed pharmaceutical advice.

004STBCS4 Clinical Biology Internship + Report 6 Cr.

This internship provides students with hands-on experience in clinical biology, familiarizing them with various biological tests and their interpretation in clinical laboratories.

004STAHS6 Hospital Internship 11 Cr.

This course consists of rotations in various hospital departments and the hospital pharmacy, tailored for fifth-year Doctor of Pharmacy students. It spans two semesters of the academic year, running concurrently with a theoretical course in Clinical Pharmacy taught by pharmacists and medical specialists.
Students complete their clinical internship at the *Hôtel-Dieu de France* Medical Center and the Bellevue Medical Center, covering several departments: pharmacy, cardiology, oncology, psychiatry, infectious diseases, pediatrics, and pulmonology. Each student selects five departments at the start of the year.
This internship aims to enhance students' clinical knowledge. They will understand key pathologies and international treatment guidelines, as well as evaluate pharmacotherapy. This includes assessing treatment appropriateness, identifying potential side effects and strategies to minimize them, recognizing possible drug interactions, and adjusting dosages. Ultimately, students will develop tailored pharmaceutical care plans for individual patients within specific hospital contexts.
They will receive guidance from coordinators who monitor their activities and progress throughout the internship. The clinical internship lasts for five periods of four weeks each, totaling 20 weeks during the fifth year of pharmacy studies.

004STAGS6 Pharmacy or Industrial Internship 1 Cr.

This is the final part of the pharmacy internship, where students will complete their training with a month of practical synthesis in a community pharmacy.

004SUIOS2 Pharmacy Internship III, Pharmacy Follow-up, and Report 6 Cr.

This internship deepens students' theoretical pharmacy knowledge, enables them to apply it in practice, and familiarize them with prescription validation and pharmaceutical care.
Objectives:

- Enhance knowledge of over-the-counter and prescribed medications according to the Faculty's program.
- Organize and plan work to complete the program on time.
- Manage therapy for a set number of patients, increasing as the internship progresses and ensuring case diversity.
- Research information, analyze therapy, and identify goals, potential side effects, and patient-specific issues.
- Counsel patients in a respectful manner, ensuring they understand and accept their therapy.

- Document activities regularly for presentation to the supervisor during weekly meetings.
- Conduct self-assessments of activities, identifying successes and areas for improvement.
- Attend follow-up meetings at the Faculty.

004SUOFI4 Pharmacy Internship II, Pharmacy Follow-up, and Report 6 Cr.

This internship aims to strengthen students' theoretical knowledge of pharmacy, apply it in practical settings, and help them become familiar with the daily operations of a pharmacy.
Objectives:
- Enhance knowledge of over-the-counter and prescribed medications according to the Faculty's program.
- Organize and plan work to complete the program on time.
- Manage therapy for a set number of patients, increasing as the internship progresses and ensuring case diversity.
- Research information, analyze therapy, and identify goals, potential side effects, and patient-specific issues.
- Counsel patients in a respectful manner, ensuring they understand and accept their therapy.
- Document activities regularly for presentation to the supervisor during weekly meetings.
- Conduct self-assessments of activities, identifying successes and areas for improvement.
- Attend follow-up meetings at the Faculty.

004SOFRI2 Pharmacy Internship I, Pharmacy Follow-up, and Report 6 Cr.

Internship Follow-up and Report.

004SYNIS5 Integrated Syntheses 3 Cr.

Integrated Syntheses

005TSPHL2 Care Techniques 2 Cr.

This course equips students with knowledge and skills in applying care techniques while adhering to safety and quality standards.

004EXPCI1 Expression Techniques 3 Cr.

This course enhances the skills needed to effectively receive, analyze, and convey information. It focuses on mastering appropriate techniques, improving linguistic and methodological competencies, and empowering students to communicate effectively while strengthening their personal and professional image.

004TOXIS3 Toxicology 4 Cr.

This required course contributes to the development of the following competencies and Program Learning Outcomes (PLO):
C.1.1. Prepare and dispense medications and health products.
C.1.2. Address the needs of patients seeking pharmaceutical care for treatment or guidance.
PLO 1.1.3. Inform patients about potential toxic effects of medications.
By the end of this course, students will be able to:
- Inform patients about potential toxic effects of medications and other toxic products.
- Analyze an intoxication, assess its severity, and determine appropriate actions.

004TODUS4 Emergency Toxicology 3 Cr.

By the end of this required course, students will be able to:
- Inform patients about potential toxic effects of medications and other toxic products.
- Analyze an intoxication, assess its severity, and determine appropriate actions.

004TPBIS2 Biochemistry Practical Work 1 Cr.

This practical work focuses on quantifying biomolecules and demonstrating their chemical properties. Students will synthesize, format, and present their results according to scientific standards, with each pair preparing a report.

Objectives:

- Select a method to analyze a biological sample.
- Apply biochemistry concepts to design an experimental method for biomolecule analysis.
- Familiarize with biochemical calculations and equations.
- Produce a concise report summarizing the work and results, presented in graphs or tables.

004TPCAI4 Analytical Chemistry Practical Work 2 Cr.

This practical work introduces the fundamental principles of qualitative and quantitative chemical analysis in aqueous solutions, utilizing acid-base, redox, precipitation, and complexation equilibria. It familiarizes students with the underlying theories of various instrumental techniques in chemistry. The experiments include NMR, MS, GC, HPLC, visible and UV spectroscopy, infrared spectrophotometry, and spectrofluorimetry. Additionally, some analytical strategies for detecting counterfeit medications will be discussed.

Objectives:

- Apply theoretical concepts in chemistry and the structure-property relationship to design an experimental method for drug analysis.
- Conduct all steps involved in colorimetric volumetric titration.
- Characterize organic compounds structurally using complementary information from MS, NMR, and IR analyses.

004CHTPI4 Organic Chemistry Practical Work 2 Cr.

These practical sessions familiarizes students with modern organic synthesis techniques used to prepare small organic molecules for applications in medicinal chemistry, agrochemistry, materials science, and cosmetics. The sessions will involve identifying the synthesized molecules using advanced analytical techniques such as NMR, MS, UV, IR, HPLC, GC-MS, and TLC. Students will also gain experience in planning experiments, managing time, maintaining a laboratory notebook, adhering to lab safety protocols, and respecting environmental concerns. A relevant bibliographic review and an experimental report are required.

Objectives:

- Analyze experimental results to determine the mechanism or reactivity of chemical species.
- Apply theoretical concepts in chemistry and the structure-property relationship to design an experimental method for synthesizing a molecule.
- Precisely determine a molecule's structure by integrating various spectroscopic techniques and analyze an experimental fact to draw conclusions.

004TPMIS3 Special Microbiology Practical Work 1 Cr.

This course is offered to students enrolled in the 4th year of the Doctorate of Pharmacy (Practicing Doctorate). It aims to develop the competency of applying theoretical knowledge in bacteriology within a medical biology laboratory. The practical instruction is not intended to train students as bacteriologists but rather to provide an overview of conventional bacteriological diagnostic methods.

Objectives:

- Perform basic microbiology techniques: direct examination, Gram staining, and culture on solid and liquid media, along with slide agglutination tests.
- Use biochemical galleries and biochemical tests for bacterial identification.
- Conduct an antibiogram using the diffusion method in agar, interpret results, and select effective antibiotics for treating infections.

004SYINS1 Pharmaceutical Formulation Practical Work + Integrated Syntheses Practical Work 1 Cr.

Practical work in pharmaceutical formulation + integrated syntheses

004IELES2 Industrial Pharmacy Practical Work 1 Cr.

This course involves formulating a medication and simulating production in industrial manufacturing workshops while applying principles of drug control from a galenic and biopharmaceutical perspective. The practical sessions consist of rotating manipulations, where students will gain hands-on experience in drug formulation and quality control. Utilizing knowledge from galenic pharmacy and chemistry, students will adhere to good laboratory and manufacturing practices. This unit is essential for understanding the formulation, manufacturing, and quality control of medications, encompassing topics such as galenic pharmacy, industrial pharmacy, pharmacokinetics, and quality assurance.

004PHAPS3 Special Pharmacology Practical Work 1 Cr.

Tests on analgesics and muscle relaxants.

004TOXXS4 Toxicology Practical Work 1 Cr.

This required course covers the detection of toxic substances (medications, drugs, metals, etc.) in various biological fluids or foods through practical work. It complements the Toxicology course.
Objectives:

- Analyze an intoxication case
- Assess its severity
- Determine appropriate measures to take

004VSLAS6 Laboratory Internship Validation 0 Cr.

Exams related to the laboratory internship.

004VSOFS6 Pharmacy Internship Validation 0 Cr.

Exams related to the pharmacy internship.

004VIROS4 Virology 2 Cr.

This foundational required course introduces students to viral infectious pathologies in humans, whether strictly human or zoonotic. It aims to:

- Recognize various pathogenic viruses in humans and the clinical signs of associated infections.
- Initiate diagnostic processes for viral infections.
- Identify appropriate antiviral treatments for each infection.
- Acquire essential knowledge for differential diagnosis with bacterial infections.