Faculty of Pharmacy

Course Specifications
2015 - 2016
Semester 1
Computer and Applications

**Code:** CSP 101  
**Pre-requisites:** None  
**Department:** Computer Science  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**  
This course provides the students with basic knowledge about the internet, the World Wide Web and introduces basic software and hardware concepts and terminology, as well as, the types of application software such as personal productivity tools, scientific visualization and graphics applications, and different business applications.

English for Academic Purpose and Medical Terminology

**Code:** ENG 101  
**Pre-requisites:** ELAT  
**Department:** English  
**Credit hours:** 3  
**Contact hours:** 4.5  
**Course Outline:**  
English 101 is an academic writing course for College English learners. The course teaches writing in a straightforward manner, using a step-by-step approach. Clear models and varied practice helps to develop confidence and style in writing.

Mathematics

**Code:** MTH 101  
**Pre-requisites:** None  
**Department:** Mathematics  
**Credit hours:** 2  
**Contact hours:** 2  
**Course Outline:**  
This course helps the students to recognize the basic knowledge of Mathematics which aids in solving pharmaceutical problems.
**Organic Chemistry 1**

**Code:** PC 111  
**Pre-requisites:** None  
**Department:** Organic Chemistry  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**

This course is concerned with studying of important aliphatic compounds such as: aliphatic alkanes, alkenes, alkynes, alkyl halides, alcohols, aldehydes, ketones, acids, esters, ethers and amines. Their chemical properties, preparation, reactivity and reactions.

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**Pharmacognosy 1**

**Code:** PG 101  
**Pre-requisites:** None  
**Department:** Pharmacognosy  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**

The course is concerned with the study of drugs from natural products, the methods of cultivation, collection and drying of these drugs. The course focuses on medicinal drugs from leaves, flowers and barks with their active constituents, medicinal uses and contraindications.
Introduction to Pharmaceutics

**Code:** PT 101  
**Pre-requisites:** None  
**Department:** Pharmaceutics  
**Credit hours:** 2  
**Contact hours:** 2  
**Course Outline:**  
This course is concerned with introducing students to the history of pharmacy as well as introducing them to the profession of pharmacy with an emphasis on the contribution of pharmacy to healthcare in various settings.

General and Physical Chemistry

**Code:** PC 100  
**Pre-requisites:** None  
**Department:** Analytical Chemistry  
**Credit hours:** 2  
**Contact hours:** 2  
**Course Outline:**  
This course introduces the students to the basic principles of chemistry including: periodic table, chemical bonding, solubility concepts, and theories and principles of acids and bases. In addition, the students study the physical properties of gas as well as the gas laws and are provided with basic knowledge of chemical thermodynamics and principles of chemical kinetics.
Semester 2
**Analytical Chemistry 1**

**Code:** PC 123  
**Pre-requisites:** None  
**Department:** Analytical Chemistry  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**

This course enables the students to comprehend the most important chemical reactions required for qualitative analysis. Students are introduced to the differences between ions of the same group (anions or cations) using laboratory reagents. In addition, the students explore the analytical methods for identification of unknown chemical powder depending on simple chemical test.

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**English Language for Study Skills**

**Code:** ENG 102  
**Pre-requisites:** ENG 101  
**Department:** English  
**Credit hours:** 3  
**Contact hours:** 4.5  
**Course Outline:**

This course teaches the students to develop formal reports and business proposals writing, note taking and oral presentation skills, show the students how to acquire study skills that would facilitate any research process and state types of business writing, such as reports, business letters, memos, and Job related document (Résumé & application letter) as well as dealing with Job Interview.
Physical Pharmacy

**Code:** PT 102  
**Pre-requisites:** None  
**Department:** Pharmaceutics  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**  
This course is concerned with providing basic background information on physicochemical properties of drugs and drug products and understanding how physicochemical characteristics affect formulation of drug products.

Organic Chemistry 2

**Code:** PC 112  
**Pre-requisites:** PC 111  
**Department:** Organic Chemistry  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**  
This course is concerned with studying important aromatic compounds such as benzene, aromatic arenes, aromatic alkyl halides, phenols, nitrogenous compounds and poly nuclear compounds. Their chemical properties, preparation, reactivity and reactions.

Pharmacognosy 2

**Code:** PG 102  
**Pre-requisites:** PG 101  
**Department:** Pharmacognosy  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**  
The course is a continuation of the previous one. It is concerned with studying crude drugs from seeds, fruits, subterranean organs and the unorganized drugs with their active constituents, medicinal uses and contraindications.
Anatomy and Histology

**Code:** PO 101  
**Pre-requisites:** None  
**Department:** Pharmacology  
**Credit hours:** 3  
**Contact hours:** 4

**Course Outline:**
This course provides comprehensive knowledge about the basic structure of the human body and its clinical significance that provides a strong foundation for future studies. It deals with human morphology that starts with the cellular level of organization followed by tissue, organ and system levels. This course is also concerned with teaching the students the basic histological structures of different cells and tissues of human body; preparing them for making correlation between functions and structure of various tissues.
Semester 3
Analytical Chemistry 2

Code: PC 223  
Pre-requisites: PC 123  
Department: Analytical Chemistry  
Credit hours: 3  
Contact hours: 4  
Course Outline:  
This course introduces the students to the fundamental principles underlying the quantitative analytical chemistry and stoichiometric determinations. Students comprehend the basic titrimetric methods of chemical analysis covering the major types of reactions; acid-base, aqueous and non-aqueous titrations, metal/ligand complexation, and finally precipitation.

English Language for Research Purpose

Code: ENG 201  
Pre-requisites: ENG 102  
Department: English  
Credit hours: 3  
Contact hours: 4.5  
Course Outline:  
This course prepares the students for writing research papers and project reports, emphasizes research skills necessary for writing research papers, provides a survey of different articles on specialized topics. It also, trains the students on rhetorical awareness beyond traditional composition, intensive writing practice with a thorough guidance on using references and citing sources.
**General Microbiology and Immunology**

**Code:** PM 204  
**Pre-requisites:** None  
**Department:** Microbiology  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**  
This course provides the students with basic knowledge about various types of microorganisms with details about structure, morphology, components of each type. Also how microorganism maintain itself in a balanced state in the biosphere. In addition, greater understanding about immune system and the role of immune system in health and disease conditions such as tumor and graft rejection.

**Organic Chemistry 3**

**Code:** PC 211  
**Pre-requisites:** PC 112  
**Department:** Organic Chemistry  
**Credit hours:** 4  
**Contact hours:** 5  
**Course Outline:**  
This course is concerned with: Heterocyclic structures: concerned with studying important six membered heterocyclic ring containing one hetero atom such as pyridine or more as diazines and five membered heterocyclic ring with one hetero atom such as furan and pyran. Beside quinolines and quinazolines. Their chemical properties, preparation, reactivity and reactions. Stereo chemistry and carbohydrates.

**Pharmaceutical Dosage Form 1**

**Code:** PT 201  
**Pre-requisites:** PT 101  
**Department:** Pharmaceutics  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**  
This course is concerned with giving the students an insight into the design, formulation, manufacture and evaluation of a number of liquid dosage forms.
Semester 4
Chemistry of Natural Products 1

Code: PG 212  
Pre-requisites: PG 102 and PC 211  
Department: Pharmacognosy  
Credit hours: 3  
Contact hours: 4  
Course Outline:  
The course is concerned with the study of the chemistry of different classes of natural constituents including carbohydrates, different types of glycosides (cardiac, anthraquinones, flavonoids...) their structures, and methods of isolation, purification, detection and quantitative estimation, in addition to study the pharmacological actions and therapeutic uses of these natural constituents.

Analytical Chemistry 3

Code: PC 224  
Pre-requisites: PC 223  
Department: Analytical Chemistry  
Credit hours: 3  
Contact hours: 4  
Course Outline:  
This course introduces the students to the basic knowledge needed for comprehending the electrochemical techniques of analysis with special focus on potentiometry and conductometry in addition to chromatographic separation techniques. The students comprehend the basic redox reactions.

Physiology

Code: PO 201  
Pre-requisites: PO 101  
Department: Pharmacology  
Credit hours: 3  
Contact hours: 4  
Course Outline:  
This course provides Pharmacy students with fundamentals of functions of various body systems as well as potential drug targets in each system.
Pharmaceutical Business Administration

**Code:** MS 201  
**Pre-requisites:** ENG 101  
**Department:** Management sciences  
**Credit hours:** 2  
**Contact hours:** 2  
**Course Outline:**  
This course is concerned with introducing pharmacy students to the basics of managing a business, development of professional aspects of owning and managing pharmacy practice. Students also learn business terminology and provide preliminary study into the areas of economics, global business, ethics, business ownership, business management, human resource management, marketing, accounting and finance. As well as, exploring the basic concepts and processes of management and the functional roles and processes of planning, leading, organizing, and controlling comprising the manager role.

Pharmaceutical Dosage Form 2

**Code:** PT 203  
**Pre-requisites:** PT 201  
**Department:** Pharmaceutics  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**  
This course is concerned with highlighting the role of skin in percutaneous absorption of different topical preparations and develop the understanding of the design, formulation, manufacture and evaluation of topical as well as transdermal semi-solid dosage forms.
Pharmaceutical Microbiology

Code: PM 203  
Pre-requisites: PM 204  
Department: Microbiology  
Credit hours: 3  
Contact hours: 4  
Course Outline:  
Students in this course study the basic knowledge about chemotherapeutic agents, antibiotics and various sterilization techniques (the mode of action of antibiotics and other antimicrobial agents, Know how each sterilization process destruct microorganisms or prevent its presence within a system. Also begin to recognize methods of evaluation of the potency of antibiotics, preservatives and disinfectants. In addition raising the awareness of methods for testing efficiency of each sterilization process, methods of controlling microorganisms in the lab, hospital and the pharmaceutical company and methods for assessment of a new antibiotic.

Psychology and Sociology for Pharmacy

Code: BS 202  
Pre-requisites: ENG 101  
Department: Behavioral Sciences  
Credit hours: 2  
Contact hours: 2  
Course Outline:  
This course covers the principles of psychology and sociology applicable to many different health contexts in the corresponding health organizations. It also, introduces a wide array of theoretical perspectives, sociological aspects and research methods insight into health related behavior (Contemporary practice of pharmacy)
Semester 5
Chemistry of Natural Products 2

Code: PG 311  
Pre-requisites: PG 212  
Department: Pharmacognosy  
Credit hours: 3  
Contact hours: 4  
Course Outline:  
The course is concerned with alkaloids, as one of the major plant constituents, their structures, pharmacological actions isolation, purification, identification and quantitative estimation which will lead to its efficient use in different pharmaceutical preparations. It is concerned also with the study of the basics of various chromatographic techniques and their applications in the separation of active ingredients from their natural origin.

Biochemistry I

Code: PB 301  
Pre-requisites: PO 201  
Department: Biochemistry  
Credit hours: 3  
Contact hours: 4  
Course Outline:  
The course is concerned with studying the basic knowledge about the chemical structure and functions of different food stuffs including (sugar, lipids and proteins), enzymes and nucleoproteins and the biochemical functions of sun cellular organelles.
**Instrumental Analysis**

**Code:** PC 321  
**Pre-requisites:** PC 211 and PC 224  
**Department:** Analytical Chemistry – Organic Chemistry  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**

This course is divided into 2 parts:

Analytical chemistry part: Enables the students to demonstrate and understand the electromagnetic radiation and to elucidate the importance of advanced instrumental methods for chemical analysis in order that he/she understands that these analytical tools are crucial for the investigation of any pharmaceutical product from the qualitative and quantitative aspects. Also, the course acquaints the students with the appropriate setting regarding basic components of instrumentation, underlying principles behind methodologies and applications of each method.

Organic chemistry part: Concerned with studying methods of any chemical compound identification through using INFRARED spectral data, H1 NMR data and mass spectrum.

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**Medical Microbiology**

**Code:** PM 302  
**Pre-requisites:** PM 204  
**Department:** Microbiology  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**

Medical Microbiology begins with a series of chapters presenting the general concepts of bacterial microbiology and then with chapters detailing the major bacterial pathogens of humans. Similar sections cover virology, and mycology. In each section, the introductory chapters stress the mechanisms of infection characteristic of that type of microorganism, thus providing the reader with a framework for understanding rather than memorizing the clinical behavior of the pathogens. The course illustrate the microbiological aspects of infectious disease, demonstrate the clinical symptoms of each disease, show methods of treatment of these diseases, predict the spreading ability of epidemic diseases and employ the student’s awareness of laboratory diagnosis of infectious disease. Also, to dramatize the student’s awareness of laboratory diagnosis of infectious disease.
Pharmacology I

Code: PO 311  
Pre-requisites: PO 201  
Department: Pharmacology  
Credit hours: 4  
Contact hours: 5  
Course Outline:

The course introduces basic pharmacology studies of different body systems and major drug categories on cardiovascular diseases, respiratory and gastrointestinal tracts with special focus on the autonomic nervous system. The students learn to have detailed working aspects of physiology and pathology as well as pharmacology of molecular drugs at receptor sites and ion channels. The practical part teaches the students in depth the different sites of action of drugs. At the end of the course the students should be able to place major drugs into correct therapeutic categories and identify indications, side effects, and interactions.

Biopharmaceutics and Pharmacokinetics

Code: PT 302  
Pre-requisites: PT 102  
Department: Pharmaceutics  
Credit hours: 3  
Contact hours: 4  
Course Outline:

This course is concerned with introducing the students to the general principles of drug bioavailability and bioequivalence and extending students' knowledge about pharmacokinetics and the various parameters affecting it.
Semester 6
Chemistry of Natural Products 3

Code: PG 313  
Pre-requisites: PG 311  
Department: Pharmacognosy  
Credit hours: 2  
Contact hours: 2  
Course Outline: 
This course provides students with detailed knowledge about volatile oils as one of the major plant constituents, their structures, isolation, purification, identification and quantitative estimation, in addition to the study of the theoretical concepts of different biosynthetic pathways of different classes of active plant constituents.

Biochemistry 2

Code: PB 303  
Pre-requisites: PB 301  
Department: Biochemistry  
Credit hours: 3  
Contact hours: 4  
Course Outline: 
The course is concerned with studying the metabolic processes occurring in the human body regarding carbohydrates and factors affecting blood glucose, the different metabolic pathways of lipids and lipoproteins and finally the amino acids degradation, fate of the ammonia and amino acid synthesis.
Ethics and Safety

**Code:** RS 302
**Pre-requisites:** Sophomore Students
**Department:** Research and Seminar
**Credit hours:** 2
**Contact hours:** 2

**Course Outline:**
This course provides the students with basic knowledge about the importance of both ethical and biosafety aspects as a rapidly growing field. It helps them to understand, identify and solve problems in critical, creative and ethical manner and to recognize the value of self and others in order to be a productive member of a diverse global society. This course will prepare the students to embark on related post–graduate studies of interest which would provide better opportunities and advancement in the relevant areas of pharmacology ...etc.

Pharmaceutical Dosage Form 3

**Code:** PT 303
**Pre-requisites:** PT 203
**Department:** Pharmaceutics
**Credit hours:** 3
**Contact hours:** 4

**Course Outline:**
This course is concerned with the design, formulation, manufacture and evaluation of solid dosage forms, as well as acquainting the students to the compounding and quality control procedures of different solid dosage forms.
Pathophysiology and Parasitology

Code: PM 303  
Pre-requisites: PM 204  
Department: Microbiology  
Credit hours: 3  
Contact hours: 4  
Course Outline:  
This course is divided into two parts:  
Pathophysiology part: Provides Pharmacy students with fundamentals of pathophysiology of common diseases of different body systems and the rationale of the therapy.

Parasitology part: Provides Pharmacy students with basic knowledge about various types of parasites, raise the awareness to important parasites especially those endemic in Egypt and the modes of transmission, laboratory diagnosis and treatment of each parasite

Pharmaceutical Chemistry I

Code: PC 331  
Pre-requisites: PC 211  
Department: Pharmaceutical Chemistry  
Credit hours: 3  
Contact hours: 4  
Course Outline:  
The course is concerned with studying chemotherapeutic agents and their applications in medicinal fields with a focus on structure activity relationship, detection of purities and determination of active constituent concentration in dosage forms.
Pharmacology 2

Code: PO 312
Pre-requisites: PO 311
Department: Pharmacology
Credit hours: 3
Contact hours: 4
Course Outline:
pharmacology II drives the students to study central nervous systems, blood diseases and drugs acting on the endocrines. The course is engaged with studying various mechanism of action of drugs. The practical course tends to be more sophisticated where the students learn how to deal with experimental animals and how to investigate the mechanism of action of drugs by various techniques in vitro and in vivo.
Semester 7
Clinical Biochemistry and Molecular Biology

**Code:** PB 401  
**Pre-requisites:** PB 303  
**Department:** Biochemistry  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**
The course is concerned with reviewing and monitoring the biochemical changes in a specific diseases, the diagnostic importance of some hormones and enzymes. Studying the concepts of clinical molecular biology and the application of clinical biochemistry in diagnosis of cancer.

Bioassay and Biostatistics

**Code:** PO 411  
**Pre-requisites:** PO 312  
**Department:** Pharmacology  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**
The course is divided into two parts. Firstly, bioassay which is shorthand for biological assessment include wide range and varieties of scientific experiments carried on different body organs and isolated tissues to determine the biological activity of a substance, such as hormone or drugs. Bioassay is important to measure the effects of novel drugs as well as standard drugs and essential in the development of new drugs. The second part includes the application and design of statistics and offer appropriate mathematical framework for scientific context to fill the gap between theory and practice. The students are trained to collect, summarize and analyze data from different experiments and subsequently interpret the validity of research results.
**Industrial Pharmacy 1**

**Code:** PT 411  
**Pre-requisites:** PT 303  
**Department:** Pharmaceutics  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**  
Industrial courses are concerned with providing the students with experience in machinery, equipment and peripherals used in a drug manufacturing facility. Also, familiarizing them with some pharmaceutical operations used in pharmaceutical industry, such as mixing, drying and milling, etc.

**Pharmaceutical Chemistry 2**

**Code:** PC 431  
**Pre-requisites:** PC 331  
**Department:** Pharmaceutical Chemistry  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**  
The course is concerned with studying different pharmacological classes of drugs, their mechanisms of action, chemical synthesis, identification of pharmacophores and determination of active constituent concentration in dosage forms.

**Clinical Pharmacokinetics**

**Code:** PL 401  
**Pre-requisites:** PT 302  
**Department:** Clinical Pharmacy  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**  
The course is concerned with investigating, reviewing and evaluating (qualitatively and quantitatively) the processes of drug distribution, metabolism and elimination. Also students will be able to recognize the pharmacokinetics of different dosage forms.
Semester 8
**Industrial Pharmacy 2**

**Code:** PT 413  
**Pre-requisites:** PT 411  
**Department:** Pharmaceutics  
**Credit hours:** 3  
**Contact hours:** 4  

**Course Outline:**  
Industrial courses are concerned with providing the students with experience in machinery, equipment and peripherals used in a drug manufacturing facility. Also, familiarizing them with some pharmaceutical operations used in pharmaceutical industry, such as mixing, drying and milling, etc.

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**Marketing and Drug Promotion**

**Code:** MS 401  
**Pre-requisites:** MS 201  
**Department:** Management sciences  
**Credit hours:** 2  
**Contact hours:** 2  

**Course Outline:**  
The aims of the course are to explain the marketing functions of product/service planning, pricing, distribution, and promotion, as well as, the relationship between previous marketing approaches and marketing trends in the New Economy, define marketing terms, concepts, models, and processes, conduct research to demonstrate research skills using the Internet, textbook, and marketing periodicals. It also aims at comparing, contrasting or articulating a new point of view using critical thinking skills and creating a marketing plan for a business that demonstrates knowledge of material covered in class.
Pharmacy Practice

Code: PT 421  
Pre-requisites: Junior students  
Department: Clinical Pharmacy  
Credit hours: 3  
Contact hours: 4  
Course Outline: 
This course aims at teaching the students how to critically investigate the structures, processes and outcomes of a variety of services provided by community pharmacies. Build a patient care practice capable of providing a consistent service to every patient. Enhance pharmacy practice skills through contact with patients as well as health professionals with emphasis on non-prescription medication counselling, health promotion, and disease prevention activities.

Research Methodology

Code: RS 401  
Pre-requisites: Junior Students  
Department: Research and Seminar  
Credit hours: 3  
Contact hours: 3  
Course Outline: 
This course is concerned with scientific thinking, ethical frameworks and research. It will prepare the student for the graduation projects.
Toxicology and First Aid

**Code:** PO 422  
**Pre-requisites:** PO 312  
**Department:** Pharmacology  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**

It is a branch concerned with the study of the adverse effects of chemicals on living organisms. It studies the harmful effects of biological, chemical and physical agents in biological systems that cause damage in the living organisms. The course focuses on factors that influence chemical toxicity including the dosage (acute or chronic), route of administration, species, age, sex and environment.

Biotechnology

**Code:** PM 401  
**Pre-requisites:** PM 204  
**Department:** Microbiology  
**Credit hours:** 2  
**Contact hours:** 2  
**Course Outline:**

This course demonstrate the role of molecular biology and genetic engineering in development of biological sciences, appraise the role of biotechnology as an alternate source of producing natural products and reflect the use of biotechnology for production of pharmaceutical products.
Semester 9
Clinical Pharmacy and Drug Information

Code: PL 504  
Pre-requisites: PO 312  
Department: Clinical Pharmacy  
Credit hours: 3  
Contact hours: 4  
Course Outline:  
This course is concerned with interpreting knowledge into the provision of drug information to patients and to other health care professionals and to integrate knowledge into the provision of a clinical intervention service to patients and other health care professionals for a specific disease state.

Clinical Pharmacology and Drug Interaction

Code: PO 512  
Pre-requisites: PO 312  
Department: Pharmacology  
Credit hours: 3  
Contact hours: 4  
Course Outline:  
It is science of drugs and clinical uses. The course is underpinned by pharmacology I and pharmacology II with added principles of clinical applications and principles in real situations. The course bridges the gap between clinical practice and laboratory science. It aims to prepare pharmacists skilled in areas of drug information, medication safety and other aspects of pharmacy practice related to clinical pharmacology.
**Drug Design**

**Code:** PC 532  
**Pre-requisites:** PC 431  
**Department:** Pharmaceutical Chemistry  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**  
The course is concerned with recognition of fundamental aspects and current methodologies involved in drug discovery process, critically examines the metabolic changes in drug molecules and highlights the concept of drug latentiation in prodrug.

**Quality Control and Quality Assurance**

**Code:** PC 521  
**Pre-requisites:** PC 321  
**Department:** Analytical Chemistry - Pharmaceutics  
**Credit hours:** 2  
**Contact hours:** 2  
**Course Outline:**  
This course introduces the students to the basis of quality control and the different types of quality standards for laboratories. It allows the students to recognize the importance of quality control processes which contribute directly or indirectly to the safety, efficiency and acceptability of the pharmaceutical product. The course also raises the awareness to international and national standard organization requirements and acquaints the students with instrumental calibration, validation and manipulation.
Independent Studies in Pharmaceutical Sciences

**Code:** RS 501  
**Pre-requisites:** Senior Students  
**Department:** Research and Seminar  
**Credit hours:** 4  
**Contact hours:** 4

**Course Outline:**
This course allows the student to demonstrate the ability to carry out a sustained piece of research, set an action plan of work for the practical part and acquire the skills of literature surveying, analyzing information, interpreting, suggesting solutions and writing reports. In addition to, some soft skills as presentation skills, communication skills, time management.
Semester 10
**Therapeutics**

**Code:** PL 503  
**Pre-requisites:** PO 312  
**Department:** Clinical Pharmacy  
**Credit hours:** 3  
**Contact hours:** 4  
**Course Outline:**  
This course aims at extending students’ knowledge about the therapeutics of different disease states. The student will learn how to collect data about patients and how to correlate patient history with the proper medication. This is expected to improve the drug monitoring ability of the student.

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**Drug Delivery Systems**

**Code:** PT 502  
**Pre-requisites:** PT 303  
**Department:** Pharmaceutics  
**Credit hours:** 2  
**Contact hours:** 2  
**Course Outline:**  
This course is concerned with identifying and characterizing the physical and biological barriers to drug transport as a function of various routes of administration, understanding the principles of delivering a drug molecule to its target organ and understanding the applications of nanotechnology in drug delivery.

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**Sterile Products**

**Code:** PT 522  
**Pre-requisites:** PT 303  
**Department:** Pharmaceutics  
**Credit hours:** 2  
**Contact hours:** 2  
**Course Outline:**  
This course is concerned with providing the students with the fundamental principles used to formulate, manufacture and control sterile products, namely ophthalmics and parenterals, as well as providing the students with the knowledge of the applications of radiopharmaceuticals, measurement of radioactivity and formulation of radiopharmaceuticals.
Research Project

**Code:** RS 502  
**Pre-requisites:** Senior Students  
**Department:** Research and Seminar  
**Credit hours:** 6  
**Contact hours:** 6  
**Course Outline:**  
This course allows the student to apply previously acquired knowledge to a pharmaceutical research problem, demonstrate the ability to carry out a sustained piece of research, set an action plan of work for the practical part and acquire the skills of literature surveying, analyzing information, interpreting, suggesting solutions and writing reports. In addition to, some soft skills as presentation skills, communication skills, time management.

Public health

**Code:** PM 501  
**Pre-requisites:** PM 302  
**Department:** Microbiology  
**Credit hours:** 2  
**Contact hours:** 2  
**Course Outline:**  
This course recognize the role of pharmacist in the public and community, recognize, appreciate and analyze different problems in the community that may affect public health and to specify the pharmacist role in its manipulation. Also the course help to determine, design and evaluate the methods needed to control environmental and communicable hazards.

Pharmaceutical Ethics and Legislation

**Code:** PT 531  
**Pre-requisites:** Senior Students  
**Department:** Pharmaceutics  
**Credit hours:** 2  
**Contact hours:** 2  
**Course Outline:**  
This course is concerned with providing the students with the laws and legislations governing the practice of pharmacy.