

## Courses Description

**College:** Pharmaceutical Sciences

**Department:**

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**Course ID:** ١٣١٧٠٣٢١١      **Description:** Pharmaceutical Organic Chemistry

**Full Course Description:** The course is planned to cover knowledge of organic chemistry with particular emphasis on heterocyclic organic compounds including their nomenclature, natural sources, and methods of synthesis. It covers the chemistry of different classes of heterocyclic and polycyclic aromatic compounds involving one or more heteroatoms with focusing on their medical and pharmaceutical importance. Additionally, the course will confer the stereo-chemical aspects of these systems focusing on their effect on drugs activities.□

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**Course ID:** ١٣١٧٠٣٢١٢      **Description:** Pharmaceutical Organic Chemistry - Practical

**Full Course Description:** This course is created to cover practical applications of various methods and techniques used for the identification of functional groups of organic compounds of pharmaceutical interest, giving more attention to chemical identification. The laboratory includes two parts; the first part includes the various separation and purification techniques of organic compounds such as crystallization, distillation, extraction, and chromatography. The second part concentrates on the identification of functional groups of organic compounds of pharmaceutical interest, giving more attention to chemical identification.

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**Course ID:** ١٣١٧٠٣٣١٣      **Description:** Pharmacognosy and Phytochemistry

**Full Course Description:** Study of basic information on pharmacognosy and medicinal plants regarding classification and identification of their components. Providing information on different naturally occurring secondary metabolites. The course will emphasize the chemical, biological and therapeutic activities of these compounds and the different constituents used in the pharmaceutical industry.

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**Course ID:** ١٣١٧٠٣٣١٤      **Description:** Pharmacognosy and Phytochemistry - Practical

**Full Course Description:** Understanding the definition and material of pharmacognosy science and its applications in therapy and pharmacy, acquainting knowledge of natural drug products, their classification, production, evaluation as well as their general chemistry, and understanding the qualitative and quantitative tests used to evaluate plant material in its crude and powdered status according to pharmacopeia and WHO guidelines for plant-based material.□  
In addition, this practical course intends to acquaint students with the required practical skills of natural product analysis including herbal sample preparation (drying and grinding), extraction, separation (chromatography; TLC), and characterization. The applications covered include some selected medicinal herbs and their extractives that are rich in various phytochemical groups of primary and secondary metabolism such as sugars, fixed and volatile oils, alkaloids, phenols, terpenoids, etc., particularly covered by the theoretical courses Photochemistry.□

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**Course ID:** ١٣١٧٠٣٣١٥      **Description:** Pharmaceutical Instrumental Analysis

**Full Course Description:** The course is designed to give the pharmacy student an overview of the various modern instrumental analytical technique used in pharmaceutical analysis. The requirements for instrumentation including the precision, accuracy, sensitivity, selectivity, detection limit, and dynamic range will be discussed during this course. Students will be taught how to identify the chemical structure from the complementary information afforded by four types of spectra: UV, IR, NMR, and MS. Additionally, the introduction to the chromatographic theory, separation techniques, and applications concerned HPLC and GC.

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**Course ID:** ١٣١٧٠٣٣١٦      **Description:** Pharmaceutical Instrumental Analysis - Practical

**Full Course Description:** This course is designed to cover the practice of instrumental analysis as applied to the identification and quantitation of analytes in samples typically encountered in chemical and pharmaceutical industries. Course emphasis will be placed on Potentiometric titration, UV-Visible spectroscopy qualitative analysis, Infrared, Solid-phase extraction, High-performance liquid chromatography, and Gas chromatography. These methods are used in the lab along with other analytical procedures in applications for the analysis of pharmaceutical preparations.

## Courses Description

**College:** Pharmaceutical Sciences

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**Course ID:** ١٣١٧٠٣٣٢٣      **Description:** Medicinal Chemistry (١)

**Full Course Description:** This course explains the effects of a drug's structure and physicochemical properties on pharmacokinetics ADME (Absorption, Distribution, Metabolism and Excretion), pharmacodynamics (reaction of drug with its receptor), and drug metabolism (phase I (oxidative, reductive, and hydrolytic biotransformation) and phase II (conjugation). Prodrugs also will be discussed. In addition, the structure activity relationship of the different drug classes including autonomic nervous system, cardiovascular system, antiasthmatic and antiallergic drugs, drugs used in gastric ulcer and hormone therapy and the effect of chemical modification on the efficacy and the physicochemical properties of these groups of compounds.

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**Course ID:** ١٣١٧٠٣٤٢٤      **Description:** Medicinal Chemistry (٢)

**Full Course Description:** In this course, the knowledge from prerequisite course will be applied. Recognize the relation between molecules for design of certain synthetic leads. The categories of drug classes and their efficacies including antibiotics, antibacterial, antiviral, antifungal, anthelmintic, central nervous system drugs (antipsychotic, antiepileptic, sedative-hypnotics, anxiolytic, antidepressants and CNS stimulants), antidiabetic drugs, analgesics (opioiod and non-opioiod) anticancer, will be identified.

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**Course ID:** ١٣١٧٠٣٤٢٥      **Description:** Medicinal Chemistry -Practical

**Full Course Description:** This practical course in medicinal chemistry concerned with multistep synthesis of selected medicinal compounds. The successful medicinal chemist is an expert organic chemist who has, or can acquire, sufficient knowledge in other disciplines to apply that knowledge to drug synthesis and design. We shall have opportunities to illustrate the dependence of medicinal chemistry on knowledge from other disciplines as we progress through this course. So our course will build on the experience gained from organic chemistry lab through the synthesis and characterization of complex molecules, the acquisition and interpretation of physical data and the investigation of chemical systems through computational techniques gained in analytical and instrumental labs. It consists of a series of laboratory-based experiments aimed at developing skills in the synthesis, safe handling and analysis of chemical substances of a range of different classes of compounds; an understanding of modern characterization techniques (e.g. chromatography, atomic and molecular spectroscopy), and the operation of instrumentation for the acquisition of kinetic, structural and thermodynamic data.

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**Course ID:** ١٦١٧٠٣٥٩٠      **Description:** Spectroscopic Methods Applications in Pharmacy

**Full Course Description:** This course is designed to develop an understanding of spectroscopy and its application in the elucidation of the structures of chemical compounds. This will include aspects of C H N S O elemental analysis, UV- visible spectroscopy, infrared spectroscopy, nuclear magnetic resonance (NMR) spectroscopy and mass spectrometry. The fundamental physical and chemical principles of each method will be discussed. The major emphasis of this course is on chemical structure determination by way of interpreting the data (generally in the form of a spectrum or spectra) that each method provides.

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**Course ID:** ١٧١٧٠٣٦٥٩٠      **Description:** Advanced Pharmaceutical Analysis

**Full Course Description:** This course is designed to develop an understanding of spectroscopy and its application in the elucidation of the structures of chemical compounds. This will include aspects of C H N S O elemental analysis, UV-visible spectroscopy, infrared spectroscopy, nuclear magnetic resonance (NMR) spectroscopy, and mass spectrometry. The fundamental physical and chemical principles of each method will be discussed. The major emphasis of this course is on chemical structure determination by way of interpreting the data (generally in the form of a spectrum or spectra) that each method provides.

## Courses Description

**College:** Pharmaceutical Sciences

**Department:**

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**Course ID:** ١٩١٧٠٣١٢١٠      **Description:** Pharmaceutical Organic Chemistry (١)

**Full Course Description:** The course is designed to focus on the most important substance classes in organic chemistry (e.g. alcohols, amines, alkenes, alkynes, aldehydes, ketones, carboxylic acids, and carboxylic acid derivatives) with respect to their structure and their chemical properties. Naming by means of rational chemical nomenclature (IUPAC), including some common names, is an important part of this course. The interplay between structure and function will be discussed for a greater understanding of chemical reactions and processes. Further, organic-chemical reactions (e.g. substitution, elimination, addition to the alkene and the alkyne, carbonyl group reactions, carboxylic acid derivatives reactions, oxidation, and reduction) are discussed together with the associated reaction mechanisms.

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**Course ID:** ١٩١٧٠٣١٢١١      **Description:** Pharmaceutical Organic Chemistry (٢)

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**Course ID:** ١٩١٧٠٣١٣٢٣      **Description:** Medicinal Chemistry (١)

**Full Course Description:** This course explains the effects of a drug's structure and physicochemical properties on pharmacokinetics ADME (Absorption, Distribution, Metabolism and Excretion), pharmacodynamics (reaction of drug with its receptor), and drug metabolism (phase I (oxidative, reductive, and hydrolytic biotransformation) and phase II (conjugation). Prodrugs also will be discussed. In addition, the structure activity relationship of the different drug classes including autonomic nervous system, cardiovascular system, antiasthmatic and antiallergic drugs, drugs used in gastric ulcer and hormone therapy and the effect of chemical modification on the efficacy and the physicochemical properties of these groups of compounds.