YEAR 1

25139 - BIOLOGY

The objective of the course is to provide students the knowledge and skills to identify and understand fundamental biological processes of living organisms (molecular and cellular structure, bioenergetics, metabolism, regulation, genetics and evolution) and the interrelationship of these processes under the perspective of evolution, always bearing in mind the scientific method as a tool in Biology. The aspects of biotechnological application are also taken into consideration

26136 - PHYSICS

The basic concepts of Newtonian mechanics are presented. Furthermore, the electric and magnetic fields, electromagnetic radiation and its relationship with the optic are studied.

The importance of Physics as a subject related to Chemistry is highlighted during the course: Mechanics (which describes the motion of particles) and Electromagnetism (which studies the interactions between charged particles) are basic on the description of the motion of molecules and the interaction of the electrons (highly important in chemical reactions).

Therefore some exercises arise over the course, that relate physical magnitudes to other generally used in chemistry.

25227 - GEOLOGY

One of the main points in this subject is that students acquire skills in the field of crystallography and mineralogy, which are essential for the development of applied mineralogy. Lattice theories and symmetry are included to allow the study of finite and infinite objects, while the student unfolds spatial vision and capacity for abstraction.

The fundamentals of geology are applied to identify the different types of rocks and minerals.

25824 - MATHEMATICS I

Mathematics I is a compulsory subject in the basic module of the degree. Its aim is to train the students in the use of the basic mathematical tools of Algebra and Calculus.

26137 - MATHEMATICS II AND STATISTICS

Mathematics II is a compulsory subject in the basic module of the degree. It aims to deepen and broaden the basic study conducted in Mathematics Calculus I and introduce the students in the field of differential equations and statistics.

26132 - BASIC LABORATORY OPERATIONS

This course includes a set of practices that are intended for students to learn basic safety rules in a chemical laboratory, acquire skills in the use of basic instrumental and machinery; being able to produce further reports.

26134 - EXPERIMENTAL METHODOLOGY IN CHEMISTRY

This highly practical course of Matter Chemistry, belonging to the Basic Module, combines different methodologies. On the one hand, laboratory practices are performed complementing those already done in the course Unit Operations in Chemistry, but with the requirement of statistical processing of the numerical results. Data processing included in this course relate basically to numerical settings functions and graphical expression data derived from kinetic studies, potentiometric titrations, instrumental calibration or similar, previously performed at the Laboratory. These treatments will be executed by numerical and statistical methods that require the use of calculators or computers. It is further contemplated other methodologies such as the use of computer applications for finding scientific information (databases, search engines), for visualization of molecules or for numerical simulation of chemical processes.

26111 - GENERAL CHEMISTRY I

In this course, the student is introduced to the microscopic and macroscopic chemical elements and compounds properties, bond models and reactivity, and the formulation standards and nomenclature of Organic and Inorganic compounds are established.

26135 - GENERAL CHEMISTRY II

The content of this course complements General Chemistry I and deal with introductory aspects related to Physical Chemistry and Analytical Chemistry.

Descriptions of pure substances, mixtures and solutions are introduced. The bases of Thermochemistry and Chemical Kinetics introduce general concepts of chemical equilibrium that subsequently will be applied to balance ionic solutions and, more specifically, issues relating to acid-base equilibrium and redox equilibria between complex ions.

YEAR 2

25194 - BIOCHEMISTRY

The objective of the course is to provide a basic understanding of chemical reactions that occur in living organisms, their characteristics and mechanisms and systems of control and regulation. Similarly, it aims to initiate the students to develop skills to perform simple biochemical experiments and to promote the ability to describe, analyze and critically interpret the results.

26117 - PHYSICAL CHEMISTRY I

The course provides students with the necessary knowledge for the study of the macroscopic behaviour of matter in aspects of Chemical Thermodynamics, Kinetics chemical or electrochemical phenomena. It allows also, to know the basis and applications of transport phenomena, surface phenomena and macromolecular and colloidal systems. The program enables to recognize the importance of Physical Chemistry in the general context of chemistry and its impact on industrial and technological society.

26122 - EXPERIMENTS IN PHYSICAL CHEMISTRY

This course introduces students to the use of some experimental methods for determining macroscopic properties of matter in aspects of Thermodynamics Chemistry, Chemical Kinetics and electrochemical phenomena. It is also applied the already acquired knowledge related to surface properties, macromolecules and colloids.

26124 - INORGANIC CHEMISTRY I

In this subject, the integrated study of training, composition, structure and reactions of inorganic elements and compounds is addressed.

26125 - EXPERIMENTAL INORGANIC CHEMISTRY

This course includes a set of experiments that are intended for students to get a broad overview of the synthesis methods in inorganic chemistry, and to became familiar with the working material in this area.

26113 - ORGANIC CHEMISTRY I

In this subject the study of structural, physical and chemical major hydrocarbons and functional groups of organic chemistry properties and methods of preparation are addressed, including the mechanisms of the main types of reactions.

26115 - EXPERIMENTS IN ORGANIC CHEMISTRY

The main objective of the course is to introduce the process of organic synthesis from a global point of view, starting with the sampling design up to the realization of the analysis and interpretation of results. Special emphasis will be given to taking and handling samples and chemical separation methods (not chromatographic) as well as procedures for isolating and characterizing the synthesized products.

The students will perform simple operations that will facilitate the understanding of some fundamental concepts of the subject.

26127 - ANALYTICAL CHEMISTRY I

The main purpose of this course is to introduce the analytical process from a global point of view, from the sampling design to the analysis and interpretation of results. Special emphasis will be placed on the collection and processing of samples, chemical separation methods (no chromatographic) as well as the application of chemical analysis methods (volumetric and Gravimetric). This include a series of lab simple operations that will facilitate the understanding of some fundamental concepts of the subject.

YEAR 3

26128 - ANALYTICAL CHEMISTRY II

In this course all the concepts and contents of instrumental chemical analysis are introduced. First, the fundamental characteristics of analytical instrumentation and the main instrumental techniques (spectroscopic, electroanalytical and chromatographic) are described. Moreover, methodological basis of instrumental methods are shown, along with standardization and calibration laboratory univariate methods and an introduction to chemometrics.

26129 - EXPERIMENTS IN ANALYTICAL CHEMISTRY

In this course, the concepts and techniques of instrumental analysis are applied to the analysis of real samples.

26138 - SPECTROSCOPIC IDENTIFICATION OF ORGANIC COMPOUNDS

The course prepares the student to the determination of the chemical structure of organic substances by spectroscopic and spectrometric techniques. Specifically, it is for the students to deepen in routine interpretation and other more specific applications of the most powerful procedures in the elucidation of the chemical nature of organic compounds spectroscopic and spectrometric techniques, such as Infrared Spectroscopy Fourier transform (FTIR), Mass Spectrometry, Nuclear Magnetic Resonance (NMR) and UV / Visible spectroscopy. The information provided by these techniques allows the student to interpret and clarify the structures of unknown compounds and/or products from chemical reactions.

25115 - CHEMICAL ENGINEERING

The subject of Chemical Engineering introduces students to the industrial aspects of chemistry, and gives them the tools to tackle the analysis, design and operation of the equipments used in industrial chemical plants.

In this course the theoretical principles of industrial operations (property balances and mathematical description of chemical reactors). In this way, students acquire the basic methods and techniques for the study of industrial operations and chemical processes.

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26133 - MATHEMATICAL METHODS FOR CHEMISTRY

This course provides students with the mathematical knowledge needed to formulate and solve problems in various fields of chemistry, expanding the basic and advanced concepts introduced in the subjects Mathematics I and Mathematics II and Statistics.

26123 - PHYSICAL CHEMISTRY II

The main objective of the course is to study the physicochemical systems from a microscopic point of view, so the student can relate the macroscopic properties of systems developed in the subject Physical Chemistry I with the individual properties of the atomic-molecular systems studied in this subject. Quantum Chemistry is presented and applied to the study of atoms and molecules, and the properties obtained by theoretical calculations are compared with experimental data. Statistical Thermodynamics for macroscopic physicochemical variables are determined from microscopic properties. The course includes a series of practices and Computer Laboratory Practice to perform quantum mechanical calculations and underline the need for experimental data confirming the theoretical calculations.

26126 - INORGANIC CHEMISTRY II

This course deepens into the knowledge of Inorganic Chemistry through the study of Coordination Chemistry and Organometallic Chemistry and Basic Principles of Chemistry of Inorganic Solids.

26114 - ORGANIC CHEMISTRY II

This course delves into the knowledge of organic chemistry through the study of modern methods of organic synthesis, general reactions and specific versions, and its application to the synthesis of organic molecules. The course includes a laboratory for experimentation in Organic Chemistry, oriented planning and execution of synthesis of simple organic molecules.

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YEAR 4

26121 - MATERIALS SCIENCE

The basic aim of the course is to provide the student with the theoretical and practical knowledge to enable them to understand the relationship between structure and properties of different materials, and taking into account the influence of processing. Specifically, the students will learn the different kinds of materials, understand their general behaviour, properties, characteristics and potentialities, and recognize the effects of the environment and use in their behaviour. This understanding is necessary to be able to select the right material to be used in the design of reliable and economical components, systems and processes from the wide range of materials available at present.

26131 - PROJECTS IN INDUSTRIAL CHEMISTRY

This course introduces students to the characteristics of the industrial chemical sector and provides concepts and tools needed to work in that environment. As an introduction to the study of the industrial chemical sector, the structure and content of the projects for industrial scale chemical facilities and management principles and their development will be explained. Finally, the student is introduced to the main concepts of safety in chemical processes.

26142 - CATALYSIS AND BIOORGANOMETALLICS

This subject deals about the study of catalytic processes of transformation of organic compounds in homogeneous conditions with organometallic complexes as catalysts including asymmetric processes of interest in the preparation of drugs, and introduces students to the role of organometallic compounds in biological processes and medical treatments.

26139 - ENVIRONMENTAL TECHNOLOGY & CHEMISTRY

Environmental processes not only involve physicochemical phenomena, but also overlap with the biological world. It is necessary to develop a broad view of substances in the natural environment that combines chemical and biological aspects. In this course students should be formed in two complementary aspects:

- Applying the principles of chemistry, within the limits imposed by the environment, to understand the behavior and evolution of a compound in the medium and be able to evaluate their potential danger.

- Using the principles of chemical engineering processes for selecting and evaluating facilities aimed to the elimination of the risk linked to polluting emissions and waste.

26130 - APPLIED BIOLOGICAL CHEMISTRY

In this course, the student will acquire knowledge about biological and biochemical aspects that are not part of chemistry, but represent the border between chemistry and health sciences.

The students will work on the learning of the methods, concepts and terminology associated with large areas of clinical research that will allow them to interact with specialists from other disciplines, facilitating integration in interdisciplinary teams.

The knowledge gained through discussions and exercises will help to eliminate the tendency of the student to stick to their field of expertise, and access information from other specialties.

26112 - MACROMOLECULAR CHEMISTRY

This course shows the student the most common methods of synthesis of polymers and macromolecules: stepwise polymerization and PCR with its many variants. Likewise, the course provides an introduction to the chemical modification of macromolecules that can result in substantial changes in their properties and applications. This knowledge is used to understand the different processes of environmental degradation of macromolecular materials. The practical laboratory sessions the student will develop skills regarding various reactions of synthesis and modification of macromolecules as well as very representative degradation processes.

26141 - ORGANIC SYNTHESIS AND BIOMOLECULES

This course interprets the information provided by the spectroscopic techniques to determine the structure of biomolecules and related compounds. The student focuses into the concepts of stereochemistry and conformational analysis, as well as the modern methods of synthesis and its applications in the preparation of drugs and molecules of biological interest.

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26143 – GRADE FINAL PROJECT

The main objective of this Final Project is the implementation and consolidation of the knowledge acquired during the Degree.

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