Courses Description

College: Science

Department: Chemistry

Couse ID: 110103102 **Description:** General Chemistry (2)

Full Course Description: *States of matter and intermolecular forces, physical properties of solutions, thermochemistry and chemical thermodynamics, chemical equilibrium in gaseous systems, acid-base equilibria in aqueous solutions, solubility and complex ion equilibria, electrochemistry, chemical kinetics, effect of temperature on reaction rates.

Couse ID: 110103103 **Description:** General Chemistry Lab. (1)

Full Course Description: *Safety and laboratory rules, chemical observation, Avogadro's number, stoichiometry volumetric analysis, oxidation-reduction, cations and anions tests.

Couse ID: 110103105 **Description:** General Chemistry Laboratory

Full Course Description: *This course is intended to illustrate. Safety and laboratory rules, in addition to the following experimental topics: moles stoichiometry, gases, volumetric analysis (titration), cations and anions detection, colligative properties, chemical Kinetics, chemical equilibrium, thermodynamics, electrochemistry and oxidation-reduction reactions.

Couse ID: 110103108 **Description:** Basics of General Chemistry Laboratory

Full Course Description: *Safety and laboratory rules, laboratory techniques, selected experiments to illustrate some important topics such as: chemical calculations, colligative properties, thermochemistry, chemical equilibrium and solubility product constant, pH and buffer solutions, electrochemistry and organic chemistry.

Couse ID: 110103211 **Description:** Analytical Chemistry

Full Course Description: *Introduction and review of some basic principles, errors in chemical analysis and statistical treatment of results, gravimetric methods of analysis, volumetric methods of analysis, aqueous solution chemistry and the various types of equilibria in analytical chemistry, activity and activity coefficient, acid–base titrations, precipitation titrations, complex–formation titration, redox titrations.

Couse ID: 110103213 **Description:** Analytical Chemistry Laboratroy

Full Course Description: * The course includes selected experiments to illustrate gravimetric analysis, various types of titrimetric methods of analysis, as well as some chromatographic methods, statistical treatment of data is emphasized.

Couse ID: 110103221 **Description:** Inorganic Chemistry (1)

Full Course Description: * This course is an introductory course in inorganic chemistry. It covers areas such as: atomic structure, ionic bonding, covalent bonding, bond energies, bonding, structures, and reactivity, chemical forces, acid-base chemistry, Chemistry in aqueous and non-aqueous solutions.

Couse ID: 110103231 **Description:** Organic Chemistry (1)

Full Course Description: *Introduction. Nomenclature, isomerism, preparative methods, reactions and mechanisms (substitution, addition and elimination) of: alkanes and cycloalkanes, alkenes, alkynes stereochemistry and optical activity, alkyl halides, alcohols and ethers. Alcohols from carbonyl compounds, oxidation–reduction and organometallic compounds.

Couse ID: 110103232 **Description:** Organic Chemistry (2)

Full Course Description: *Spectroscopic methods of structure determination (IR, UV, NMR, MS), conjugated unsaturated systems, aromatic compounds and their reactions, aldehydes and ketones, carboxylic acids and their derivatives, amines, phenols and aryl haldis, nucleophilic aromatic substitution .

Couse ID: 110103235 **Description:** Practical Organic Chemistry

Full Course Description: *The course comprises basic techniques used in the separation and purification of organic compounds, and determination of physical constants: melting point determination: crystallization, distillation, extraction, and chromatography. Simple preparative experiments. Qualitative test for selected classes of organic compounds.

Courses Description

College: Science

Department: Chemistry

Couse ID: 110103236 **Description:** Basics of Organic Chemistry

Full Course Description: *The course is designed for biology students in order to give a brief survey of concepts and functional groups in organic chemistry, including structure and bonding, aliphatic and aromatic hydrocarbons, alkyl halides, alcohols, phenols, carbonyl compounds, carboxylic acids and their derivatives and amines. Also, the course includes an introduction to lipids, carbohydrates, amino acids and proteins.

Couse ID: 110103237 **Description:** Basics of Organic Medicinal Chemistry

Full Course Description: *The course is designed for Faculty of Medicine students in order to give a brief survey of concepts and functional groups in organic chemistry, including structure and bonding, aliphatic and aromatic hydrocarbons, alkyl halides, alcohols,, phenols, carbonyl compounds, carboxylic acids and their derivatives and amines. Also, the course includes an introduction to lipids, carbohydrates, amino acids and proteins.

Couse ID: 110103241 **Description:** Physical Chemistry (1)

Full Course Description: *Ideal and non-ideal gases, equations of state, kinetic molecular theory of gases and Maxwell distribution of molecular speeds.□
Laws of chemical thermodynamics and their applications, solutions and partial molar quantities, phase equilibria and the phase rule for pure substances and mixtures, chemical equilibrium.□

Couse ID: 110103331 **Description:** Spectroscopy of Organic Compounds

Full Course Description: *General principles of spectroscopy are introduced. Different spectroscopic methods which are used for structure determination of organic compounds are described. These methods include ultraviolet (UV) and visible spectroscopy, infra-red (IR) spectroscopy, 1H and 13C nuclear magnetic resonance (NMR) spectroscopy and mass spectrometry (MS). Combination of the information obtained using the different methods is given to teach students how spectroscopic methods are used to solve complex structural problems and investigating bonding features in organic molecules.

Couse ID: 110103342 **Description:** Physical Chemistry (3)

Full Course Description: *

Couse ID: 110103464 **Description:** Polymer Chemistry

Full Course Description: * Introduction to polymer science and technology synthesis. Thermodynamics and kinetics of polymerization. Physical properties and structure. Technological applications, methods for determination of molecular weights, thermal and photodegradation of polymers.

Couse ID: 110103491 **Description:** Seminar

Full Course Description: *

Couse ID: 110103495 **Description:** Special Topics in Organic and Inorganic Chemistry

Full Course Description: * This course includes the study of some special topics in Organic and Inorganic chemistry, chosen by the tutor.

Couse ID: 110103497 **Description:** Special Topics in Physical and Analytical Chemistry

Full Course Description: *This course includes the study of special topics in Analytical and Physical chemistry, chosen by the tutor.

Couse ID: 2001031311 **Description:** Instrumental Analysis (1)

Full Course Description: This course covers basic principles of instrumentation such as: instrument components, calibration methods, and signal-to-noise ratio. It covers the theoretical principles, detailed instrument components, and analytical applications of the following spectral methods of analysis: atomic absorption, atomic emission, uv-visible molecular absorption, infrared absorption, as well as molecular luminescence.

Courses Description

College: Science

Department: Chemistry

Couse ID: 2001031312 **Description:** Instrumental Analysis (2)

Full Course Description: This course covers the theoretical principles, detailed instrument components, and analytical applications of instrumental analytical techniques, such as: chromatographic separation, gas-liquid chromatography, high performance liquid chromatography, ion-exchange chromatography, ion chromatography, column chromatography, and other separation techniques such as electrophoresis. It covers also some electroanalytical methods of analysis, such as: potentiometry, electrogravimetry, coulometry, amperometry, amperometric titrations, voltammetry, and polarography. Laboratory experiments will be carried out on some of these techniques.

Couse ID: 2001031313 **Description:** Practical Instrumental Analysis

Full Course Description: This course consists of a set of laboratory experiments in some instrumental techniques, such as: atomic absorption, atomic emission, uv-visible molecular absorption, infrared absorption, as well as molecular luminescence.

Couse ID: 2001031321 **Description:** Inorganic Chemistry (2)

Full Course Description: Theories of coordination compounds, chemistry of coordination compounds. Structures of coordination compounds, different coordination numbers, isomerism in coordination chemistry, electronic spectra of transition metal complexes, chelate effect, trans effect, kinetics and mechanisms of coordination chemistry reactions.

Couse ID: 2001031325 **Description:** Practical Inorganic Chemistry

Full Course Description: This laboratory course deals with the preparation, physical and chemical properties of transition metal complexes. Compounds are prepared and their spectral, magnetic, conductivity and chemical properties are examined. In all cases the compounds are analyzed after preparation. This course relies considerably on instrumental analysis, and illustrates principles encountered in Inorganic Chemistry (2) course.

Couse ID: 2001031335 **Description:** Identification of Organic Compounds

Full Course Description: The course covers multistep synthesis of selected organic compounds. Classification tests for detection of functional groups. Identification of unknown organic compounds by physical, chemical and spectroscopic techniques, and by the preparation of derivatives. The course also includes series of lectures related to the theoretical aspects of the experimental parts noted above. Discussions and solving of various problems sets.

Couse ID: 2001031341 **Description:** Physical Chemistry (2)

Full Course Description: This course deals with Equilibrium, in non-ideal systems, Equilibrium in Electrochemical cells, activity and activity coefficient for these systems, Debye-Huckel theory and electrode process, type of cells and cell potential. Transport properties and determination of transport number. Rate and order of chemical reactions. Theories of chemical reactions, type of chemical reactions, ionic reactions, catalysis, surface chemistry, colloids and colloidal properties of solutions.

Couse ID: 2001031342 **Description:** Physical Chemistry (3)

Full Course Description: Introduction to quantum mechanics, The postulates of quantum mechanics, solution of Schrodinger equation, operators in quantum mechanics, particle in a box, harmonic oscillator, rigid rotor, angular momentum, approximation methods (variation and perturbation) the hydrogen atom, orbital angular momentum and magnetic field, molecular systems, Vibrational rotational spectroscopy.

Couse ID: 2001031345 **Description:** Practical Physical Chemistry

Full Course Description: This course consists of approximately 30 laboratory sessions designed to illustrate the principles discussed in (110103241, 2001031341 and 2001031342) the experimental topics range over a wide variety of subjects such as: Partial molar quantities, determination of reaction enthalpies, the phase rule, electrochemistry, spectroscopy, kinetics, surface chemistry and photochemistry.

Courses Description

College: Science

Department: Chemistry

Couse ID: 2001031412 **Description:** Environmental Analytical Chemistry

Full Course Description: The course provides an introduction to the basics of environmental chemistry. The topics cover biogeochemical cycles of sulfur, nitrogen, oxygen, carbon, and trace metals. Also includes selected environmental problems of global concern such as acid rain, greenhouse effect, depletion of stratospheric ozone, and nuclear winter. Recent analytical methods for the determination of pollutants in water and atmosphere will be described.

Couse ID: 2001031413 **Description:** Industrial Analysis

Full Course Description: This course deals with topics related to industry-specific analyzes, such as investigative in the food and pharmaceutical industry, types of documentation and documentation methods related to industrial analyses, especially with regard to quality, quality control and quality assurance. It also includes verification studies of the devices used in the analysis and verification of various automated analysis methods, the statistical calculations required for the purposes of verification of the analytical results, and studies of stability and severity. The material also includes practical topics related to preparing the sample for analysis and a detailed study of some industrial analysis models such as analysis of minerals and alloys and their ores, analysis of processed foods, pharmaceuticals, fertilizers and pesticides, analysis of petrochemical industries, water analyzes and environmental pollution.

Couse ID: 2001031421 **Description:** Inorganic Chemistry (3)

Full Course Description: This course includes topics such as: symmetry, point groups and their applications especially in vibrational spectroscopy-cluster compounds-kinetics and mechanisms of inorganic reactions, chemistry of the halogens and noble gases, bioinorganic chemistry.

Couse ID: 2001031422 **Description:** Organometallic Chemistry

Full Course Description: Metal-carbon bond, organometallic compounds of the main-group elements with the emphases on the organic compounds of lithium, magnesium, boron, aluminum, silicon, and tin. Organometallic compounds of transition metals. Carbonyls, olefinic complexes, allylic complexes, butadiene complexes,?5–cyclopentadienyl complexes, ?6– complexes of benzene organometallic compounds derived from acetylene. Catalysis by organometallic compounds.

Couse ID: 2001031432 **Description:** Organic Biochemistry

Full Course Description: This course deals with betacarbonyl compounds, preparation, reactions and chemistry of inolate ions, lipids (oils, fats and waxes), carbohydrates, amino acids and proteins, nucleic acids and an introduction to heterocyclic compounds.

Couse ID: 2001031433 **Description:** Natural Products Chemistry

Full Course Description: The course covers an introduction to the structure and biosynthesis of secondary metabolites including alkaloids, terpenoids flavones, vitamins, and thocyanins. Reference to the synthesis and biological activities of some of these compounds is made. Chemistry and ecology.

Couse ID: 2001031435 **Description:** Chemistry of Heterocyclic Compounds

Full Course Description: This Course focuses on studying the properties and the methods of synthesis of the heterocyclic compounds with one hetero-atom either saturated or unsaturated starting from the 3-membered rings to the 7-membered rings. Pyridine and pyrole derivatives have special attention.

Couse ID: 2001031441 **Description:** Molecular Spectroscopy

Full Course Description: This course combines the theoretical background and the physical aspects of subject with relation to the properties and structure of molecules. It includes the study of rotational and vibrational spectra (microwave, IR and Raman). Also includes the study of electronic absorption and emission spectroscopy. Symmetry and group theory and the calculations of modes of vibrations, applications.

Courses Description

College: Science

Department: Chemistry

Couse ID: 2001031443 **Description:** Surface Chemistry

Full Course Description: This course focuses on basic concepts of surfactants, the physical chemistry of their solutions, surface and interface science. It discusses fundamental subjects, such as thermodynamics of interfaces, surface tension, surface free energy, surface films on air-liquid and air-solid interfaces, intermolecular interactions, stabilization of suspensions, emulsions and foams, contact angle and wetting, surfactants, self-assembly, micelles and vesicles, friction, lubrication and adhesion, adsorption, characterization of colloidal particles. Surface characterization methods will be introduced.

Couse ID: 2001031444 **Description:** Photochemistry

Full Course Description: This course deals with the theories of light and the strength of absorption, photochemical processes, quantum yield. Kinetics of photochemical reactions. Photophysics and photochemistry of atomes, diatomic molecules and polyatomic molecules, selection rules, franck-condon principle, energy transfer complexes, triplet state, phosphorescence, triplet-triplet transitions and lifetime. Photochemical reactions from triplet state, fluorescence, type of fluorescence, and fluorescence lifetime, fluorescence from excimers and exciplexes. Chemiluminence, lasers, applications of lasers in chemistry.

Couse ID: 2001031445 **Description:** Electrochemistry and Corrosion

Full Course Description: Principles of electrochemistry and its applications: Behavior of electrolyte solution, Thermodynamics and kinetics of electrochemical reactions, electodeposition. Electrocatalysis, batteries and fuel cells. Corrosion, electrochemical corrosion. Corrosion by acids, alkalis and pure water, influence of environment on corrosion.

Couse ID: 2001031461 **Description:** Industrial Chemistry

Full Course Description: This course includes the study of some inorganic and organic chemical industries, such as: acids, fertilizers, detergents, glass, pigments, cement, and phosphate industries. Also, fluorinated and chlorinated hydrocarbons, cellulose derivatives, polymers, leather, dyes and insecticides.

Couse ID: 2001031496 **Description:** Research Project and Seminar

Full Course Description: This course includes the student's acquaintance with the scientific sources, how to use the various library facilities, how to use abstracts, periodicals and other references, and the student to conduct an appropriate practical research project and prepare a report on what has been accomplished documented with the sources that were used and also provide a short lecture on the topic of the research.

Couse ID: 2201031422 **Description:** Applied Inorganic Chemistry

Full Course Description:

Couse ID: 2201031499 **Description:** Graduation Project And Seminar

Full Course Description: