

Courses Description

College: Science

Department: Chemistry

Course ID: 103711 **Description:** Advanced Instrumental Methods of Analysis

Full Course Description: Theory, instrumentation and application of some advanced analytical methods are studied. Examples of these methods are: Inductively coupled plasma (ICP –ES and ICP- MS), x-ray fluorescence, cyclic voltammetry, differential pulse anodic stripping voltammetry, gas chromatography coupled with mass spectrometry (GC – MS), high performance liquid chromatography and ion chromatography.□
Seminars on recent publications applying the above methods or other sophisticated methods for instrumental analysis are also included.□

Course ID: 103712 **Description:** Electroanalytical Method of Analysis

Full Course Description: Introduction to electroanalytical chemistry, potentiometric methods of analysis, metallic indicator electrodes, ion-selective membrane electrodes, molecular-selective electrodes, instruments for measuring cell potentials. Coulometer methods of analysis, potentiostatic coulometry, amperostatic coulometry. Voltammerty, paleograpghy, pulse polargraphy, fast linear-sweep polarography, and stripping methods.

Course ID: 103713 **Description:** Environmental Chemical Analysis

Full Course Description: Analysis of environmental pollutants and concentration mechanisms of organic matter and metal ions in the environment. Analysis for low-and high-concentration pollutants in natural waters. Analysis of solid matters including animal apn plant tissues, soil and sediments. Analysis of air pollutants in terms of suspended solids and dust in addition to high and low-concentration pollutants.

Course ID: 103721 **Description:** Advanced Inorganic Chemistry

Full Course Description:

Course ID: 103722 **Description:** Structural Methods in Inorganic Chmistry

Full Course Description: Vibrational Spectroscopy: vibrational spectra and symmetry, assignment of bands to vibrations, structural information, group frequency. Electronic Spectra: electronic spectra of transition metal complexes. Mass spectrometry: molecular ions, fragmentation. Introduction to diffraction methods.

Course ID: 103723 **Description:** Reactions Mechanisms & Applications of Complexes

Full Course Description:

Course ID: 103731 **Description:** Molecular Structure & Mechanisms of Organic Reactions

Full Course Description: Molecular orbital theory with emphasis on its applications to common organic reaction mechanisms (HOMO- LUMO and Hard-Soft concepts). Several distint mechanism for aliphatic and aromatic, substitution and addition reaction that depends on the substrate, nucleophile, leaving group and reaction conditions. Neighbouring group effects, rearrangements, oxidations and reductions are also investigated.

Course ID: 103732 **Description:** Chemistry of Heterocyclic Compounds

Full Course Description: Study of Heterocyclic organic compounds including their nomenclature, methods of synthesis, reactions and their mechanisms. Three-four-five and six- membered heterocyclic compounds with one heteroatom as well as five- and six- membered with two or three heteroatoms, particularly those containing nitrogen were involved. The course includes synthesis of some naturally occurring heterocyclic compounds.

Course ID: 103733 **Description:** Organic Synthesis

Full Course Description: This course contains Schrodinger equation, particle in a box, harmonic oscillator, angular momentum, Hydrogen atom, Quantum mechanics theory, perturbation theory, electronic spin, Pauli exclusion principle and polyelectronic atoms.

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Course ID: 103741 **Description:** Quantum Chemistry

Full Course Description: The application of various types of reactions in the synthesis of different types of organic compounds were involved. The use of organometallic compounds and the generation and uses of electron deficient intermediates in organic synthesis was also included. Synthetic and mechanistic organic chemistry novel biologically active compounds was involved.

Course ID: 103742 **Description:** Advanced Speectroscopy

Full Course Description: Microwave (Rotational) spectroscopy, Infra-red (Vivritional)spectroscopy, Raman Spectroscopy, Electric Spectroscopy of atoms, Electronic spectroscopy of molecules, Spin resonance spectroscopy, solid sate and surface spectroscopy, and Mossbauer spectroscopy.

Course ID: 103743 **Description:** Lasers & their Chemical Applications

Full Course Description: Laser Light and its Basic Principles: Light Waves, Monochromaticity, Directionality, Brightness, Coherence, Polarization, Active Medium, Pumping and Optical feedback. □ Laser Out and its Modification: Absorption and Emission Line shapes Broadening Laser Modes, Pumping Rate, Gain Oscillations, Power Output Gain Saturation, Single Mode Operation, Q-Switching and Mode Locking Common Lasers: Gas Lasers, Dopted-Insulator Lasers, Semiconductor Lasers, Dye Lasers, Chemical Lasers, and High Power Lasers. □ Application of Laser Output: laser Absorption Spectroscopy, laser Induced Fluorescence Spectroscopy, Laser-Induced Molecular Dissociation: Application in Isotopic Separation and Related Processes, laser Spectroscopy in Analytical Chemistry. Molecular Energy Transfer: Vibrational, Rotational and Translational transfer in Gases, Vibrational Relaxation in Condensed Phases. Lasers and Non-Linear Optics: Harmonic Generation, Parametric Oscillation, Multiphoton Processes. □

Course ID: 103793 **Description:** Reseach Methods

Full Course Description: This course deals with science, the scientific method, and hypothesis examination. Scientific literature and its sources. Research method and stages, research design and research project preparation. Collecting and analyzing information, preparing research results and writing scientific papers. And the work of studies and statistical analyzes related to the research and the experiences related to it.

Course ID: 103794 **Description:** Special Topics

Full Course Description:

Course ID: 103795 **Description:** Spesial Topics

Full Course Description: This course deals with the study of a specific topic that is determined by the department with specifications not included in the study plan, and deals with the latest topics in the field of chemistry, in which the most important developments in this topic are reviewed with the possibility of including some practical experiments in this course.

Course ID: 103799 **Description:** Thesis

Full Course Description:

Course ID: 3103799 **Description:** thesis

Full Course Description:

Course ID: 6103799 **Description:** thesis

Full Course Description:

Course ID: 9103799 **Description:** thesis

Full Course Description:

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Couse ID: 2001031721 **Description:** Group Theory

Full Course Description: This course discusses the molecular symmetry and group theory. Also, applications of group theory in inorganic compounds, inorganic chains, cycles, cages and clusters, hydride and halide chemistry, inert gases chemistry, and other organometallic subjects.

Couse ID: 2001031723 **Description:** Advanced Inorganic Chemistry

Full Course Description: This course discusses reactive and inert complexes, oxidation-reduction mechanisms. It also deals with transition metal complexes that are used in catalysis. This course contains an introduction in bioinorganic chemistry as well.