

**AKDENİZ UNIVERSITY**  
**GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES**  
**DEPARTMENT OF CHEMISTRY**  
**COURSE CONTENT OF**  
**THE MASTER OF SCIENCE PROGRAM**

**70303501 ADVANCED POLYMER CHEMISTRY**

Survey of Polymers; polymers; technology of polymers; types of polymers; condensation polymers, etc.

**70303502 ACTUAL TOPICS IN INORGANIC CHEMISTRY :**

Last improvements in ceramic production, inorganic and environment, last improvement in catalizor chemistry, bioinorganic chemistry.

**70303503 ADVANCED CHEMICAL KINETICS**

Analysis of kinetic results. Measurement of reaction rates. Mechanism of elementary reactions. Elementary reactions in the gas-phase and solutions. Complex reactions. Elementary catalysis. Mechanisms of some reactions in solutions.

**70303505 PHYSICAL CHEMISTRY OF ELECTROLYTIC SOLUTIONS**

Properties of water molecule. Properties of water as a solvent for ions. Solvation of ions in the gas phase. Techniques for studying ionic solvation. Relation between ionic processes and ionic hydration energies in solution. Calculation of ionic hydration energies. Individual ionic hydrations. Concentration dependence of thermodynamics properties of electrolyte solutions. Ion pairing. Salting-out and salting-in phenomena. Steric and stereochemical effects in solvation. Hydrophobic interactions in ionic hydration. Electrostriction. Partial molar volumes and compressibility of ions. Hydration numbers. Hydration in biochemical systems.

**70303506 KINETICS AND THERMODYNAMICS OF COMPLEX FORMATION**

The determination of stability constants of stepwise complex formation, experimental methods, complex formation in aqueous and non-aqueous solutions, the donor-acceptor interactions, the classification of donors-acceptors, thermodynamics of complex formation reactions, the electrostatic crystal field and ligand field theories, chemistry of the transition elements, the mechanisms and rearrangements in reactions of complex ions.

### **70303508 ORGANIC SPECTROSCOPY**

Electron spectroscopy: UV and visible spectrometry, Infrared spectrometry, NMR spectrometry, Mass spectrometry, Applications and identification of structures.

### **70303509 NATURAL COMPOUNDS CHEMISTRY**

Methods of general isolation and purification of naturel products. General aspects of terpenoides, steroides, carbohydrates, alkaloids and their important reactions.

### **70303510 DEVELOPMENTS IN FOOD SCIENCE**

Chemistry of desired and undesired components in foods, deteriorative reactions in foods, physical principles of the methods used to preserve food.

### **70303511 ADVANCED ORGANIC CHEMISTRY I**

Delocalized chemical bonding, Stereochemistry: Optical activity, cis-trans isomerization, conformational analyses, Carbocations, Free radicals, Carbenes, Nitrenes, Photochemistry, Aliphatic nucleophilic substitution, Aliphatic electrophilic substitution, Aromatic nucleophilic substitution.

### **07303512 ADVANCED ORGANIC CHEMISTRY II**

Free radical substitution, Addition to carbon-carbon multiple bonds, Addition to carbon-heteroatom multiple bonds, Eliminations, Rearrangements, Oxidations and reductions.

### **70303513 ADVANCED HETEROCYCLIC CHEMISTRY**

Three-membered heterocyclics: Synthesis and reactions of oxiranes. Four-membered heterocyclics: Synthesis and reactions of Oxetanes and lactams. Five-membered heterocyclics: Synthesis and reactions of pyrrol, furan and thiophene. Six-membered heterocyclics: Synthesis and reactions of pyridines, pyrilium, piperidine. Condensed heterocyclics: Quinoline. Heterocyclic compounds containing IIIA and IVA Group Elements (Boron, Aluminum, Gallium, Indium, Thallium, Silicon, Germanium, Tin and Lead)

### **70303516 ADVANCED CHROMATOGRAPHIC SEPARATION METHODS II**

High Performance Liquid Chromatography (HPLC) and its principles, HPLC instruments, column types used in HPLC and column technologies, application fields of HPLC, Ion Exchange Chromatography (IC) and its principles, application fields of IC, the developments in HPLC and IC and literature works.

### **70303517 ADVANCED CHROMATOGRAPHIC SEPARATION METHODS I**

The aim of this course is to learn how to separate the components of a sample by chromatographic methods and how to determine necessary optimum conditions for qualitative and quantitative analysis of a component in the sample and to learn the application fields of chromatography. The main topics covered in this course are; The introduction of chromatograph and its classification, basic principles of chromatographic methods, Gas Chromatography (GC) and its principles, GC instruments, column types used in GC and column technologies, application fields of GC, Column and Thin Layer Chromatographies, Super Critical Fluid Chromatography and its principles, application fields of SFC, the developments in GC and SFC and literature works.

### **70303523 BIOANALYTICAL TECHNIQUES FOR PROTEINS**

Short history, protein isolation and sample preparation, protein determination methods, enzymatic activity tests, spectroscopic methods, chromatographic separation methods, electrophoretic methods, amino acid analysis, protein sequence analysis, proteome analysis, protein-protein-interaction, western-blotting

### **70303524 ADSORPTION ONTO ACTIVATED CARBON**

Definitions of adsorption, adsorbent and adsorbate. Activated carbon sources, structure and properties (e.g. surface area, porosity, pore size distribution). Production of activated carbon and its modification, physical and chemical activation, surface characterization and surface characterization methods of activated carbon, types of activated carbon, liquid and gas phases adsorption processes, adsorption isotherms, application of activated carbon as adsorbent.

### **70303526 BIOANALYTICAL TECHNIQUES FOR NUCLEIC ACIDS**

Short history, isolation of nucleic acids, cutting of DNA and restriction enzymes, electrophoretic methods, staining of nucleic acids, blotting of nucleic acids (southern and northern blotting), polymerase chain reaction, DNA sequence determination, fluorescence-in-situ-hybridisation, gene modification, transgenic organisms

### **70303528 NAMED ORGANIC REACTIONS**

Arndt-Eistert Synthesis, Baeyer-Villiger Oxidation, Barbier Reaksiyonu, Beckmann Rearrangement, Benzidine Rearrangement, Benzoin Condensation, Birch Reduction, Cannizzaro Reaction, Claisen Ester Condensation, Curtius Reaction, Diels-Alder Reaction, Favorskii Rearrangement, Filkelstein Reaction, Friedel-Crafts Alkylation-Acylation, Fries Rearrangement, Gabriel Synthesis, Grignard Reaction, Hofmann Elimination Reaction, Hofmann Rearrangement, Hunsdiecker Reaction, McMurry Reaction, Michael Reaction, Mitsunobu Reaction, Reformatsky Reaction, Reimer-Tiemann Reaction, Sandmeyer Reaction, Simmons-Smith Reaction, Strecker Synthesis, Suzuki Reaction, Vilsmeier Reaction, Wagner-Meerwein Rearrangement, Williamson Ether Synthesis, Wittig Reaction, Wolf-Kishner Reduction.