

## COURSE LIST

### Institute of Natural and Applied Sciences

#### Field : Chemistry

Course Title	Code	ECTS Credit	COMU Credit	Lecturer
Advanced Biochemistry I	ULP - 21 - KY001	7.5	3	Prof. Dr. Cahit Akgül
Advanced Biochemistry II	ULP - 21 - KY002	7.5	3	Prof. Dr. Cahit Akgül
Advanced Physical Chemistry I	ULP - 21 - KY003	7.5	3	Prof. Dr. Eyüp Özdemir
Advanced Physical Chemistry II	ULP - 21 - KY004	7.5	3	Prof. Dr. Eyüp Özdemir
Polymer Chemistry I	ULP - 21 - KY005	7.5	3	Assoc. Prof. Dr. Nurettin Sahiner
Polymer Chemistry II	ULP - 21 - KY006	7.5	3	Assoc. Prof. Dr. Nurettin Sahiner
Spectroscopic Methods in Organic Chemistry I	ULP - 21 - KY007	7.5	3	Prof. Dr. Mehmet Ay Assoc. Prof. Dr. Fatih Algi Assist. Prof. Dr. Sirin Gulden
Spectroscopic Methods in Organic Chemistry II	ULP - 21 - KY008	7.5	3	Prof. Dr. Mehmet Ay Assoc. Prof. Dr. Fatih Algi Assist. Prof. Dr. Sirin Gulden
Applications of Biosensor In Analytical Chemistry	ULP - 21 - KY009	7.5	3	Prof. Dr. Yusuf Dilgin
Electrochemical Sensors	ULP - 21 - KY010	7.5	3	Prof. Dr. Yusuf Dilgin
Multicomponent Reactions in Organic Chemistry	ULP - 21 - KY011	7.5	3	Assist Prof. Dr. Sirin Gulden

Course Code	ULP - 21 - KY001
Name of the Course in English	Advanced Biochemistry I
Name of the Course in Turkish	İleri Biyokimya I

Language of the Course	English
Level of the Course	Master
Lecturer	<b>Prof. Dr. Cahit Akgül</b>
ECTS Credit	7.5
COMU Credit	3
Description	Cellular organelles and their functions Amino acids Proteines Strategies and aims in protein purification Techniques in protein purification Protein Electrophoresis Polypeptide sequencing Recombinant DNA technologies: Enzymes Recombinant DNA technologies: Techniques Polimeraz chain reaction Recombinant protein production Uses of recombinant proteins Structure and functions of antibodies Use of antibodies in modern techniques

Course Code	ULP - 21 - KY002
Name of the Course in English	<b>Advanced Biochemistry II</b>
Name of the Course in Turkish	Ileri Biyokimya II
Language of the Course	English
Level of the Course	Master
Lecturer	<b>Prof. Dr. Cahit Akgül</b>
ECTS Credit	7.5
COMU Credit	3
Description	Cellular membranes and wall structures Lipids in cellular membranes Proteins in cellular membranes Carbohydrates in cellular membranes Transport through cellular membranes: Passive transport Active transport İon channels Intracellular and intercellular signalling systems Molecules used in signalling systems Types of receptors Protein phosphorylation Mechanisms of transcription Transcription factors Regulation of transcription via transcription factors

Course Code	ULP - 21 - KY003
Name of the Course in English	<b>Advanced Physical Chemistry I</b>
Name of the Course in Turkish	Ileri Fizikokimya I
Language of the Course	English
Level of the Course	Master
Lecturer	<b>Prof. Dr. Eyüp Özdemir</b>
ECTS Credit	7.5
COMU Credit	3
Description	Properties of matter, properties of gases,

	real gases, thermodynamic concepts, Zeroth and first law of thermodynamics, Second law of thermodynamics. Third principle of thermodynamics, Phase rules, properties of mixtures.
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Course Code	ULP - 21 - KY004
Name of the Course in English	<b>Advanced Physical Chemistry II</b>
Name of the Course in Turkish	<b>Ileri Fizikokimya II</b>
Language of the Course	English
Level of the Course	Master
Lecturer	<b>Prof. Dr. Eyüp Özdemir</b>
ECTS Credit	7.5
COMU Credit	3
Description	Definition of chemical reaction rate, determination of rate law, temperature dependence of reaction rates, concentration dependence of chemical rate and catalyst, Enzym reactions, chain reactions, reaction mechanism, principles of chemical equilibrium, response of equilibria to the conditions. Electrochemistry, migration ions, electrochemical cells. Application of standart potentials, introduction to quantum chemistry, postulates of quanyum chemistry. Schrodinger equation

Course Code	ULP - 21 - KY005
Name of the Course in English	<b>Polymer Chemistry I</b>
Name of the Course in Turkish	<b>Polimer Kimyasi I</b>
Language of the Course	<b>English</b>
Level of the Course	Master
Lecturer	<b>Polimer Kimyasi I</b>
ECTS Credit	7.5
COMU Credit	3
Description	Polymer concept and classification, general properties of polymes, average molar masses and distributions, fractionalization and fractionalization methods, polymer characterization -

	molar masses, step reaction polymerization, kinetics of step growth polymerization, characteristics of step growth polymerization, free radical addition polymerization, thermodynamics of free radical polymerization, features of free radical polymerization.
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Course Code	ULP - 21 - KY006
Name of the Course in English	<b>Polymer Chemistry II</b>
Name of the Course in Turkish	<b>Polimer Kimyasi II</b>
Language of the Course	English
Level of the Course	Master
Lecturer	<b>Polimer Kimyasi I</b>
ECTS Credit	7.5
COMU Credit	3
Description	Introduction to polymer world, naming, classifications, controlled radical polymerization (ATRP), emulsion and suspension polymerization, anionic and cationic polymerizations, metallonece catalysis, ring opening methathesis polymerizations, enzymatic polymerizations, copolymerization, other polymerization techniques and polymers photo poly(uv-irr) gamma, e-beam, microwave etc, structures, crystallization, melting and glass transition, thermodynamics of polymer solutions and blends, polymer characterization methods and spectroscopy.

Course Code	ULP - 21 - KY007
Name of the Course in English	<b>Spectroscopic Methods in Organic Chemistry I</b>
Name of the Course in Turkish	<b>Organik Kimyada Spektroskopik Yontemler I</b>
Language of the Course	English
Level of the Course	Master
Lecturer	<b>Prof. Dr. Mehmet Ay</b> <b>Assoc. Prof. Dr. Fatih Algi</b> <b>Assist. Prof. Dr. Sirin Gulden</b>
ECTS Credit	7.5
COMU Credit	3
Description	UV-Vis spectroscopy, applications and spectrum-structure identification 3 : UV-Vis spectroscopy, applications and spectrum-structure identification, 4 : UV-Vis spectroscopy, applications and

	spectrum-structure identification, Midterm Exam 1 5 : Fluoresans, fosforesans, ESCA 6 : Raman spectroscopy, Derivative spectroscopy 7 : IR spectroscopy, applications and spectrum-structure identification 8 : IR spectroscopy, applications and spectrum-structure identification 9 : IR spectroscopy, applications and spectrum-structure identification, Midterm Exam 2 10 : <sup>1</sup> H-NMR spectroscopy, applications and spectrum-structure identification 11 : <sup>1</sup> H-NMR spectroscopy, applications and spectrum-structure identification 12 : <sup>1</sup> H-NMR spectroscopy, applications and spectrum-structure identification, Midterm Exam 3 13 : Double resonance, <sup>1</sup> H-NMR shift reagents 14 : <sup>19</sup> F, <sup>31</sup> P, <sup>15</sup> N ve <sup>17</sup> O spektroskopis.
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Course Code	ULP - 21 - KY008
Name of the Course in English	<b>Spectroscopic Methods in Organic Chemistry II</b>
Name of the Course in Turkish	<b>Organik Kimyada Spektroskopik Yontemler I</b>
Language of the Course	English
Level of the Course	Master
Lecturer	<b>Prof. Dr. Mehmet Ay</b> <b>Assoc. Prof. Dr. Fatih Algi</b> <b>Assist. Prof. Dr. Sirin Gulden</b>
ECTS Credit	7.5
COMU Credit	3
Description	Spectroscopical techniques in organic synthesis & analysis: 13 C NMR Spectrometry & Structural Analysis 2 : Spectroscopical techniques in organic synthesis & analysis: 13 C NMR Spectrometry & Structural Analysis 3 : Spectroscopical techniques in organic synthesis & analysis: 13 C NMR Spectrometry & Structural Analysis, Midterm Exam 1 4 : 2 D NMR Spectrometries (COSY, HETCOR, INADEQUATE, NOE Techniques etc.) & Structural Analysis 5 : 2 D NMR Spectrometries (COSY, HETCOR, INADEQUATE, NOE Techniques etc.) & Structural Analysis 6 : 2 D NMR Spectrometries (COSY, HETCOR, INADEQUATE, NOE Techniques etc.) & Structural Analysis 7 : Mass Spectrometry (EI, CI, FI, FD, FAB, SIMS Techniques) 8 : Mass Spectrometry (EI, CI, FI, FD, FAB, SIMS Techniques) 9 : Mass Spectrometry (EI, CI, FI, FD, FAB, SIMS Techniques) 10 : Mass Spectrometry (EI, CI, FI, FD, FAB, SIMS Techniques), Midterm Exam 2 11 : GC-MS and LC-MS Spectrometries 12 : GC-MS and LC-MS Spectrometries 13 : Combinated Systems and Combined Problem Solving involving UV, IR, NMR & MS Spectras 14 : Combinated Systems

and Combined Problem Solving involving UV, IR, NMR & MS Spectras

Course Code	ULP - 21 - KY009
Name of the Course in English	<b>Applications of Biosensor In Analytical Chemistry</b>
Name of the Course in Turkish	<b>Analitik Kimyada Biyosensor Uygulamalari</b>
Language of the Course	English
Level of the Course	Master
Lecturer	<b>Prof. Dr. Yusuf Dilgin</b>
ECTS Credit	7.5
COMU Credit	3
Description	This course includes teaching of the typical aspects of biosensors and its instrumentation; definition of biosensors as analytical devices incorporating a biological material (eg. tissue, microorganisms, organelles, cell receptors, enzymes, antibodies, nucleic acids etc), a biologically derived material or biomimic intimately associated with, integrated within a physiochemical transducer, or transducing microsystem, which may be optical, electrochemical, thermometric, piezoelectric or magnetic

Course Code	ULP - 21 - KY010
Name of the Course in English	<b>Electrochemical Sensors</b>
Name of the Course in Turkish	<b>Elektrokimyasal Sensorler</b>
Language of the Course	English
Level of the Course	Master
Lecturer	<b>Prof. Dr. Yusuf Dilgin</b>
ECTS Credit	7.5
COMU Credit	3
Description	This course include the teaching of i ) basic principles electrochemical methods which have been used in the construction of electrochemical sensors ii ) the applications of electrochemical sensors iii ) electrochemical biosensors and their application iv ) obtaining most sensitive and selective results in electrochemical analyses with electrochemical sensors.

Course Code	ULP - 21 - KY011
Name of the Course in English	<b>Multicomponent Reactions in Organic Chemistry</b>
Name of the Course in Turkish	Organik Kimyada Cok Bilesenli Reaksiyonlar
Language of the Course	English
Level of the Course	Master
Lecturer	<b>Assist Prof. Dr. Sirin Gulden</b>

ECTS Credit	5
COMU Credit	3
Description	<p>Beginning principles of multicomponent reactions, basic concepts in multicomponent reactions. Introduction and definition of multicomponent reactions ( MRCs) The brief history of MCRs. Domino, Tandem, Cascade, Zipper reactions and their applications in the literature. Strecker reaction, Hantzsch reaction and their applications in the literature. Biginelli reaction, Mannich reaction and their applications in the literature. Passerini reaction, Ugi reaction and their applications in the literature. Isocyanide based MCRs (IMCRs). Applications of MCRs in the literature. IMCR/cyclic condensation, IMCR/ intramolecular Diels-Alder reaction IMCR/Heck reaction, IMCR/Wittig reaction and their applications. MCR/sulfonyl azide and MCR/aza-Diels-Alder reaction. Free-radical-mediated multicomponent coupling reactions. Multicomponent reactions in the total synthesis of natural products. Applications of multicomponent reactions in drug discovery. Organometallic MCRs.</p>

