

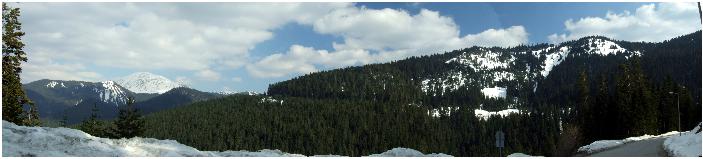
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| ECTS CATALOG | | | 20 January 2012 |



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| ECTS CATALOG |  |
| KASTAMONU UNIVERSITY  FACULTY OF ARTS AND SCIENCES  DEPARTMENT OF BIOLOGY | |



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| EDUCATION SYSTEM |

The official length of Biology Programme in Kastamonu University is 4 years, 2 semesters per year, 14 weeks of lecture + 2 weeks of exam period per semester. At the 4th year of study students should select one of four branches, namely Botany, Molecular Biology and Biotechnology, Ecology and Environmental Biology, and Zoology.

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| YEAR - 1 COURSE LIST |



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* [B-112 FOREIGN LANGUAGE: ENGLISH II](#FOREIGN_LANGUAGE_ENGLISH_II)
* [B-113 TURKISH LANGUAGE I](#TURKISH_LANGUAGE)
* [B-114 TURKISH LANGUAGE II](#TURKISH_LANGUAGE2)
* [B-115 ATATÜRK’S PRINCIPLES AND HISTORY OF TURKISH REVOLUTION I](#TURKISH_REVOLUTION_I)
* [B-116 ATATÜRK’S PRINCIPLES AND HISTORY OF TURKISH REVOLUTION II](#TURKISH_REVOLUTION_II)
* [B-117 GENERAL BIOLOGY LABORATORY I](#GENERAL_BIOLOGY_LABORATORY_I)
* [B-118 GENERAL BIOLOGY LABORATORY II](#GENERAL_BIOLOGY_LABORATORY_II)
* [B-120 MICROTECHNIQUE METHODS LABORATORY](#MICROTECHNIQUE_METHODS_LABORATORY)

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| book-icon.gif | **B101 - GENERAL BIOLOGY I** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (3+0+0) 3 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | To give basic informations on the systematics, structure, metabolism, genetics, ecology, evolution and diversity of living organisms |
| **ASSESSMENTS METHODS** | **Midterm Exam, Homework, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Biological molecules** |
| **2** | **Cell membrane structure and function; Cell structure and function** |
| **3** | **Energy flow in the life of a cell and photosynthesis** |
| **4** | **Respiration** |
| **5** | **Structure of DNA, RNA; gene expression and heredity** |
| **6** | **Cellular reproduction** |
| **7** | **Biotechnology** |
| **8** | **Midterm** |
| **9** | **Nomenclature and classification of living organisms** |
| **10** | **Protists, slime molds, algae, fungi, musci and mosses, plants.** |
| **11** | **Animals, their characteristics, animal phyla** |
| **12** | **Evolution and natural selection** |
| **13** | **Hardy-Weinberg theory, formation of species** |
| **14** | **Evolution of seed plants, vertebrates** |

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| **RECOMMENDED READING** |
| 1. **Audesirk, T., Audesirk, G., Byers. E.B. 2002. BIOLOGY Life on earth. Upper Saddle River.New Jersey.** 2. **Campbell NA and Reece JB. (2008) Biology, Sixth Edition. Benjamin Cumings-Pearson Education.** |

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| book-icon.gif | **B102 - GENERAL BIOLOGY II** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (3+0+0) 3 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | The aim of this course is to give the principles and events related with plant structure and function and to give events related with animal structure and function. Homeostasis , Systems of animals. Animal Behaviour, Ecosystem and its variations |
| **ASSESSMENTS METHODS** | **Midterm Exam, Homework, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Plant Form and Function** |
| **2** | **Root, Stem and Leaves. Plant Life Cycles** |
| **3** | **Plant Responses to the Environment; Plant Hormones** |
| **4** | **Homeostasis and the organization of the Animal Body** |
| **5** | **Circulatory system, Respiratory system,** |
| **6** | **Nutrition, Digestive system, Urinary system,** |
| **7** | **Immune system, Endocrine system** |
| **8** | **Circulatory system, Respiratory system,** |
| **9** | **Animal Nervous System and The Senses** |
| **10** | **Animal Reproduction and Development** |
| **11** | **Animal Behaviour** |
| **12** | **Population growth and regulation** |
| **13** | **Community relationships** |
| **14** | **How do ecosystems work? Various ecosystems in the world** |

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| **RECOMMENDED READING** |
| 1. **Audesirk, T., Audesirk, G., Byers. E.B. 2002. BIOLOGY Life on earth. Upper Saddle River.New Jersey.** 2. **Campbell NA and Reece JB. (2008) Biology, Sixth Edition. Benjamin Cumings-Pearson Education.** |

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| book-icon.gif | **B-103** **BASIC INFORMATION TECHNOLOGIES** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Can Doğan VURDU |

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| **AIMS AND OBJECTIVES** | Introduction to computer systems, software and hardware. Windows operating systems, word processor and workbook/worksheet applications. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **General information for software and hardware, turning on and turning off the computer** |
| **2** | **Introduction to Windows, mouse practices, games, paint practices** |
| **3** | **Keyboard practices, Notepad and WordPad practices** |
| **4** | **Taskbar and windows (menus/toolbars/icons) applications, control panel applications** |
| **5** | **Start menu components (using/conversion/creation/addition/deletion)** |
| **6** | **Desktop/My computer/Windows Explorer applications.** |
| **7** | **Defining the drivers (A/B/C/D) and capacity units (Byte/ KB/ MB/ GB/ TB)** |
| **8** | **File, folder, shortcut practices (Cut/Copy/Paste/Rename), Recycled bin practices** |
| **9** | **Network applications** |
| **10** | **Introduction to Word Processor Software (Writing document, New, Open, Save, Print)** |
| **11** | **Editing documents (cut/copy/paste/undo/redo), Font and Paragraph properties** |
| **12** | **Appending the table into document and table practices** |
| **13** | **Appending the picture into document and picture practices** |
| **14** | **Introduction to Workbook/Worksheet Software and Worksheet practices** |

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| **RECOMMENDED READING** |
| 1. N. Baykal, N. Tekin, Bilgisayar Eğitimine Giriş, Başbakanlık SEHÇEK Yay., Ankara, 2002.  2. H.Ç. Bal, Bilgisayar ve Internet, Akademisyen Yay., Rize, 2002. |

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| book-icon.gif | **B104 -** **MICROTECHNIQUE METHODS** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (1+0+0) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | Explaining the plant microtechnic developments to students |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | TOPICS |
| **1** | **Principles and general techniques,** |
| **2** | **Specimen collected methods** |
| **3** | **Killing and Fixation,** |
| **4** | **Dehydration and Infiltration** |
| **5** | **Embedding and Sectioning** |
| **6** | **Stains (Dyes),** |
| **7** | **Staining techniques** |
| **8** | **Common adhesives and mounting media,** |
| **9** | **Special techniques** |
| **10** | **Whole mount methods and Maceration** |
| **11** | **Paraffin method I** |
| **12** | **Paraffin method II** |
| **13** | **Light microscopy, Principles of light microscopy and attachments** |
| **14** | **Electron microscopic studies.** |

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| **RECOMMENDED READING** |
| **1-Algan, G., (1981) Bitkisel dokular için mikroteknik, Fırat Üniv. Fen Fak. Yay. No:1** |
| **2-Baker, J.R., (1969) Principles of biological microtechnique Menthuen Co.Ltd. London** |
| **3-Hugo Freund W. (1951) Handbuch der mikroskopie in der technik. Band I, teil I Umscau verlag- Frankfurt** |
| **4-Hugo Freund W. (1957) Handbuch der mikroskopie in der technik. Band V, teil I Umscau verlag- Frankfurt** |

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| book-icon.gif | **B105 -** **GENERAL CHEMISTRY I** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+2+0) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Atila ÇAĞLAR |

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| **AIMS AND OBJECTIVES** | Matter: Some properties and measurement, Atom and atomic theory. Elements, Chemical compounds and chemical reactions, Solutions-I, Gases, Thermochemistry, Atmospheric gases, The electronic structure of atoms. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Properties of matter and measuring** |
| **2** | **Atoms and atomic theory** |
| **3** | **Elements, chemical compounds, chemical reactions** |
| **4** | **Nature of aqueous solutions, methathesis reactions** |
| **5** | **Acid-base (neutralization) reactions, reduction-oxidation reactions, titrations.** |
| **6** | **Simple gas law’s, Ideal Gas Law, general Gas Equation** |
| **7** | **Gases in chemical reactions, mixture of gases, Real gases** |
| **8** | **Some terms in thermochemistry, reaction heat and calorimetry, work, the first law of thermodynamic** |
| **9** | **Enthalpy of standart formation, fuels as an energy source** |
| **10** | **Hydrogen, nitrogen, oxygen, noble gases and the oxides of carbon** |
| **11** | **The electronic structure of atom, Atomic spectrums, Bohr’s Atomic theory** |
| **12** | **Quantum numbers and electron orbitals, electronic configurations of the elements** |
| **13** | **Laboratory practice** |
| **14** | **Laboratory practice** |

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| **RECOMMENDED READING** |
| 1. Petrucci, H., R., Harwood, W., S., and Herring, F., G., General Chemistry 1, Trans. Edited By, Uyar, T. and Aksoy, S., Palme Publishing, Ankara, 2002. |

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| book-icon.gif | **B106 -** **GENERAL CHEMISTRY II** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+2+0) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Atila ÇAĞLAR |

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| **AIMS AND OBJECTIVES** | To explain theoretically and practically the basic concepts and properties of atoms, elements, compounds and solutions, the molecular forces of attractions and the factors that affect the rate of chemical changes. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **The classification of elements: Periodic law. Atoms and their sizes. Ionization energy** |
| **2** | **Electron affinity. Magnetic properties. Metals, non-metals and their ions** |
| **3** | **The basic concepts in chemical bonds: Lewis theory. Covalent bonding. Diagrams of the Lewis structures and resonance. Exceptions to the Octet rule** |
| **4** | **Molecular shapes. Bond order and bond distances. Bond energies. Valence Bond Theory** |
| **5** | **Hybridization of molecular orbitals. Folded covalent bonds. Molecular Orbital Theory. Bond formation in metals** |
| **6** | **Some properties of liquids. Evaporation of liquids: Vapour pressure. Some properties of solids. Phase diagrams** |
| **7** | **Van der Waals forces. Hydrogen bonding and chemical bonds with respect to intermolecular forces of attractions. Crystal structures and energy changes during formation of this type of structures** |
| **8** | **Types of solutions. Concentration of solutions. Intermolecular forces and solubility** |
| **9** | **Formation of solution and equilibrium. Solubility of gases. Vapour pressure of solution** |
| **10** | **Osmotic pressure. Freezing point depression and boiling point elevation in non-electrolyte solutions. Electrolyte solutions** |
| **11** | **The rate of a chemical reaction. Measurement of rates of reactions. Rate Law.** |
| **12** | **Reaction orders: Reactions with zero, first and second order. Theoretical models in chemical kinetics. The effect of temperature on reaction rates. Catalysts** |
| **13** | **Laboratory practices** |
| **14** | **Laboratory practices** |

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| **RECOMMENDED READING** |
| 1. Petrucci, H., R., Harwood, W., S., and Herring, F., G., General Chemistry 1, Trans. Edited By, Uyar, T. and Aksoy, S., Palme Publishing, Ankara, 2002. |

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| book-icon.gif | **B107 -** **GENERAL PHYSICS I** |

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+2+0) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ahmet Tolga TAŞCI |

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| **AIMS AND OBJECTIVES** | The significance of Newton’s laws of motion in our daily life and their adaptation to engineering. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Physics Quantities, Standards and Units** |
| **2** | **Vectors** |
| **3** | **Motion In One Dimension** |
| **4** | **Motion In Two Dimension** |
| **5** | **Newton’s Laws** |
| **6** | **Uniform Circular Motion** |
| **7** | **Work and Energy** |
| **8** | **The Conservation of Energy** |
| **9** | **Conservation of Linear Momentum** |
| **10** | **Rotational Kinematics** |
| **11** | **Rolling Kinematics** |
| **12** | **Equilibrium of Rigid Bodies** |
| **13** | **Gravitation** |
| **14** | **Harmonic Motion** |

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| **RECOMMENDED READING** |
| 1. Physics, for Scientists and Engineers with Modern Physics, R.Serway, Saunders College Publishing, 1990.  2. David Halliday, Robert Resnick Fundamentals Of Physics |

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| book-icon.gif | **B108 -** **GENERAL PHYSICS II** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+2+0) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ahmet Tolga TAŞCI |

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| **AIMS AND OBJECTIVES** | Preparing some fundamental knowledge of physics (electric and magnetism) during the student’s education period |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Coulomb Law** |
| **2** | **Electric Fields** |
| **3** | **Gauss Law** |
| **4** | **Gauss Law** |
| **5** | **Electric Potential and Potential Energy** |
| **6** | **Capacitance and Dielectric** |
| **7** | **Ohm Law, Current and Resistance** |
| **8** | **Linear Current Circuits** |
| **9** | **Magnetic Fields** |
| **10** | **Sources of Magnetic Fields** |
| **11** | **Faraday Law** |
| **12** | **Self induction and Lens Law** |
| **13** | **Alternative Current** |
| **14** | **Electromagnetic Fields and Waves** |

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| **RECOMMENDED READING** |
| 1. Physics, for Scientists and Engineers with Modern Physics, R.Serway, Saunders College Publishing, 1990. |

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| book-icon.gif | **B109 -** **BASIC MATHEMATICS** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (3+0+0) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Prof. Dr. Ferhad NASIBOV |

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| **AIMS AND OBJECTIVES** | Learning the methods for mathematical analysis. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Sets. Operations on the sets. Numbers. Exponential and rooted statements** |
| **2** | **Intervals. Identities. Equations. Inequalities. Absolute valid** |
| **3** | **Functions. Partial Functions. Exponential and logarithm functions** |
| **4** | **Trigonometric functions. Inverse trigonometric functions. Trigonometric equations** |
| **5** | **Hyperbolic and inverse hyperbolic functions. General application** |
| **6** | **Limit concept. Limit of trigonometric functions. Some properties on limit** |
| **7** | **Limits on right and left sides. Continuity. Some properties of continuous functions** |
| **8** | **Definition and properties of derivatives. Rules of derivative calculation** |
| **9** | **Derivative of trigonometric functions. Derivative of inverse function. Derivative of hyperbolic and inverse hyperbolic functions** |
| **10** | **Derivative of exponential and logarithm functions. Derivative of implicit function. Higher order derivatives** |
| **11** | **Equations of tangent and normal. Increasing and decreasing functions. Maximum and minimum. Concaveness** |
| **12** | **Some theorems for derivative functions. Undetermined cases** |
| **13** | **Drawing of function graphs** |
| **14** | **Some applications of derivatives. General application** |

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| **RECOMMENDED READING** |
| 1. Süray S.,Umumi Matematik, C1, Çağlayan Kitabevi, İstanbul, !974.  2. Kamali M., Kadıoğlu E., Genel Matematik, Erzurum, 2005 |

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| book-icon.gif | **B110 -** **BIOSTATISTICS** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (3+0+0) 3 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** | Teaching basic concepts of statistics and techniques for statistical analysis. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Homework, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Basic concepts, measure and measure types** |
| **2** | **Design of data: Frequency tables and graphs** |
| **3** | **Measures of location for qualitative and quantative data** |
| **4** | **Measures of dispersion for qualitative and quantative data** |
| **5** | **Probability and probability distributions, Binomial and Poisson distributions** |
| **6** | **Normal distribution and its properties** |
| **7** | **Sampling distributions** |
| **8** | **Estimation, confidence intervals and hypothesis testing for population means** |
| **9** | **Confidence intervals and hypothesis testing for the deference of two population means** |
| **10** | **Confidence intervals and hypothesis testing for the population proportion and the difference of two population proportions** |
| **11** | **Chi-square analysis, contingency tables with applications** |
| **12** | **Simple linear regression models estimation and hypothesis testing. Correlation analysis** |
| **13** | **Analysis of variance (ANOVA)** |
| **14** | **Nonparametric statistical methods and application for life science** |

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| **RECOMMENDED READING** |
| 1. Apaydın, A., Kutsal, A., Atakan, C. (1994). Uygulamalı İstatistik, Baran Ofset, Ankara  2.Sümbüloğlu, K., Sümbüloğlu, V. (1986). Biyoistatistik uygulama kitabı, Çağ matbaası. |

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| book-icon.gif | **B111 -** **FOREIGN LANGUAGE: ENGLISH I** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Prof. Dr. Süleyman TABAN |

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| **AIMS AND OBJECTIVES** | The aim of the course is to develop students’ four skills in English: speaking, listening, writing and reading and to ensure that students use English communicatively and appropriately in real life situations. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Simple Present: the verb to be** |
| **2** | **This is/That is, These are/Those are. Personal Pronouns. Hours** |
| **3** | **Present Continuous Tense** |
| **4** | **Simple Present Tense** |
| **5** | **Modal Verbs** |
| **6** | **Possessive adjectives, object, subject pronouns and possessive pronouns** |
| **7** | **Possession, How much/many, Quantifiers 1** |
| **8** | **Prepositions of place** |
| **9** | **Making suggestions** |
| **10** | **Asking for help and expressing preferences** |
| **11** | **There is/are. Quantifiers 2** |
| **12** | **Frequency adverbs** |
| **13** | **Simple Past Tense with regular verbs** |
| **14** | **Simple Past Tense with irregular verbs** |

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| **RECOMMENDED READING** |
| 1. Full Steam Ahead. Revised 4th Edition. (2005) Edited by Dr. A. Vahit Çakır, Dr. Nilgün Yorgancı and Dr. Gül Keskil. Gündüz Eğitim ve Yayıncılık. |

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| book-icon.gif | **B112 -** **FOREIGN LANGUAGE: ENGLISH II** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Prof. Dr. Süleyman TABAN |

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| **AIMS AND OBJECTIVES** | The aim of the course is to develop students’ four skills in English: speaking, listening, writing and reading and to ensure that students use English communicatively and appropriately in real life situations. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Comparisons: as … as, …er than, the …est, more … than, the most …** |
| **2** | **Comparisons with adjectives; comparisons with adverbs** |
| **3** | **Planned future and strong predictions** |
| **4** | **Adjectives derived from verbs** |
| **5** | **Recent actions: yet, just, already** |
| **6** | **Before, ever, never, once, twice, three times** |
| **7** | **Actions that started in the past and continuing in the present: how long …?, for, since; enough, too** |
| **8** | **Actions that started in the past and continuing in the present: how long …?, for, since; enough, too** |
| **9** | **Interrupted, incomplete or continuing actions in the past** |
| **10** | **When, while; reflexive pronouns** |
| **11** | **Unplanned future and weak predictions** |
| **12** | **Possible happenings in the future; degrees of certainty** |
| **13** | **Direct and indirect speeches** |
| **14** | **Focusing on actions** |

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| **RECOMMENDED READING** |
| 1. Full Steam Ahead. Revised 4th Edition. (2005) Edited by Dr. A. Vahit Çakır, Dr. Nilgün Yorgancı and Dr. Gül Keskil. Gündüz Eğitim ve Yayıncılık. |

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| book-icon.gif | **B113 -** **TURKISH LANGUAGE I** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 2 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yudum KIRMIZI |

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| **AIMS AND OBJECTIVES** | Language, grammar, dialect-intonation-accent, classification of the world languages, the place of Turkish in the world languages, vowels, consonants, congruity, characteristics of Turkish words, root, affix (flexional-formational affixes). |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Description of language, grammar (the birth of grammar, usage)** |
| **2** | **Linguistics and branches** |
| **3** | **Dialect-intonation-accent (dialects and accents of Turkish)** |
| **4** | **Language-thought, language-society relation, colloquial** |
| **5** | **Dialect-intonation-accent (dialects and accents of Turkish)** |
| **6** | **Classification of languages (structure and source)** |
| **7** | **The place of Turkish in the world languages** |
| **8** | **The ages of Turkish (old-middle-new-modern)** |
| **9** | **Phonetics (vowels-consonants)** |
| **10** | **Congruity** |
| **11** | **Basic phonetic characteristics of Turkish words.** |
| **12** | **Root- body-affixes** |
| **13** | **Flexional affixes** |
| **14** | **Formational affixes** |

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| **RECOMMENDED READING** |
| 1. Muharrem Ergin; Türk Dil Bilgisi, Bayrak yay. İstanbul 1997.  2. Mehmet Kiremit; Türk Dili I: Ses ve Şekil Bilgisi. Ankara 2002. |

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| book-icon.gif | **B114 -** **TURKISH LANGUAGE II** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 2 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr Eyüp AKMAN |

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| **AIMS AND OBJECTIVES** | Word types (noun, adjective, adverb, verbal, prepositions, conjunction, exclamation, verb). Verb conjugation (simple timed verb conjugations, complex timed conjugations). Word groups (noun phrase, adjectival phrase, repetition group, title group, conjunction group, complex noun group, exclamation group, number group, complex verb group, abbreviation groups). Sentence [sentence types (simple, complex, sequential sentences, positive, negative, question, inverted). Sentence constituents (subject, predicate, adverb, complement, object)]. Text studies (text selection, identification of the text according to the age group’s , intern and extern analysis of the texts) |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Word types in Turkish** |
| **2** | **Noun, adjective** |
| **3** | **Adverb, pronoun** |
| **4** | **Preposition, conjunction, exclamation** |
| **5** | **Verbals (noun verb, adjective verb, adverb noun)** |
| **6** | **Verbs according to their structure (simple, derived, complex)** |
| **7** | **Formation in verbs (according to its subject (active, passive, conjunct, reflexive), according to its object (transitive, intransitive, causative))** |
| **8** | **Verb conjugation (simple timed verb conjugations)** |
| **9** | **Compound timed verb conjugations** |
| **10** | **Word groups (noun phrase, adjectival phrase, repetition group…)** |
| **11** | **Verb groups (abbreviation groups)** |
| **12** | **Sentence types. Sentences according to their structure (simple, complex, sequential, bound)** |
| **13** | **Sentence types (sentences according to its meaning, according to the predicates place, according to the predicate’s type), constituents of a sentence (subject, verb, complement, object)** |
| **14** | **Text studies (text selection, identification of the text according to the age group difficulty level, intern and extern structure analysis of the text)** |

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| **RECOMMENDED READING** |
| 1. Doğan Aksan; Sözcük Türleri, TDK.1983 Leyla Karahan; Türkçede Söz Dizimi, Akçağ Yay. Ankara.2004 |

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| book-icon.gif | **B115 - ATATÜRK’S PRINCIPLES AND HISTORY OF** **TURKISH REVOLUTION I** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 2 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ercan ÇELEBİ |

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| **AIMS AND OBJECTIVES** | The aim of Atatürk’s Principles and History of Turkish Revolution is to provide accurate information about war independence, Atatürk’s reforms, thinking on the basis of Atatürk’s ideas and to bring them up in accordance with the target. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **The aim of Atatürk’s Principles and History of Turkish Revolution, Basic concepts of History of Turkish Revolution** |
| **2** | **The tensile of Ottoman State** |
| **3** | **Efforts of Ottoman modernization** |
| **4** | **Ideas movements (Ottomanism, Panislamism, Panturkism, Westernisation)** |
| **5** | **Trablusgarp and Balkan Wars** |
| **6** | **World War I** |
| **7** | **Borders on World War I** |
| **8** | **Results of World War I and Mondros Armistice Agreement** |
| **9** | **The national resistance movement in Anatolia “Milli Mücadele”** |
| **10** | **Occupations** |
| **11** | **Greece, England, France, Italy** |
| **12** | **Congresses and “Misak-i Milli”** |
| **13** | **Struggle of Military and Boundaries** |
| **14** | **Project of Sevres, Lausanne Treaty** |

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| **RECOMMENDED READING** |
| 1. E. Semih Yalçın, Mustafa Turan ve Diğerleri, Türk İnkılap Tarihi ve Atatürk ilkeleri, Siyasal Kitabevi, Ankara, 2004., M.K.Atatürk, Nutuk, Atatürk Araştırma Merkezi Yayını,Ankara,1997.A. Mumcu, E.Özbudun ve diğerleri, Atatürk İlkeleri ve İnkılap Tarihi I-II, YÖK, Ankara, 1986. |

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| book-icon.gif | **B116 - ATATÜRK’S PRINCIPLES AND HISTORY OF TURKISH REVOLUTION II** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 2 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ercan ÇELEBİ |

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| **AIMS AND OBJECTIVES** | To teach stages of establishment in modern Turkey |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **National forces and fronts of Adana, Antep, Maraş, Urfa** |
| **2** | **Establishment of uniform army and western front** |
| **3** | **War of Sakarya and its results** |
| **4** | **War of Commander chief domain and its results** |
| **5** | **Agreement of Mudanya and Conference of Lozan** |
| **6** | **Enduring reign** |
| **7** | **Establishment of Republic of Turkey** |
| **8** | **Establishment of Republic of Turkey** |
| **9** | **Progressive-mind Republican Party and Free Party** |
| **10** | **Rebellion of Sheyh Sait and its results** |
| **11** | **Revolutions** |
| **12** | **Establishment of Intuition of Turkish History and Turkish Language** |
| **13** | **Principles of Atatürk** |
| **14** | **National forces and fronts of Adana, Antep, Maraş, Urfa** |

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| **RECOMMENDED READING** |
| 1. E. Semih Yalçın, Mustafa Turan ve Diğerleri, Türk İnkılap Tarihi ve Atatürk ilkeleri, Siyasal Kitabevi, Ankara, 2004., M.K.Atatürk, Nutuk, Atatürk Araştırma Merkezi Yayını,Ankara,1997.A. Mumcu, E.Özbudun ve diğerleri, Atatürk İlkeleri ve İnkılap Tarihi I-II, YÖK, Ankara, 1986. |

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| book-icon.gif | **B117 -** **GENERAL BIOLOGY LABORATORY I** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | To learn the biological molecules, membranes cell, tissue, organisms and systems |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Visiting to department laboratories and introductions equipment of laboratories** |
| **2** | **Microscopy** |
| **3** | **Prokaryotic and eukaryotic cells** |
| **4** | **Starch granules** |
| **5** | **Plastids** |
| **6** | **Crystals** |
| **7** | **Enzymes** |
| **8** | **Biological molecules** |
| **9** | **Mitosis and meiosis** |
| **10** | **Segmentation** |
| **11** | **Plant tissue: Transportation** |
| **12** | **Plant tissue: Supportive** |
| **13** | **Animal tissues: Skeletons, Cartilage** |
| **14** | **Animal tissues: Blood and Muscles** |

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| **RECOMMENDED READING** |
| 1. **GUNSTREAM, S.E. 2002. Explorations in Basic Biology(Nith Edition). Prentice Hall, Upper Saddle River, New Jersey 07458, USA** |

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| book-icon.gif | **B118 -** **GENERAL BIOLOGY LABORATORY II** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | To learn plant and animal organs and systems |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Root** |
| **2** | **Stem** |
| **3** | **Leaf** |
| **4** | **Flower** |
| **5** | **Fruit and seed** |
| **6** | **Digestive system** |
| **7** | **Heart of Mammalian** |
| **8** | **Nervous System** |
| **9** | **Endocrine system** |
| **10** | **Circulatory system** |
| **11** | **Respiratory system** |
| **12** | **Plant systematic** |
| **13** | **Animal systematic** |
| **14** | **Dissection of Frog** |

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| **RECOMMENDED READING** |
| 1. **GUNSTREAM, S.E. 2002. Explorations in Basic Biology(Nith Edition). Prentice Hall, Upper Saddle River, New Jersey 07458, USA** |

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| book-icon.gif | **B120 -** **MICROTECHNIQUE METHODS LABORATORY** |

[**Return to list**](#YEAR_1_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | Explaining the plant microtechnic developments to students |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | Definition of glass equipments, laboratory devices |
| **2** | Tissue fixation |
| **3** | Tissues processing, |
| **4** | Maceration |
| **5** | Maceration |
| **6** | Heiz-acetocarmin methods |
| **7** | Glicerin-Jelatine methods |
| **8** | Paraffin method I |
| **9** | Paraffin method II |
| **10** | Paraffin method III |
| **11** | Paraffin method IV |
| **12** | Paraffin method V |
| **13** | Definition of light microscopy |
| **14** | Demonstration of Electron microscopy preparations |

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| **RECOMMENDED READING** |
| **1-Algan, G., (1981) Bitkisel dokular için mikroteknik, Fırat Üniv. Fen Fak. Yay. No:1** |
| **2-Baker, J.R., (1969) Principles of biological microtechnique Menthuen Co.Ltd. London** |
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| YEAR - 2 COURSE LIST |

* [B-201 CELL BIOLOGY](#CELL_BIOLOGY)
* [B-202 ANIMAL HISTOLOGY](#ANIMAL_HISTOLOGY)
* [B-203 CELL BIOLOGY LABORATORY](#CELL_BIOLOGY_LABORATORY)
* [B-204 ANIMAL HISTOLOGY LABORATORY](#ANIMAL_HISTOLOGY_LABORATORY)
* [B-205 CRYPTOGAMIC BOTANY I](#CRYPTOGAMS_I)
* [B-206 CRYPTOGAMIC BOTANY II](#CRYPTOGAMS_II)
* [B-207 CRYPTOGAMIC BOTANY LABORATORY I](#CRYPTOGAMS_LABORATORY_I)
* [B-208 CRYPTOGAMIC BOTANY LABORATORY II](#CRYPTOGAMS_LABORATORY_II)
* [B-209 PHANEROGAMS I](#PHANEROGAMS_I)
* [B-210 PHANEROGAMS II](#PHANEROGAMS_II)
* [B-211 PHANEROGAMS LABORATORY I](#PHANEROGAMS_LABORATORY_I)
* [B-212 PHANEROGAMS LABORATORY II](#PHANEROGAMS_LABORATORY_II)
* [B-213 INVERTABRATE ANIMALS I](#INVERTABRATES_I)
* [B-214 INVERTABRATE ANIMALS II](#INVERTABRATES_II)
* [B-215 INVERTABRATE ANIMALS LABORATORY I](#INVERTABRATES_LABORATORY_I)
* [B-216 INVERTABRATE ANIMALS LABORATORY II](#INVERTABRATES_LABORATORY_Iı)
* [B-217 VERTABRATE ANIMALS I](#VERTABRATES_I)
* [B-218 VERTABRATE ANIMALS II](#VERTABRATES_II)
* [B-219 VERTABRATES LABORATORY I](#VERTABRATES_LABORATORY_I)
* [B-220 VERTABRATES LABORATORY II](#VERTABRATES_LABORATORY_II)
* [B-221 ORGANIC CHEMISTRY I](#ORGANIC_CHEMISTRY_I)
* [B-222 ORGANIC CHEMISTRY II](#ORGANIC_CHEMISTRY_II)
* [B-223 ENGLISH FOR BIOLOGY I](#ENGLISH_FOR_BIOLOGY)
* [B-224 ENGLISH FOR BIOLOGY II](#ENGLISH_FOR_BIOLOGY2)

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| book-icon.gif | **B201 -** **CELL BIOLOGY** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** | The course aims to help students learn to cell and cell structure. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | Definition of cell and history of cell, the chemical components of a cell |
| **2** | General cell structure, molecular organization of the cell membrane; Prokaryotic cells: Bacteria; Viruses |
| **3** | Cell membranes: Membrane lipids; membrane proteins. Prokaryotic and eukaryotic cell walls; Extracellular matrix |
| **4** | Differentiations of cell membrane, intercellular communications and gap junctions |
| **5** | Cell cytoskeleton: microtubules; actin; myosin filaments and cell movement; intermediate filaments |
| **6** | Endoplasmic reticulum; Golgi apparatus; Vesicular transport |
| **7** | Mitochondria; The oxidative phosphorylation; Chloroplasts and other plastids: Photosynthesis |
| **8** | Lysosomes; Phagocytosis: Peroxisomes; Glyoxsomes and Glyoxylate cycle |
| **9** | The cell surface: Cilia; Microvilli: Endocytosis; Cell-cell interactions: Adhesion molecules, tight and gap junctions; plant cell adhesion and plasmodesmata |
| **10** | Transport of small molecules: Passive, facilitated and active transport; ATPases |
| **11** | Ribosomes; RNA synthesis and Processing; Protein synthesis processing and regulation |
| **12** | Cell signalling: signalling molecules; cell surface receptors; signalling in development and differentiation |
| **13** | Nucleus: the nuclear envelope and traffic between the nucleus and cytoplasm; internal organisation of nucleus; Nucleolus |
| **14** | Cell division (Mitosis and Meiosis) |

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| **RECOMMENDED READING** |
| 1. Albert,B., Bray,D., Lewis, J., Rolf, M., Robert, K and Watson, J.D. 1989, Molecular Biology of the Cell  2. Karol,S., Ayvalı,C., Suludere,Z. 2000, Hücre Biyolojisi  3. Lodiish, Berk, Zibursky, et al. 2000, Molecular Cell Biology, W.H.Freeman and Company  4. Gerald Carp, Cell and Molecular Biology. 1999, John Wiley and Sons Inc.  5. Becker, Kleinsmith, Hardin, 2003, The World of the Cell, The Benjamin/Cummings Publishing Comp.  6. G. M. Cooper, 1997, The Cell: A Molecular Approach, ASM Press. |

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| book-icon.gif | **B202 -** **ANIMAL HISTOLOGY** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** | This course is to acquaint the biology students with fundamental concepts of histology. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Epithelial tissue : Cellular characters of epithelial cells and covering epithelia** |
| **2** | **Glandular epithelia and types** |
| **3** | **Connective tissue** |
| **4** | **Molecular structures of ground substances** |
| **5** | **Connective tissue fibres and cells** |
| **6** | **Adipose tissue** |
| **7** | **Cartilage** |
| **8** | **Bone** |
| **9** | **Muscular tissue** |
| **10** | **Skeletal muscle fibres and contraction mechanism** |
| **11** | **Blood: Plasma and cells** |
| **12** | **Bone marrow and haematopoiesis** |
| **13** | **Nerve tissue** |
| **14** | **Lymphoid system** |

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| **RECOMMENDED READING** |
| 1. Ayvalı, C. 2002, Hayvan Histolojisi Ders Notları,  2. Ross, M.H. Romrell, L.J. 1989, Histology, A text and Atlas, 2nd Ed. Williams & Wilkins  3. Junqueria, L.C., Carnerio, J., Kelley, R.O. 1997, Basic Histology 8th Ed., A Lange Medical  4. Don W. Fawcett, 1986, A text Book of Histology 11th Ed. W.B. Saunders Company |

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| book-icon.gif | **B203 -** **CELL BIOLOGY LABORATORY** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Kerim GÜNEY |

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| **AIMS AND OBJECTIVES** | The aim of this course is to define the basic concepts of histology laboratory. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Epithelium, Gland epithelium** |
| **2** | **Connective tissue** |
| **3** | **Cartilage (hyaline, fibro cartilage, elastic cartilage)** |
| **4** | **Bone** |
| **5** | **Blood** |
| **6** | **Muscles** |
| **7** | **Central nervous tissue** |
| **8** | **Peripherical nervous tissue** |
| **9** | **Digestive system** |
| **10** | **Integument system** |
| **11** | **Respiratory system** |
| **12** | **Urinary system** |
| **13** | **Male and female reproductive system** |
| **14** | **Endocrine system** |

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| **RECOMMENDED READING** |
| 1. Carlos Junqueira, L. Carneiro, J. Kelly, R.O. 1998. Histoloji, Çeviri Prof Dr. Yener AYTEKİN, Barış Kitapevi |

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| book-icon.gif | **B204 -** **ANIMAL HISTOLOGY LABORATORY** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** |  |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B205 -** **CRYPTOGAMIC BOTANY I** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** | The students should be able;  1. To identify the basic principles of systematics.  2. To define how plants are classified.  3. To point out the main steps in the historical background of plant systematics.  4. To define the diversity and distribution of algae and bryophytes.  5. To define the morphology and anatomy of algae and bryophytes.  6. To define the classification of algae and bryophytes.  7. To define the economical and ecological importance of algae and bryophytes.  8. To give some examples to algae and bryophytes having medicinal properties. |
| **ASSESSMENTS METHODS** | **Quiz, Homework, Midterm Exam, Term Homework, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Basic Principles of Systematics, Introduction to Plant Systematics** |
| **2** | **Historical Context of Plant Systematics** |
| **3** | **Algae - Occurrence and Distribution, Structure of Thallus** |
| **4** | **Algae - Nutrition & Reproduction** |
| **5** | **Algae - Economical and Ecological Importance** |
| **6** | **Algae - Classification** |
| **7** | **Algae - Classification** |
| **8** | **Bryophtes - Why they are accepted as plants?** |
| **9** | **Bryophtes - Distribution, Morphology and Anatomy** |
| **10** | **Bryophtes - Economical and Ecological Importance** |
| **11** | **Bryophtes - Classification** |
| **12** | **Morphology, Anatomy and Systematics of Hornworts** |
| **13** | **Morphology, Anatomy and Systematics of Mosses** |
| **14** | **Examples of Hornworts and Mosses Having Medicinal Properties** |

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| **RECOMMENDED READING** |
| 1. Graham LE. and Wilcox LW. 2000. Algae, Prentice Hall, USA.  2. Barsanti L. and Gualtieri P. 2006. Algae - Anatomy, Biochemistry and Biotechnology, Taylor & Francis Group, USA.  3. Stevenson RJ., Bothwell ML. and Lowe RL. 1996. Alga1 Ecology - Freshwater Benthic Ecosystems, Academic Press, UK.  4. Goffinet B. and Shaw AJ. 2009. Bryophyte Biology, Cambridge University Press, UK.  5. Vanderpoorten A. and Goffinet B. 2009. Introduction to Bryophytes, Cambridge University Press, UK. |

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| book-icon.gif | **B206 -** **CRYPTOGAMIC BOTANY II** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** | The students should be able;  1. To define the diversity and distribution of ferns, horsetails, mushrooms and lichens.  2. To define the morphology and anatomy of ferns, horsetails, mushrooms and lichens.  3. To classify ferns, horsetails, mushrooms and lichens.  4. To identify the economical and ecological importance of ferns, horsetails, mushrooms and lichens.  5. To give some examples to ferns, horsetails, mushrooms and lichens having medicinal properties. |
| **ASSESSMENTS METHODS** | **Quiz, Homework, Midterm Exam, Term Homework, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Introduction to Ferns** |
| **2** | **Horsetails** |
| **3** | **Morphology and Anatomy of Ferns and Horsetails** |
| **4** | **Classification of Ferns** |
| **5** | **Economical and Ecological Importance of Ferns** |
| **6** | **Introduction to Mushrooms** |
| **7** | **Morphology and Anatomy of Mushrooms** |
| **8** | **Classification of Mushrooms** |
| **9** | **Economical and Ecological Importance of Mushrooms** |
| **10** | **Introduction to Lichens** |
| **11** | **Morphology and Anatomy of Lichens** |
| **12** | **Classification of Lichens** |
| **13** | **Economical and Ecological Importance of Lichens** |
| **14** | **Ferns, Horsetails, Mushrooms and Lichens Having Medicinal Importance** |

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| **RECOMMENDED READING** |
| 1. Alan R.S., Kathleen M.P., Eric S., Petra K., Harald S. and Paul G.W. 2006. A classification for extant ferns. Taxon 55(3): 705-731.  2. Hibbet et al. 2007. A higher-level phylogenetic classification of the Fungi. Mycological Research, 509-547.  3. Boddy L., Frankland J.C., van West P., 2008. Ecology of Saprotrophic Basidiomycetes. The British Mycological Society.  4. Kavanagh K. 2005. Fungi - Biology and Applications. John Wiley & Sons Ltd, West Sussex, England.  5. Webster J., Weber R. 2007. Introduction to Fungi. Cambridge University Press, UK.  6. Nash T.H. 2008. Lichen Biology. Cambridge University Press, UK.  7. Hanson J.R. 2008. The Chemistry of Fungi. RSC Publishing, UK.  8. Charlile M.J., Watkinson S.C., Gooday, G.W. 2001. The Fungi. Academic Press, UK. |

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| book-icon.gif | **B207 -** **CRYPTOGAMIC BOTANY LABORATORY I** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** | The students should be able;  1. To define basic criteria for the classification of algae.  2. To define basic criteria for the classification of bryophytes.  3. To identify samples of *Chrococcus, Pediastrum, Scenedesmus, Microcystis, Navicula, Surirella, Dinobryon, Volvox, Chara, Cladophora, Anabena, Oedegonium, Spirogyra, Zygnema, Codium, Ulva, Cystoseira, Enteromorpha, Padina* and *Cosmarium*.  4. To recognise acrocarpous and pleurocarpous mosses.  5. To identify leaf posture types, leaf shape, leaf margin, leaf apices, cell types, capsule and capsule lid types. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Basic Criteria for The Classification of Algae.**  **Examination of Samples (*Navicula* and *Surirella*).** |
| **2** | **Examination of Samples (*Dinobryon* and *Volvox*).** |
| **3** | **Examination of Samples (*Chrococcus* and *Pediastrum*).** |
| **4** | **Examination of Samples (*Scenedesmus* and *Microcystis*).** |
| **5** | **Examination of Samples (*Anabena* and *Oedegoinum*).** |
| **6** | **Examination of Samples (*Spirogyra* and *Zygnema*).** |
| **7** | **Examination of Samples (*Chara* and *Cladophora*).** |
| **8** | **Examination of Samples (*Codium, Ulva* and *Enteromorpha*).** |
| **9** | **Examination of Samples (*Cystoseira* and *Padina*).** |
| **10** | **Basic Criteria for The Classification of Bryophytes.**  **Examination of Leaf Posture Types.** |
| **11** | **Examination of Leaf Shape and Leaf Margin** |
| **12** | **Examination of Leaf Apices** |
| **13** | **Examination of Cell Types** |
| **14** | **Examination of Capsule and Capsule Lid Types** |

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| **RECOMMENDED READING** |
| 1. Graham LE. and Wilcox LW. 2000. Algae, Prentice Hall, USA.  2. Barsanti L. and Gualtieri P. 2006. Algae - Anatomy, Biochemistry and Biotechnology, Taylor & Francis Group, USA.  3. Stevenson RJ., Bothwell ML. and Lowe RL. 1996. Alga1 Ecology - Freshwater Benthic Ecosystems, Academic Press, UK.  4. Goffinet B. and Shaw AJ. 2009. Bryophyte Biology, Cambridge University Press, UK.  5. Vanderpoorten A. and Goffinet B. 2009. Introduction to Bryophytes, Cambridge University Press, UK. |

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| book-icon.gif | **B208 -** **CRYPTOGAMIC BOTANY LABORATORY II** |

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** | The students should be able;  1. To define basic criteria for the classification of ferns.  2. To define basic criteria for the classification of mushrooms.  3. To define basic criteria for the classification of lichens.  4. To examine cross section of a fern sample.  5. To examine sections of a horsetail sample.  6. To examine mushroom samples.  7. To examine lichen samples.  8. To identify anatomy and morphology of ferns, horsetails, mushrooms and lichens. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Basic Criteria for The Classification of Ferns.** |
| **2** | **Anatomy and Morphology of Ferns** |
| **3** | **Examination of a Fern Stem Cross Section.** |
| **4** | **Examination of Fern Spores.** |
| **5** | **Anatomy and Morphology of Horsetails** |
| **6** | **Examination of a Horsetail Stem Cross Section.** |
| **7** | **Examination of Horsetail Spores.** |
| **8** | **Basic Criteria for The Classification of Mushrooms.** |
| **9** | **Anatomy and Morphology of Mushrooms.** |
| **10** | **Examination of Fungi Imperfecti and *Ascomycetes* Samples.** |
| **11** | **Examination of *Basidiomycetes* Samples.** |
| **12** | **Basic Criteria for The Classification of Lichens.** |
| **13** | **Anatomy and Morphology of Lichens.** |
| **14** | **Examination of Lichen Samples.** |

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| **RECOMMENDED READING** |
| 1. Alan R.S., Kathleen M.P., Eric S., Petra K., Harald S. and Paul G.W. 2006. A classification for extant ferns. Taxon 55(3): 705-731.  2. Hibbet et al. 2007. A higher-level phylogenetic classification of the Fungi. Mycological Research, 509-547.  3. Boddy L., Frankland J.C., van West P., 2008. Ecology of Saprotrophic Basidiomycetes. The British Mycological Society.  4. Kavanagh K. 2005. Fungi - Biology and Applications. John Wiley & Sons Ltd, West Sussex, England.  5. Webster J., Weber R. 2007. Introduction to Fungi. Cambridge University Press, UK.  6. Nash T.H. 2008. Lichen Biology. Cambridge University Press, UK.  7. Hanson J.R. 2008. The Chemistry of Fungi. RSC Publishing, UK.  8. Charlile M.J., Watkinson S.C., Gooday, G.W. 2001. The Fungi. Academic Press, UK. |

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| book-icon.gif | **B209 -** **PHANEROGAMS I** |

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | To learn plant systematics, plant identification and present plant species |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **History and Fundamentals of plant systematics** |
| **2** | **Classifications of Gymnosperms and general characteristics** |
| **3** | **Pre-Phanerogames** |
| **4** | **Cycadales** |
| **5** | **Ginkgoales** |
| **6** | **Fossil Gymnosperms** |
| **7** | **Coniferales, their phylogeny and classifications** |
| **8** | **Pinales, Pines of Turkey** |
| **9** | **Genus of Pinus, Abies, Cedrus and Picea , examples from world and Turkey** |
| **10** | **Araucasiaceae, Podocarpaceae,** |
| **11** | **Cupressaceae, Taxodiaceae** |
| **12** | **Taxales, Cephalotaxales** |
| **13** | **Ephedrales** |
| **14** | **Welwitschiales, Gnetales** |

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| **RECOMMENDED READING** |
| 1. **Akman, Y., Ketenoğlu, O. Ve ark., 2003- Gymnospermae (Açık Tohumlular) ISBN: 975-97436-2-0** |

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| book-icon.gif | **B210 -** **PHANEROGAMS II** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | To teach systematic characteristics of seed plants and biological diversity. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Subdivision of Angiospermae and their general characteristics** |
| **2** | **Primitive and advanced characters, paleobotanic of Angiosperms, theories about ancestors of Angiospermae and origin of Angiospermae.** |
| **3** | **Classification of Angiospermae.** |
| **4** | **General characteristics of Magnoliopsida** |
| **5** | **General characteristics of Ranunculaceae and Brassicaceae and their examples** |
| **6** | **General characteristics of Caryophyllaceae and Rosaceae Cruciferae and their examples** |
| **7** | **General characteristics of Fabaceae and Apiaceae and their examples** |
| **8** | **General characteristics of Asteraceae and Fagaceae and their examples** |
| **9** | **General characteristics of Betulaceae, Corylaceae and Scrophulariaceae and their examples** |
| **10** | **General characteristics of Lamiaceae and their examples** |
| **11** | **General characteristics of Liliopsida** |
| **12** | **General characteristics of Poaceae and their examples** |
| **13** | **General characteristics of Liliaceae and Orchidaceae and their examples** |
| **14** | **General characteristics of Iridaceae and their examples** |

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| **RECOMMENDED READING** |
| 1. **Seçmen, Ö ve diğ. 1995. Tohumlu bitkiler sistematiği. Ege Üniv. Fen Fak Kitapları Serisi No:116. 396 Sayfa, İzmir** 2. **Akman Yıldırım, Ketenoğlu O, Kurt L, Güney K, 2000. Kapalı Tohumlular / Angiospermae, Palme yayınevi, Ankara** |

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| book-icon.gif | **B211 -** **PHANEROGAMS LABORATORY I** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | To learn plant systematic, plant identification and present plant species |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Plant collection techniques** |
| **2** | **Herbarium, Botanical gardens, Arboretums** |
| **3** | **Terminology: Leaf** |
| **4** | **Terminology: Stem** |
| **5** | **Terminology: Root** |
| **6** | **Terminology: Flower** |
| **7** | **Formulas and diagrams of flower** |
| **8** | **Fruit types** |
| **9** | **Identification keys** |
| **10** | **Generative organs of Pinaceae** |
| **11** | **Vegetative organs of Pinaceae** |
| **12** | **Determination and identification of Pinaceae members** |
| **13** | **Determination and identification Cupressaceae members** |
| **14** | **Determination and identification Taxaceae members** |

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| **RECOMMENDED READING** |
| 1. **Ketenoğlu, O. ve ark., 1999-Tohumlu Bitkiler PRACTICAL Klavuzu, Ankara** |

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| book-icon.gif | **B212 -** **PHANEROGAMS LABORATORY II** |

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | To learn plant systematic, plant identification and present plant species |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **General structure of Angiosperm flower and infloresence** |
| **2** | **Ovarium conditions, plesantation types and drowing flower diagrams** |
| **3** | **Fruit types** |
| **4** | **Family description keys of Magnoliopsida** |
| **5** | **Description of Ranunculaceae and Brassicaceae** |
| **6** | **Description of Caryophylaceae and Rosaceae** |
| **7** | **Description of Fabaceae and Apiaceae** |
| **8** | **Description of Asteraceae and Fagaceae** |
| **9** | **Description of Betulaceae, Corylaceae and Scrophulariaceae** |
| **10** | **Description of Lamiaceae** |
| **11** | **Family description keys of Liliopsida** |
| **12** | **Description of Poaceae** |
| **13** | **Description of Liliaceae and orchidaceae** |
| **14** | **Description of Iridaceae** |

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| **RECOMMENDED READING** |
| 1. **Ketenoğlu, O. ve ark., 1999-Tohumlu Bitkiler Klavuzu, Ankara** |

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| book-icon.gif | **B213 -** **INVERTABRATE ANIMALS I** |

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B214 -** **INVERTABRATE ANIMALS II** |

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. İbrahim KÜÇÜKBASMACI |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B215 -** **INVERTABRATE ANIMALS LABORATORY I** |

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **RECOMMENDED READING** |
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| book-icon.gif | **B216 -** **INVERTABRATE ANIMALS LABORATORY II** |

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. İbrahim KÜÇÜKBASMACI |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **RECOMMENDED READING** |
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| book-icon.gif | **B217 -** **VERTABRATE ANIMALS I** |

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B218 -** **VERTABRATE ANIMALS II** |

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. İbrahim KÜÇÜKBASMACI |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B219 -** **VERTABRATE ANIMALS LABORATORY I** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B220 -** **VERTABRATE ANIMALS LABORATORY II** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. İbrahim KÜÇÜKBASMACI |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
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| **RECOMMENDED READING** |
| 1. |

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| book-icon.gif | **B221 -** **ORGANIC CHEMISTRY I** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** | Preparation of the student by giving a background about chemistry of compounds of carbon, structure determination, reactions and synthesis to be able to face the problems in such diverse areas as medicine, biochemistry, ecology, pollution control etc. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **The structure of organic compounds** |
| **2** | **Research methods in organic chemistry** |
| **3** | **Thermochemistry and kinetics of organic reactions** |
| **4** | **Alkanes** |
| **5** | **Alkanes** |
| **6** | **Cycloalkanes** |
| **7** | **Alkenes and Alkynes I** |
| **8** | **Alkenes and Alkynes I** |
| **9** | **Properties and Synthesis** |
| **10** | **Properties and Synthesis** |
| **11** | **Alkenes and Alkynes II** |
| **12** | **Alkenes and Alkynes II** |
| **13** | **Polyenes** |
| **14** | **Aromatic Hydrocarbons** |

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| **RECOMMENDED READING** |
| 1. Atkins, R.C., Carey F.A., Organic Chemistry: A Brief Course, 1997, McGraw-Hill.  2. T.W.G. Solomons, Organic Chemistry, Sixth Edition, John Willey & Sons. Inc. |

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| book-icon.gif | **B222 -** **ORGANIC CHEMISTRY II** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** | Preparation of the student by giving a background about chemistry of compounds of carbon, structure determination, reactions and synthesis to be able to face the problems in such diverse areas as medicine, biochemistry, ecology, pollution control etc. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Stereochemistry** |
| **2** | **Stereochemistry** |
| **3** | **Ethers** |
| **4** | **Epoxides** |
| **5** | **Amines** |
| **6** | **Carbonyl compounds** |
| **7** | **Introduction to Organic Reactions** |
| **8** | **Alcohols and Alkyl Halides** |
| **9** | **Addition Reactions** |
| **10** | **Aromatic Compounds** |
| **11** | **Stereochemistry** |
| **12** | **Nucleophilic** |
| **13** | **Substitution** |
| **14** | **Free Radicals** |

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| **RECOMMENDED READING** |
| 1. Atkins, R.C., Carey F.A., Organic Chemistry: A Brief Course, 1997, McGraw-Hill.  2. T.W.G. Solomons, Organic Chemistry, Sixth Edition, John Willey & Sons. Inc. |

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| book-icon.gif | **B223 -** **ENGLISH FOR BIOLOGY I** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Gözde GÜRELLİ |

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| **AIMS AND OBJECTIVES** | The aim of the course is to get the students acquainted with the general aspects in biology along with the technical terms and advance their English. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **The nature and logic of science** |
| **2** | **Characteristics of living things** |
| **3** | **Body temperature** |
| **4** | **Metabolic rate** |
| **5** | **The cell theory** |
| **6** | **The cell structure** |
| **7** | **Subcellular organelles** |
| **8** | **DNA molecule** |
| **9** | **Gen expression** |
| **10** | **The functional basis of life** |
| **11** | **Themes in the study of life** |
| **12** | **Life’s hierarchical order** |
| **13** | **Evolution** |
| **14** | **Unity and diversity** |

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| **RECOMMENDED READING** |
| 1. Campbell, N.A., Reece, J.B., (2009), “Biology” Eight edition, USA. |

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| book-icon.gif | **B224 -** **ENGLISH FOR BIOLOGY II** |

[**Return to list**](#YEAR_2_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Gözde GÜRELLİ |

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| **AIMS AND OBJECTIVES** | The aim of the course is to get the students acquainted with the general aspects in biology along with the technical terms and advance their English. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **DNA molecule** |
| **2** | **DNA molecule** |
| **3** | **Gen expression** |
| **4** | **Gen expression** |
| **5** | **The functional basis of life** |
| **6** | **The functional basis of life** |
| **7** | **Themes in the study of life** |
| **8** | **Themes in the study of life** |
| **9** | **Life’s hierarchical order** |
| **10** | **Life’s hierarchical order** |
| **11** | **Evolution** |
| **12** | **Evolution** |
| **13** | **Unity and diversity** |
| **14** | **Unity and diversity** |

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| **RECOMMENDED READING** |
| 1. 1. Campbell, N.A., Reece, J.B., (2009), “Biology” Eight edition, USA. |

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| YEAR - 3 COURSE LIST |

* [B-301 GENETICS I](#GENETICS_I)
* [B-302 GENETICS II](#GENETICS_II)
* [B-303 MICROBIOLOGY](#MICROBIOLOGY)
* [B-304 BIOCHEMISTRY II](#BIOCHEMISTRY_II)
* [B-305 MICROBIOLOGY LABORATORY](#MICROBIOLOGY_LABORATORY)
* [B-306 BIOCHEMISTRY LABORATORY II](#BIOCHEMISTRY_LABORATORY_II)
* [B-307 BIOCHEMISTRY I](#BIOCHEMISTRY_I)
* [B-308 ANIMAL MORPHOLOGY](#ANIMAL_MORPHOLOGY)
* [B-309 BIOCHEMISTRY LABORATORY I](#BIOCHEMISTRY_LABORATORY_I)
* [B-310 ANIMAL MORPHOLOGY LABORATORY](#ANIMAL_MORPHOLOGY_LABORATORY)
* [B-311 ANIMAL PHYSIOLOGY](#ANIMAL_PHYSIOLOGY) 
* [B-312 HYDROBIOLOGY](#HYDROBIOLOGY)
* [B-313 ANIMAL PHYSIOLOGY LABORATORY](#ANIMAL_PHYSIOLOGY_LABORATORY)
* [B-314 HYDROBIOLOGY LABORATORY](#HYDROBIOLOGY_LABORATORY)
* [B-315 PLANT PHYSIOLOGY](#PLANT_PHYSIOLOGY)
* [B-316 ECOLOGY](#ECOLOGY)
* [B-317 PLANT PHYSIOLOGY LABORATORY](#PLANT_PHYSIOLOGY_LABORATORY)
* [B-318 PLANT MORPHOLOGY](#PLANT_MORPHOLOGY)
* [B-319 PLANT ANATOMY](#PLANT_ANATOMY)
* [B-320 PLANT MORPHOLOGY LABORATORY](#PLANT_MORPHOLOGY_LABORATORY)
* [B-321 PLANT ANATOMY LABORATORY](#PLANT_ANATOMY_LABORATORY)

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| book-icon.gif | **B301 -** **GENETICS I** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+2+0) 3 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU |

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| **AIMS AND OBJECTIVES** | Identification of transmission rules of genetic material based on hybrid and pedigree analyses. Mendel`s ratios. Understanding the genetic correlations which modify Mendel`s ratios. Relationships between genotype and phenotype. Molecular basis of crossing-over and construction of gene-linkage maps. Understanding the chromosomal mutation mechanisms. |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **History of genetics, definitions of genotype, phenotype, gene, allele and hybridisation, explanation of monogenic and polygenic heredity. Logic of Mendel`s experiments.** |
| **2** | **Mendel`s rules (segregation and independent assortment). Monohybrid, dihybrid ve trihybrid crosses.** |
| **3** | **Control (test) crosses and statistical analysis of crossing results.** |
| **4** | **Transmission genetics in human and human pedigrees.** |
| **5** | **Chromosomal basis of mitosis and meiosis and alternation of generations in plants.** |
| **6** | **Extensions of Mendel`s rates (incomplete dominance, co-dominance, multiple allelism, lethal alleles)** |
| **7** | **Epistasy and X chromosome linkage in human** |
| **8** | **Internal and external factors that effect genetic expression (penetrance, expressivity, suppression and position effects, temperature, food and nutrition, imitation of genetic expression, genetic anticipation and genetic imprint)** |
| **9** | **Linkage, crossing-over and gene maps in eukaryotes.** |
| **10** | **Advanced genetic mapping techniques in eukaryotes (tetrad analyses) and genetic mapping in prokaryotes(conjugation, transduction, transformation)** |
| **11** | **Chromosomal mutations-I (Changes in chromosome structure)** |
| **12** | **Chromosomal mutations-II (Changes in chromosome numbers)** |
| **13** | **Population genetics-I (determination of allelic frequencies, Hardy-Weinberg rule, genetic variation and the methods based on the identification of genetic variations)** |
| **14** | **Population genetics-II (Effects that result in changes of allelic frequencies: mutation, genetic drift, random changes in allelic frequencies, migration and natural selection)** |

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| **RECOMMENDED READING** |
| 1. Beck, S. And Olek, A. (2003). The Epigenome. Wiley –VCH. Weinheim/Germany.  2. Lamb, B. C. (2000). The Applied Genetics of Plants, Animals, Humans and Fungi. Imperial College Press, London/England.  3. Klug, W. And Cummings, M.R. (2000). Concepts of Genetics. Prentice Hall. New Jersey/USA  4. Russel, P.J. (1996). Genetics. Harper Collins College Publishers. New York/USA  5. Weaver, R.F. and Hedrick, P.W. (1989). Genetics. C. Brown Publishers. Dubuque/USA |

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| book-icon.gif | **B302 -** **GENETICS II** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+2+0) 3 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU |

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| **AIMS AND OBJECTIVES** | Understanding of structural and functional characteristics of genetic material, genetic and biochemical basis of replication, transcription and translation systems, genetic regulation and evolution. |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Physical and chemical characteristics of deoxyribonucleic acid and ribonucleic acid.** |
| **2** | **Replication models-I (theta type replication)** |
| **3** | **Replication models-II (Rolling-circle replication, replication types in RNA and DNA viruses).** |
| **4** | **Transcription** |
| **5** | **RNA processing (splicing, polyadenylation , 5’ cap structures)** |
| **6** | **Universal characteristics of genetic code and transfer RNA** |
| **7** | **Translation, posttranslational modifications and protein transport.** |
| **8** | **Genetic regulation-I ( sigma cascade, positive and negative regulation of lactose operon)** |
| **9** | **Genetic regulation-II (regulation of phage gene expression by repressors, regulation of tryptophane operon in E. coli, regulation of maltose genes by two activators)** |
| **10** | **Genetic regulation-III (transcriptional regulation in eukaryotic cells, enhancers, downstream activator sequences, regulation of DNA for transcriptive form, Gene amplification).** |
| **11** | **Genetic regulatin-IV (posttranscriptional and translational regulation models. Control by protein degradation.** |
| **12** | **Use of recombinant DNA techniques in genetic analysis (AFLP, RFLP, Hybridization techniques, PCR, DNA cloning and sequencing)** |
| **13** | **Molecular evolution models and evolutionary clocks.** |
| **14** | **Evolution of chromosomal and extra chromosomal genetic material.** |

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| **RECOMMENDED READING** |
| 1. Lewin, B. (2003). Genes VIII. Oxford University Press. New York/USA.  2. Klug, W. And Cummings, M.R. (2000). Concepts of Genetics. Prentice Hall. New Jersey/USA  3. Alberts, B., Bray, D., Johnson, A., Lewis, J., Raff, M., Roberts, K. And Walter, P. (1998) Essential Cell Biology. Garland Publishing Inc. New York/USA.  4. Rawn, D. (1989). Biochemistry. Neil Petterson Publishers. North Carolina/USA.  5. Watson, J.D., Hopkins, N.H., Roberts, J. W., Steitz, J.A. And Weiner A.M. (1987). Molecular Biology of The Gene. The Benjamin/Cummings Publishing. Co. California/USA. |

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| book-icon.gif | **B303 -** **MICROBIOLOGY** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU |

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| **AIMS AND OBJECTIVES** | To help the students learn the structure of bacterial cells, classification criteria, their use in biotechnology, and how to control them. |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Historical evolution of microbiology; Prokaryotic cell structures and functions** |
| **2** | **Cytoplasmic membrane; Cell wall; Flagella and motility; Fimbria and Pilus, Cell surface structures** |
| **3** | **Prokaryotic genome structure, cell inclusions; Endospore, bacteria and fungus pigments** |
| **4** | **Microbial metabolism; Catabolic diversity and an overview of biosynthesis, energy recovery from organics; Energy recovery from inorganics and light** |
| **5** | **Microbial growth; Environmental effects on microbial growth; Microbial growth control** |
| **6** | **Microbial Molecular Biology; DNA structure and function; RNA structure and function** |
| **7** | **Regulation of gene expression; Regulation of enzyme activity and synthesis** |
| **8** | **Viruses, structural properties; Bacteriophages** |
| **9** | **Retroviruses; Viroid, Prion** |
| **10** | **Microbial genetic and genetic engineering** |
| **11** | **Microbial ecology and certain groups of bacteria** |
| **12** | **The Archaea** |
| **13** | **Microbial Biotechnology** |
| **14** | **Medical Microbiology** |

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| **RECOMMENDED READING** |
| 1. Madigan, M. T., Martinko, J. M., Parker, J. (2003) Brock Biology of Microorganisms, Prentice-Hall, Inc  2. Shlegel, H.D. (1994) General Microbiology. Cambridge University Press.  3. Prescott, L. M., Harley, J. P., Klein, D. A. (1996) Microbiology Wm. C. Brown Publishers England |

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| book-icon.gif | **B304 -** **BIOCHEMISTRY II** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU |

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| **AIMS AND OBJECTIVES** | Energy productions in living organisms, their mechanisms, molecules and the metabolic pathways. |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Glycogen metabolism** |
| **2** | **Hormonal control of glycogen metabolism** |
| **3** | **Biosynthesis and transportation of cholesterol** |
| **4** | **Oxidation of carbohydrates; Glycolysis** |
| **5** | **Entry of fructose and galactose into glycolysis** |
| **6** | **Control of glycolysis; Citric acid cycle** |
| **7** | **Control of citric acid cycle** |
| **8** | **Oxidative phosphorylation and respiratory chain** |
| **9** | **Pentose phosphate pathway** |
| **10** | **Fatty acid oxidation** |
| **11** | **Amino acid degradation and gluconeogenesis** |
| **12** | **Ketogenesis and glucogenesis** |
| **13** | **Urea cycle** |
| **14** | **The whole metabolism** |

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| **RECOMMENDED READING** |
| 1. Gözükara E., M. (1989) Biyokimya, Ofset Repromat Ltd. Şti., Ankara.  2. Stryer L. (1988) Biochemistry, 3rd edition. W.H.Freemand and Company, New York.  3. Nelson, D.L., Cox, M.M. (2005). Lehninger Princibles of Biochemistry, fourth eddition, Worth Publishers. |

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| book-icon.gif | **B305 -** **MICROBIOLOGY LABORATORY** |

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU |

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| **AIMS AND OBJECTIVES** | To help the students learn the structure of bacterial cells, classification criteria, their use in biotechnology, and how to control them. |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Laboratory Rules** |
| **2** | **Microscopes; Devices and equipments used in microbiology** |
| **3** | **Types of sterilization in microbiology** |
| **4** | **Growth media used in microbiology** |
| **5** | **Preparation of media** |
| **6** | **Inoculation of media** |
| **7** | **Investigation of colony morphology of microorganisms** |
| **8** | **Preparation of pure culture** |
| **9** | **Staining of bacteria-Simple staining** |
| **10** | **Counting of bacteria: Microscopic counting and Cultural counting** |
| **11** | **Physiological and biochemical properties of microorganisms: Catalase test, Jelatinase test, Amylase test, Sugar fermentation, H2 S production** |
| **12** | **Antibiotic susceptibility test** |
| **13** | **Motility test in microorganisms** |
| **14** | **Moulds and Yeasts** |

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| **RECOMMENDED READING** |
| 1. Temel Mikrobiyoloji laboratuarı Klavuzu, Çökmüş, Dönmez, Saçılık ve Berber, 1995. AÜFenFak.  2. Microbiology: A Laboratory Manual, Cappuccino and Sherman, 2002.Benjamin Cummings  3. Understanding Microbes:A Laboratory Textbook for Microbiology, Claus,1989. Freeman & Company |

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| book-icon.gif | **B306 -** **BIOCHEMISTRY LABORATORY II** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU |

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| **AIMS AND OBJECTIVES** | Biochemical solutions and practices of some biochemical tests. |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Qualitative and quantitative experiments of sterols** |
| **2** | **The quantitative determination of blood cholesterol** |
| **3** | **Total lipid determination of blood** |
| **4** | **Determination of ketone bodies in urine** |
| **5** | **Determination of haemoglobin, erythrocyte and salt in urine** |
| **6** | **Determination of vitamin C in fruit juice** |
| **7** | **Qualitative and quantitative determination of amino acid and proteins** |
| **8** | **Isolation of DNA** |
| **9** | **Showing the presence nucleic acid components in a muscle tissue** |
| **10** | **Chromatographic techniques and experiments** |
| **11** | **The properties of urine and the experiments about urine** |
| **12** | **Determination of haemoglobin in urine** |
| **13** | **Determination of proteins in urine** |
| **14** | **Quantitative determination of proteins in urine** |

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| **RECOMMENDED READING** |
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| book-icon.gif | **B307 -** **BIOCHEMISTRY I** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** | Energy productions in living organisms, their mechanisms, molecules and the metabolic pathways. |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Goals and roots of biochemistry** |
| **2** | **Space, time and energy; Reversible interactions of biomolecules** |
| **3** | **The biologically important properties of water; Carbohydrates structure and functions** |
| **4** | **Molecules of cell coats and group substances** |
| **5** | **Synthesis and degradations of oligosaccharides** |
| **6** | **Glycosaminoglycans; Proteoglycans; Glycolipids and lipopolysaccharides** |
| **7** | **Lipids; Major physiological roles of lipids** |
| **8** | **Fatty acids** |
| **9** | **Triacylglycerols; Phospoglycerides; Sphingolipids; Waxes** |
| **10** | **Terpens** |
| **11** | **Steroids and Prostaglandins** |
| **12** | **Cholesterol biosynthesis, transport and metabolic disorders** |
| **13** | **Biosynthesis of bile salts and their role in metabolism** |
| **14** | **The structures of Eicosanoids; synthesis, degradation and biological importance** |

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| **RECOMMENDED READING** |
| 1. Gözükara E., M. (1989) Biyokimya, Ofset Repromat Ltd. Şti., Ankara.  2. Stryer L. (1988) Biochemistry, 3rd edition. W.H.Freemand and Company, New York.  3. Nelson, D.L., Cox, M.M. (2005). Lehninger Princibles of Biochemistry, fourth eddition, Worth Publishers. |

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| book-icon.gif | **B308 - ANIMAL MORPHOLOGY** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Gözde GÜRELLİ |

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| **AIMS AND OBJECTIVES** | The aim and objective of this course are to inform the student of the wide variety of life forms represented by the vertebrates. The functional role of differences in variety of groups and forms (e.g. morphology) will be discussed. |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Description of anatomy, homology** |
| **2** | **Inter-relationships of the classes of vertebrates** |
| **3** | **Glands of skin** |
| **4** | **Bony structures of skin** |
| **5** | **Skin derivatives** |
| **6** | **Axial skeleton** |
| **7** | **Appendicular skeleton** |
| **8** | **Cranial skeleton** |
| **9** | **Skeletal muscle, Parietial muscle, Appendicular muscle** |
| **10** | **Circulary system** |
| **11** | **Digestive system** |
| **12** | **Respiratory system** |
| **13** | **Urogenital system** |
| **14** | **Nervous system** |

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| **RECOMMENDED READING** |
| 1. Öktay, M., (1988), “Omurgalı Hayvanların Karşılaştırmalı Anatomisi” İstanbul Üniv. Fen. Fak. Basımevi, İstanbul. |

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| book-icon.gif | **B308 -** **ANIMAL MORPHOLOGY** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Gözde GÜRELİ |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
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| **RECOMMENDED READING** |
| 1. |

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| book-icon.gif | **B309 -** **BIOCHEMISTRY LABORATORY I** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** | Biochemical solutions and practicals of some biochemical tests. |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Preparation and properties of biochemical solutions** |
| **2** | **Acid, base and buffer solutions** |
| **3** | **Qualitative and quantitative methods for determining biological molecules** |
| **4** | **Measurement of the specific optical rotations of glucose** |
| **5** | **Acid, bases and buffer solutions** |
| **6** | **Tests concerning the effects of acids and bases on carbohyrates** |
| **7** | **Molish, Antron, Seliwanoff ve Bial tests** |
| **8** | **Effects of alkaline solutions on carbohydrates: Moore test** |
| **9** | **Reducing sugar tests; Qualitative Fehling, Benedict, Picric acit, Tollen’s tests** |
| **10** | **Experiments about osozone formation;Fischer testi** |
| **11** | **Tests of some polysaccharides** |
| **12** | **Quantative carbohydrate tests** |
| **13** | **Information about spectrophotometry and blood composition** |
| **14** | **Determination of blood glucose levels after 8-12 hours of abstinence from food** |

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| **RECOMMENDED READING** |
| 1. |

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| book-icon.gif | **B310 - ANIMAL MORPHOLOGY LABORATORY** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Gözde GÜRELLİ |

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| **AIMS AND OBJECTIVES** | In the laboratory, the emphasis is on an anatomical comparison of the different vertebrates. |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Dissection of some vertebrates (fish, amphibian, reptilian and mammalia)** |
| **2** | **To display some systems of this vertebrates** |
| **3** | **Dissection of some vertebrates (fish, amphibian, reptilian and mammalia)** |
| **4** | **To display some systems of this vertebrates** |
| **5** | **Dissection of some vertebrates (fish, amphibian, reptilian and mammalia)** |
| **6** | **To display some systems of this vertebrates** |
| **7** | **Dissection of some vertebrates (fish, amphibian, reptilian and mammalia)** |
| **8** | **To display some systems of this vertebrates** |
| **9** | **Dissection of some vertebrates (fish, amphibian, reptilian and mammalia)** |
| **10** | **To display some systems of this vertebrates** |
| **11** | **Dissection of some vertebrates (fish, amphibian, reptilian and mammalia)** |
| **12** | **To display some systems of this vertebrates** |
| **13** | **Dissection of some vertebrates (fish, amphibian, reptilian and mammalia)** |
| **14** | **To display some systems of this vertebrates** |

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| **RECOMMENDED READING** |
| 1. Öktay, M., (1988), “Omurgalı Hayvanların Karşılaştırmalı Anatomisi” İstanbul Üniv. Fen. Fak. Basımevi, İstanbul. |

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| book-icon.gif | **B311 -** **ANIMAL PHYSIOLOGY** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. İbrahim KÜÇÜKBASMACI |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B312 -** **HYDROBIOLOGY** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **RECOMMENDED READING** |
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| book-icon.gif | **B313 -** **ANIMAL PHYSIOLOGY LABORATORY** |

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. İbrahim KÜÇÜKBASMACI |
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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **RECOMMENDED READING** |
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| book-icon.gif | **B314 -** **HYDROBIOLOGY LABORATORY** |

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **RECOMMENDED READING** |
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| book-icon.gif | **B315 -** **PLANT PHYSIOLOGY** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | The aim of this course is to give the principles and events related with plant structure and function: Water potential, diffusion, osmosis, structure and function of membranes, water and mineral uptake. Translocation of plants. Photosynthesis and Respiration. The role of plants in the acquisition and conservation of matter and energy, growth and development and their control by internal and external factors are discussed. Physiology movements of plants are explained. |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Chemical composition of plants** |
| **2** | **Diffusion, osmosis, swelling,** |
| **3** | **Water uptake and transport** |
| **4** | **Mineral nutrition and metabolism** |
| **5** | **Transpiration and Water loss** |
| **6** | **Pigments in light energy capture, mechanism of photosynthesis, Photophosphorylation,** |
| **7** | **Dark fixation,C4 pathway, CAM metabolism, photorespiration, Chemosynthesis.** |
| **8** | **Aerobic respiration, pentose phosphate pathway, anaerobic respiration and fermentation.** |
| **9** | **Plant growth and development, differentiation:** |
| **10** | **Plant hormones, vitamins,** |
| **11** | **Germination, dormancy,** |
| **12** | **Senescence, apical dominance, abscission** |
| **13** | **Regeneration, polarity** |
| **14** | **Physiology of movements** |

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| **RECOMMENDED READING** |
| **Salisbury, F.B., Ross, C.W., 1991. Plant Physiology. California.** |
| **Taiz, L., Zeiger,E.,1991. Plant Physiology. The Benjamin/Cummins. Publishing Company. Inc. California** |
| **Palavan-Ünsal, N., 1992. Bitki Büyüme Maddeleri İ.Ü. Basımevi ve Film Merkezi. İstanbul.** |
| **Kadıoğlu, A., 2004. Bitki Fizyolojisi. Esen Ofset Matbaacılık Şti.Trabzon** |
| **Bozcuk, S., 1997. Bitki Fizyolojisi Hatipoğlu Kitapevi. Ankara** |
| **Devlin, R. M., Witham, F.H., 1983. . Plant Plhysiology. Woodsworth. Publishing Company. California** |
| **Leopold, A.C., Kridemann, P.E.,1975. Plant Growth and Development.Tata McGraw-HILL Publishing Company LTD. New Delhi** |

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| book-icon.gif | **B316 -** **ECOLOGY** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Kerim GÜNEY |

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| **AIMS AND OBJECTIVES** | **To understand the complex interactions of ecosystems, To produce solutions so providing peacefull and sustainable life with nature.** |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Description of ecology, and the relations of its subdivisions and other disciplines.** |
| **2** | **Habitat and ecological niche.** |
| **3** | **Ecosystem concept and general characteristics.** |
| **4** | **Ecological laws and concepts (Tolerance rules, restrict rules, ecological tolerance, competition, community concept, succession, convergence and divergence).** |
| **5** | **Biogeochemical cycle (Carbon, Nitrogen, Phosphor cycles).** |
| **6** | **Importance of light and photoperiodism for plants and animals.** |
| **7** | **Importance of temperature for plants and animals.** |
| **8** | **Importance of climatic and edaphic factors for plants and animals.** |
| **9** | **Relationships within population and between populations.** |
| **10** | **Biomes (Life zones).** |
| **11** | **Population ecology.** |
| **12** | **Community ecology.** |
| **13** | **Reproduction ecology.** |
| **14** | **Ecologic adaptations and evolutions. Adaptive ecology (conservation ecology, productivity ecology, pollution ecology).** |

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| **RECOMMENDED READING** |
| **1. Şişli, N.M. 1996. Ekoloji (Çevre Bilimi) Yeni Fersa Matbaacılık, Ankara, 492 sayfa.** |
| **2. Kocataş, A., 1994. Ekoloji. Ege Üniv. Basımevi, Bornova, izmir. 564 sayfa.** |
| **3. Öztürk, A.M., Seçmen, Ö, 1999. Bitki Ekolojisi. Ege Üniv. Fen Fak. Yayınları No:141. İzmir, 232 sayfa.** |

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| book-icon.gif | **B317 -** **PLANT PHYSIOLOGY LABORATORY** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | The aim of this course is to give the principles and events related with plant structure and function. Content of inorganic and organic materials in plant cell structure, Plant- Water relationship, The roles of internal and external factories on growth and development, photosynthesis, respiration. Metabolism of hormones. Geotropism and Phototropism in plants, plant tissue culture |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Experiment and analyses of Physiology** |
| **2** | **The laboratory chemicals, glassware and apparatus** |
| **3** | **Preparation and properties of solutions** |
| **4** | **Drying, Determination of fresh and dry weights** |
| **5** | **Qualitative analysis of Starch, reducing and non-reducing sugars, proteins and lipids** |
| **6** | **Plant- Water Relationships :Diffusion rate, osmotic pressure, water uptake, swelling in electrolyte solutions, osmotic potential of the sap.** |
| **7** | **Effects of Temperature and some chemicals on germination** |
| **8** | **Effects of mineral nutrients on plant development** |
| **9** | **Chromatographic techniques and experiments** |
| **10** | **Extraction of Chlorophyll and identification** |
| **11** | **Measurement of Photosynthesis Rate: qualitative demonstration of photosynthesis and determination of its rate.** |
| **12** | **Respiration** |
| **13** | **Hormones. Investigation of effects gibberellins on amylase activity** |
| **14** | **Geotropism and Phototropism in plants, plant tissue culture** |

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| --- |
| **RECOMMENDED READING** |
| **Öncel, I., Üstün, S., Keleş,Y. 2000. Bitki Fizyolojisi Laboratuvar Kılavuzu.A.Ü.F.F. Döner Sermaye işletmesi Yayınları No:48 Ankara** |
| **Kadıoğlu, A., 2004. Bitki Fizyolojisi. Lokman Yayın Tic. Ltd.Şti.Trabzon.** |
| **Bozcuk, S., 1997. Bitki Fizyolojisi Hatipoğlu Kitapevi. Ankara** |
| **Kramer, P. J. 1983, Water Relations of Plants. Academic Press Inc.** |
| **Önder, N., Yentür, S., 1991. Bitki Fizyolojisi Laboratuvar Kılavuzu. İstanbul Üni. Fen Fak. Yayınları.** |
| **Palavan-Ünsal, N., 1993. Bitki Büyüme Maddeleri, İst. Üniversittesi Basımevi.** |
| **Demirci, Ş., Alsancak, Özkan, G., 1995. Analitik Kimya temel kavramlar. A.Ü.F.F. Döner Sermaye işletmesi Yayınları No:34 Ankara** |
| **Edward L. J., Stevenson, R., 1978. Basic Liquit Chromatography. Polo Alto, California.** |
| **Kacar B., 1984. Bitki Besleme PRACTICAL Kılavuzu. A.Ü.Z.F. Yayınları :900 Ankara** |
| **Kacar B., 1990. Bitki Fizyolojisi PRACTICAL Kılavuzu. A.Ü.Z.F. Yayınları Ankara** |

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| book-icon.gif | **B318 -** **PLANT MORPHOLOGY** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | Explaining the morphological developments to students |
| **ASSESSMENTS METHODS** | **Mid-Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Vegetative organs** |
| **2** | **1-Stem**  **1- A) Primary structure of stem** |
| **3** | **1- B) Secondary structure of stem** |
| **4** | **1- C) Outline structure of stem** |
| **5** | **2- Leaves**  **2- A) Internal structures of leaves** |
| **6** | **2- B) Outline structure of leaves** |
| **7** | **3- Root**  **3- A) Primary structure of root** |
| **8** | **3- B) Secondary structure of root** |
| **9** | **3- C) Morphology of root** |
| **10** | **Generative organs** |
| **11** | **1- Flowers** |
| **12** | **1- A) Morphology of flowers** |
| **13** | **2- Fruits** |
| **14** | **Seed morphology and anatomy** |

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| **RECOMMENDED READING** |
| 1. **Bitki Morfolojisi ders notları Prof.Dr. M. Cihat TOKER ANKARA 2004.** 2. **Paula Rudall. Anatomy of Flowring Plant. Cambridge University pres. 2007** 3. **Ray F. Evert. Esau’s Plant Anatomy. Wıley-Intersciences. 2066** |

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| book-icon.gif | **B319 -** **PLANT ANATOMY** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | Explaining the morphological developments of plant to students |
| **ASSESSMENTS METHODS** | **Mid-Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **The Protoplast: Plasma Membrane, Nucleus, and Cytoplasmic Organelles** |
| **2** | **The Protoplast: Endomembrane System, Secretory Pathways, Cytoskeleton, and Stored Compounds** |
| **3** | **Cell Wall** |
| **4** | **Meristems and Differentiation** |
| **5** | **Apical Meristems** |
| **6** | **Parenchyma and Collenchyma** |
| **7** | **Sclerenchyma** |
| **8** | **Epidermis** |
| **9** | **Xylem: Cell Types and Developmental Aspects** |
| **10** | **Xylem: Secondary Xylem and Variations in Wood Structure** |
| **11** | **Vascular Cambium** |
| **12** | **Phloem: Cell Types and Developmental Aspects** |
| **13** | **Phloem: Secondary Phloem and Variations in Its Structure** |
| **14** | **Periderm** |

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| **RECOMMENDED READING** |
| 1. **Paula Rudall. Anatomy of Flowring Plant. Cambridge University pres. 2007**  **2. Ray F. Evert. Esau’s Plant Anatomy. Wıley-Intersciences. 2066** |

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| book-icon.gif | **B320 -** **PLANT MORPHOLOGY LABORATORY** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | Explaining the morphological developments to students |
| **ASSESSMENTS METHODS** | **Mid-Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Stems of Pteridophytes** |
| **2** | **Primary structure of stem – Stem of monocotyledons** |
| **3** | **Primary structure of stem – Stem of dicotyledons** |
| **4** | **Primary structure of stem – Stem of Gymnosperms** |
| **5** | **Primary structure of stem – Stem of Angiosperms** |
| **6** | **Leaves – Leaves of Gymnosperms** |
| **7** | **Leaves – Leaves of Monocotyledons** |
| **8** | **Leaves – Leaves of Dicotyledons Bifacial leaves** |
| **9** | **Leaves – Leaves of Dicotyledons, Equifacial leaves** |
| **10** | **Leaves – Leaves of Dicotyledons, Unifacial leaves** |
| **11** | **Root – Root of Monocotyledons** |
| **12** | **Root – Root of Dicotyledons** |
| **13** | **Flowers** |
| **14** | **Fruits and Seeds** |

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| **RECOMMENDED READING** |
| **1- ALGAN G, TOKER C. 2004. Bitki Hücresi ve bitki morfolojisi laboratuar kitabı ANKARA.** |

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| book-icon.gif | **B321 - PLANT ANATOMY LABORATORY** |

[**Return to list**](#YEAR_3_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | To teaching anatomical properties of plant cell, tissue and organs |
| **ASSESSMENTS METHODS** | **Mid-Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Plant Cell and Organelles** |
| **2** | **Cell Wall Layers** |
| **3** | **Pits and Primary Pit-Fields** |
| **4** | **Plasmodesmata** |
| **5** | **Classification of Meristems and meristem type** |
| **6** | **Zonations of apical meristems** |
| **7** | **Parenchyma and Collenchyma cells** |
| **8** | **Sclereids in Stems and Leaves** |
| **9** | **Sclereids in Fruits and seeds** |
| **10** | **Epidermis and stomata types** |
| **11** | **Xylem and Cell type of xylem** |
| **12** | **Vascular Cambium, Formation of Secondary Xylem and Secondary Phloem** |
| **13** | **Phloem, Cell Types of the Phloem** |
| **14** | **Secretory Cavities and Ducts** |

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| **RECOMMENDED READING** |
| 1. 1. **Paula Rudall. Anatomy of Flowring Plant. Cambridge University pres. 2007**  **2. Ray F. Evert. Esau’s Plant Anatomy. Wıley-Intersciences. 2066** |

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| YEAR - 4 COURSE LIST |

* [B-401 SPECIAL PROJECT I](#SPECIAL_PROJECT_I)
* [B-402 SPECIAL PROJECT II](#SPECIAL_PROJECT_II)
* [B-403 MOLECULAR BIOLOGY](#MOLECULAR_BIOLOGY)
* [B-404 PRACTICE/FIELD PRACTICE](#PRACTICE_FIELD_PRACTICE)
* [B-405 MOLECULAR BIOLOGY LABORATORY](#MOLECULAR_BIOLOGY_LABORATORY)
* [B-406 BIOTECHNOLOGY](#BIOTECHNOLOGY)
* [B-407 EVOLUTION](#EVOLUTION)
* [B-408 BIOTECHNOLOGY LABORATORY](#BIOTECHNOLOGY_LABORATORY)
* [B-409 INTRODUCTION TO PALYNOLOGY](#INTRODUCTION_TO_PALYNOLOGY)
* [B-411 GENETIC ENGINEERING](#GENETIC_ENGINEERING)
* [B-412 VEGETATION OF TURKEY](#VEGETATION_OF_TURKEY)
* [B-413 ADVANCED BIOTECHNOLOGY](#ADVANCED_BIOTECHNOLOGY)
* [B-414 NATURAL PROTECTED AREAS](#NATURAL_CONSERVATION_AREAS)
* [B-415 BIOCLIMATOLOGY](#BIOCLIMATOLOGY)
* [B-416 ECONOMICALLY IMPORTANT PLANTS](#ECONOMIC_PLANTS)
* [B-417 ENVIRONMENTAL IMPACT ASSESSMENT](#ENVIRONMENTAL_IMPACT_ASSESSMENT)
* [B-418 MICROBIAL BIOTECHNOLOGY](#MICROBIAL_BIOTECHNOLOGY)
* [B-419 LIMNOLOGY](#LIMNOLOGY)
* [B-420 ENVIRONMENTAL BIOTECHNOLOGY](#ENVIRONMENTAL_BIOTECHNOLOGY)
* [B-421 PARASITOLOGY](#PARASITOLOGY)
* [B-422 VEGETATION ECOLOGY](#VEGETATION_ECOLOGY)
* [B-423 HUMAN ANATOMY AND PHYSIOLOGY](#HUMAN_ANATOMY_AND_PHYSIOLOGY)
* [B-424 MARINE BIOLOGY](#MARINE_BIOLOGY)
* [B-425 NUTRITION IN PLANTS](#NUTRITION_IN_PLANTS)
* [B-426 ANIMAL GEOGRAPHY](#ZOOGEOGRAPHY)
* [B-427 AQUACULTURE](#FISHERIES_CULTURE)
* [B-428 ICHTHYOLOGY](#ICHTHYOLOGY)
* [B-429 MICROPREPARATION TECHNIQUES AND DIGITAL IMAGING](#MICROPREPARATION_TECHNIQUES)
* [B-430 ENTOMOLOGY](#ENTOMOLOGY)
* [B-431 WATER QUALITY](#WATER_QUALITY)
* [B-432 FISHERIES BIOLOGY AND POPULATION DYNAMICS](#FISHERIES_BIOLOGY_AND_POPULATION)
* [B-433 VIROLOGY](#VIROLOGY)
* [B-434 STRESS PHYSIOLOGY](#STRESS_PHYSIOLOGY)
* [B-435 ENVIRONMENTAL POLLUTION](#ENVIRONMENTAL_POLLUTION)
* [B-436 PLANTS THAT FIGHTS CANCER](#PLANTS_THAT_FIGHTS_CANCER)
* [B-437 MEDICINAL PLANTS](#MEDICINAL_PLANTS)
* [B-438 BRYOPHYTES](#BRYOPHYTES)
* [B-439 BIOCHEMISTRY OF PHENOLIC COMPOUNDS](#BIOCHEMISTRY_OF_PHENOLIC_COMPOUNDS)
* [B-440 HISTORY OF BIOLOGY](#HISTORY_OF_BIOLOGY)
* [B-441 WASTEWATERS AND WASTEWATER TREATMENT](#WASTE_WATERS_AND_WASTE_WATER_TREATMENT)
* [B-442 HYDROBOTANY](#HYDROBOTANY)
* [B-443 AQUATIC TOXICOLOGY](#AQUATIC_TOXICOLOGY)
* [B-445 PLANT BIOCHEMISTRY](#PLANT_BIOCHEMISTRY)

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| book-icon.gif | **B401 -** **SPECIAL PROJECT I** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER  Assistant Prof. Dr. Kerim GÜNEY  Assistant Prof. Dr. Özlem FINDIK  Assistant Prof. Dr. Talip ÇETER  Assistant Prof. Dr. İbrahim KÜÇÜKBASMACI  Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU  Assistant Prof. Dr. Gözde GÜRELİ |

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| **AIMS AND OBJECTIVES** | Perform a scientific research in biology |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Subject selection** |
| **2** | **Basic principles of selected subject** |
| **3** | **Literature search** |
| **4** | **Research** |
| **5** | **Research** |
| **6** | **Research** |
| **7** | **Research** |
| **8** | **Research** |
| **9** | **Research** |
| **10** | **Research** |
| **11** | **Research** |
| **12** | **Research** |
| **13** | **Research** |
| **14** | **Interim Report** |

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| **RECOMMENDED READING** |
| Will be assigned according to the selected subject by advisors. |

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| book-icon.gif | **B402 -** **SPECIAL PROJECT II** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER  Assistant Prof. Dr. Kerim GÜNEY  Assistant Prof. Dr. Özlem FINDIK  Assistant Prof. Dr. Talip ÇETER  Assistant Prof. Dr. İbrahim KÜÇÜKBASMACI  Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU  Assistant Prof. Dr. Gözde GÜRELİ |

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| **AIMS AND OBJECTIVES** | Perform a scientific research in biology |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Research** |
| **2** | **Research** |
| **3** | **Research** |
| **4** | **Research** |
| **5** | **Research** |
| **6** | **Research** |
| **7** | **Research** |
| **8** | **Research** |
| **9** | **Research** |
| **10** | **Research** |
| **11** | **Research** |
| **12** | **Research** |
| **13** | **Research** |
| **14** | **Final Report and Presentation of the results** |

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| **RECOMMENDED READING** |
| Will be assigned according to the selected subject by advisors. |

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| book-icon.gif | **B403 -** **MOLECULAR BIOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU |

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| **AIMS AND OBJECTIVES** | Structure and functions of especially nucleic acids, proteins and other biomolecules in living organisms. |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Amino Acids and Proteins** |
| **2** | **Protein Structure and Function** |
| **3** | **Peptide Unit, Levels of Structure In Protein Architecture** |
| **4** | **Protein Synthesis; Protein modification and Cleavage; Acidic and Basic Characteristics of Proteins** |
| **5** | **Protein Folding; Nucleic Acids; Structural Units and Macromolecular Structure** |
| **6** | **Types of DNA Double Helix; Reversible Melting of Double Helix;** |
| **7** | **Reverse Transcriptase Enzyme and Its Role In Molecular Evolution** |
| **8** | **Genes; Topological Properties of DNA** |
| **9** | **RNA and DNA Polimerases In Prokaryotes and Eukaryotes** |
| **10** | **Exons, introns and RNA splicing** |
| **11** | **Biochemical reactions, Reversible and irreversible processes; The free change and the equilibrium costant; Application of free energy calculations to a biochemical reaction; Free energy sources in biological systems; High energy compounds** |
| **12** | **Enzymes; Nomenclature and classification; Allosteric enzymes; Enzymatic inhibition** |
| **13** | **Recombinant DNA technology; Restriction and modification systems; Synthesis of protein and DNA by automated solid-phase methods** |
| **14** | **Clone and cloning; DNA and protein sequencing methods** |

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| **RECOMMENDED READING** |
| 1. Gözükara E., M. (1989) Biyokimya, Ofset Repromat Ltd. Şti., Ankara.  2. Stryer L. (1988) Biochemistry, 3rd edition. W.H.Freemand and Company, New York. |

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| book-icon.gif | **B404 -** **PRACTICE/FIELD PRACTICE** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER  Assistant Prof. Dr. Kerim GÜNEY  Assistant Prof. Dr. Özlem FINDIK  Assistant Prof. Dr. Talip ÇETER  Assistant Prof. Dr. İbrahim KÜÇÜKBASMACI  Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU  Assistant Prof. Dr. Gözde GÜRELİ |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** |  |
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| **RECOMMENDED READING** |
| 1. |

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| book-icon.gif | **B405 -** **MOLECULAR BIOLOGY LABORATORY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU |

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| **AIMS AND OBJECTIVES** | To introduce students the basic plant molecular biology techniques in the laboratory. |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Introduction to basic molecular biology techniques** |
| **2** | **Ligation** |
| **3** | **Transformation of *E.coli*** |
| **4** | **Transformation of *E.coli*** |
| **5** | **Transcription factors** |
| **6** | **Transcriptional machineries** |
| **7** | **Post transcriptional regulation** |
| **8** | **Post translational regulation** |
| **9** | **Plasmid DNA isolation** |
| **10** | **Plasmid DNA isolation** |
| **11** | **Plant RNA extraction** |
| **12** | **Plant DNA extraction** |
| **13** | **RT-PCR** |
| **14** | **RT-PCR** |

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| **RECOMMENDED READING** |
| 1. Molecular cloning - A Laboratory Manual, Third Edition, Sambrook and Russell, Volumes 1, 2, 3 |

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| book-icon.gif | **B406 -** **BIOTECHNOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU |

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| **AIMS AND OBJECTIVES** | To introduce students the basic information about biotechnology |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Introduction to biotechnology** |
| **2** | **Biomolecules and their functions in living systems: lipids and carbohydrates, amino acids and proteins, nucleic acids, RNA and DNA and hybrid biomolecules** |
| **3** | **Enzymes: Introduction to biocatalysts, Enzyme kinetics, Influences of enzyme activity, Enzyme deactivation** |
| **4** | **Immobilized enzymes: Methods of immobilization, Mass transfer** |
| **5** | **Electrostatic effects in immobilized enzyme systems** |
| **6** | **Some industrial applications of free and immobilized enzymes** |
| **7** | **Genetic improvement of industrial microorganisms** |
| **8** | **Industrial fermentations** |
| **9** | **Production of cell proteins** |
| **10** | **Production of energy from biomass** |
| **11** | **Production of organic compounds** |
| **12** | **Treatment and production of materials** |
| **13** | **Applications of biotechnology in the environment** |
| **14** | **Applications of biotechnology to health and agriculture** |

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| **RECOMMENDED READING** |
| 1. Michael Wink, 2006. An Introduction to Molecular Biotechnology: Molecular Fundamentals, Methods and Applications in Modern Biotechnology, Wiley-VCH Verlag GmbH. |

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| book-icon.gif | **B407 -** **EVOLUTION** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Evolution and differention of species (mutation, genetic recombination, natural selection).** |
| **2** | **Isolation (geographical and ecological isolation, seasonal isolation, mechanical and ethological isolation, inner obstacles).** |
| **3** | **Sudden ecospecies and step by step ecospecies.** |
| **4** | **Evolutionary changes of plant world (Fossils of primitive and advanced plants).** |
| **5** | **Geological timetable (Arceosoic, Proterosoic, Paleosoic, Mesosoic, Senosoic). Continental drift** |
| **6** | **Crossing of plants from water to land.** |
| **7** | **Primitive and advanced characters. Phylogenetic relations among Pteridospermae, Gymospermae and Angispermae.** |
| **8** | **Constitution of the universe.** |
| **9** | **Beginnig of life on earth and evolution of prokaryotes and eukaryotes** |
| **10** | **Hardy-Weinberg theory.** |
| **11** | **Species formations and methods.** |
| **12** | **Homology, analogy, convergent, divergent, parallel and mosaic evolution, adaptive dehis-cense, total extinction concepts.** |
| **13** | **Evolution of invertebrates.** |
| **14** | **Evolution of vertebrates and crossing of animals from water to land.** |

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| **RECOMMENDED READING** |
| **Demirsoy, A., 2001. Kalıtım ve Evrim. Meteksan A.Ş. 946 sayfa, Ankara.** |
| **Seçmen, Ö ve ark. 1995. Tohumlu bitkiler sistematiği. Ege Üniv. Fen Fak Kitapları Serisi No:116. 396 Sayfa, İzmir** |

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| book-icon.gif | **B408 -** **BIOTECHNOLOGY LABORATORY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (0+0+2) 1 |
| **ECTS CREDITS** | 3 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU |

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| **AIMS AND OBJECTIVES** | To practise and learn the subjects related in biotechnology. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Selection of biotechnological cultures** |
| **2** | **DNA analysis** |
| **3** | **Protein analysis** |
| **4** | **Izolation of plasmid-DNA** |
| **5** | **PCR method and application** |
| **6** | **Genetic transformation method-I** |
| **7** | **Genetic transformation method-II** |
| **8** | **Using resideual materials (melas and whey) for SCP production** |
| **9** | **Using resideual materials (melas and whey) for ethanol production** |
| **10** | **Organic acid production** |
| **11** | **Bioplastic, poly-b-hydroxybutyrate (PHB) production** |
| **12** | **Exopolisaccharid (EPS) production** |
| **13** | **Cell immobilization** |
| **14** | **Enzyme immobilization** |

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| **RECOMMENDED READING** |
| 1. Michael Wink, 2006. An Introduction to Molecular Biotechnology: Molecular Fundamentals, Methods and Applications in Modern Biotechnology, Wiley-VCH Verlag GmbH.  2. Alexander, Strete, Niles; Laboratory Exercises in organismal and Molecular Microbiology.  3. Greenshields, R.; Resources and application of Biotechnology. |

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| book-icon.gif | **B409 -** **INTRODUCTION TO PALYNOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Botany branch), Elective (for others) |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | To teaching basic terms, characters and method of pollen and spores morphology |
| **ASSESSMENTS METHODS** | **Midterm, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Introduction and history of palynology** |
| **2** | **Pollen Analysis of Honey and Geological Research** |
| **3** | **Atmospheric Pollen Analysis** |
| **4** | **Generative organs of Plants** |
| **5** | **Angiosperm pollen morphology** |
| **6** | **Sporoderm structure** |
| **7** | **Kinds of Ornamentation** |
| **8** | **Midterm exam** |
| **9** | **Pollen type and shape** |
| **10** | **Symetry and polarity** |
| **11** | **Gymnosperm pollen morphology** |
| **12** | **Fungi and Lichen spore morphology** |
| **13** | **Bryophytes spore morphology** |
| **14** | **Pteridophytes spore morphology** |

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| **RECOMMENDED READING** |
| **1 Wodehouse, 1946. Pollen Grains** |
| **2 Erdman, 1953.Handbook Palynology** |
| **3 Pınar ve ark, 2003. Palinoloji Lab. Kılavuzu** |
| **4 Muilenberg and Burge, 1996. Aerobiology** |
| **5 Blackmore and Ferguson 1986. Pollen and Spores** |
| **6 Punt et al. 1994,2009. Glossary of Polen and Spore Terminology** |
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| book-icon.gif | **B411 -** **GENETIC ENGINEERING** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Molecular Bio. and Biotechnology branch), Elective (for others) |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU |

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| **AIMS AND OBJECTIVES** | Understanding of basic techniques which are used in genetic engineering. Contribution of genetic engineering techniques on the analysis of genetic material. Investigation of advantages and risks of the production of goods and services by genetically engineered organisms based on human health and environment. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | Definition and history and basic rules of genetic engineering. Isolation of genetic material from bacteria, viruses and eucaryotic cells. |
| **2** | Restriction endonuclease enzyme cuttings, construction of restriction maps, ligating of restriction fragments (DNA ligase enzymes) and characteristics of other enzymes which are used in genetic engineering. |
| **3** | Natural and artificial transformation techniques (electroporation, microinjection, protoplast transformation, microprojectil shelling) |
| **4** | Identification of recombinant cells constructed by genetic transfer and obtaining of recombinant clones. |
| **5** | Characteristics of cloning vectors and fundamentals of hybrid clone vector designation. |
| **6** | Construction and storage of gene libraries. |
| **7** | DNA probes. Use of functional complementation tests in the identification of recombinant clones. |
| **8** | Determination of gene locations by the techniques such as walking along chromosome and ectopic joining. |
| **9** | Southern, Northern, Western and dot-blot analyses. |
| **10** | DNA sequencing (Sanger and Maxam-Gilbert methods and their modifications) |
| **11** | Polymerase chain reactions and their applications in molecular diagnostic. |
| **12** | Basic techniques which are used in the protein engineering and applications. |
| **13** | The use of genetic engineering techniques in the fields of food, health, environment and scientific researches. |
| **14** | Advantages and risks of using genetically modified organisms in the production of goods and services. |

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| **RECOMMENDED READING** |
| 1. Hawley, R.S. And Walker, M.Y. (2003). Advanced Genetic Analysis. Finding Meaning in a Genome. Blackwell Publishing. Victoria/Australia.  2. Dale, J. And von Schantz, M. (2002). From Genes to Genomes. Wiley-VCH. Weinheim/Germany.  3. Pennington, S.R. And Dunn, M.J. (2001). Proteomics. BIOS Scientific Publishers Co. Oxford/England.  4. Rickwood, D. And Hames, B.D. (1995). DNA Cloning. Oxford University Press. New York/USA.  5. Bu’lock, J. And Kristiansen, B. (1987). Basic Biotechnology. Academic Press. New York/USA. |

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| book-icon.gif | **B412 -** **VEGETATION OF TURKEY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Botany branch), Elective (for others) |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Kerim GÜNEY |

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| **AIMS AND OBJECTIVES** | To explain the past and today’s plant cover of Turkey with various respects |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Turkey’s climate and bioclimatic zones** |
| **2** | **Phytogeographycal regions of Turkey** |
| **3** | **General vegetation types of Turkey** |
| **4** | **Plant cover history of Turkey** |
| **5** | **Mediterranean vegetation in Turkey: maquis** |
| **6** | **Mediterranean vegetation in Turkey: Evergreen forests** |
| **7** | **Mediterranean vegetation in Turkey: Deciduous forests** |
| **8** | **Mediterranean vegetation in Turkey: Alpine zone** |
| **9** | **Black Sea vegetation in Tukey: Evergreen forests** |
| **10** | **Black Sea vegetation in Tukey: Decidious forests** |
| **11** | **Black Sea vegetation in Tukey: Alpine zone** |
| **12** | **Step vegetation of Central and East Anatolia** |
| **13** | **Special vegetation types of Turkey** |
| **14** | **Phytosociological units defined from Turkey’s vegetation** |

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| **RECOMMENDED READING** |
| 1. **Akman, Y., 1995- Türkiye Orman Vejetasyonu, Ankara** |

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| book-icon.gif | **B413 -** **ADVANCED BIOTECHNOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Molecular Bio. and Biotechnology branch), Elective (for others) |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** | This course will give an opportunity to learn about the objectives of research, development and product manufacturing in the biopharmaceutical industry |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Introduction to Pharmaceutical Biotechnology** |
| **2** | **From DNA to pharmaceutical product** |
| **3** | **From research to approval for sale and marketing** |
| **4** | **Protein pharmaceuticals** |
| **5** | **Production of protein pharmaceuticals in bacteria** |
| **6** | **Production of protein pharmaceuticals in fungi** |
| **7** | **Production of protein pharmaceuticals in mammalian cells** |
| **8** | **Aspects of engineering** |
| **9** | **Optimization of manufacturing processes** |
| **10** | **The regulatory rules** |
| **11** | **Quality requirement for market approval** |
| **12** | **The quality management** |
| **13** | **The time and investment requirements** |
| **14** | **Patents and patenting in the biopharmaceutical industry** |

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| **RECOMMENDED READING** |
| 1. Michael Wink, 2006. An Introduction to Molecular Biotechnology: Molecular Fundamentals, Methods and Applications in Modern Biotechnology, Wiley-VCH Verlag GmbH. |

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| book-icon.gif | **B414 -** **NATURAL PROTECTED AREAS** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Botany branch), Elective (for others) |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | Importance of the protection of Nature, The problems of Specially Protected Areas, National Parks, Introduce of Nature Parks and Specially Parks. Together with natural and cultural resources values, recreational potential should be specific and important nationality and internationality |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **The history of Nature Protection** |
| **2** | **Scientific Reserve Areas and National Parks** |
| **3** | **Nature monuments-Nature protection Reserves** |
| **4** | **Landscape Protection Areas-Sources Reserve** |
| **5** | **Anthropological Reserves** |
| **6** | **Biosphere Reserves- World Heritage Areas** |
| **7** | **Reasons for protection of nature- Economical Reasons** |
| **8** | **Scientific Reasons- Esthetical Reasons** |
| **9** | **Ethics-Moral and Recreational Reasons** |
| **10** | **Nature Protection Measurements** |
| **11** | **General Reasons for announcement of Protected areas** |
| **12** | **Capacity, Place, Communication, The reasons of protected areas** |
| **13** | **Specially protected areas and theirs problems** |
| **14** | **Economical and ecological reasons of the nature protection** |

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| **RECOMMENDED READING** |
| 1. **National Parks of Turkey-(2004).Ministry of Forestry.1-95** |
| 1. **Türkiye’de Özel Çevre Koruma(1994) .** |

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| book-icon.gif | **B415 -** **BIOCLIMATOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Ecology and Environmental Biology branch), Elective (for others) |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | To explain one of the most important environmental factors: the climatological events, and their correlations with communities and their effects on organisms. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Bio climate concept. Plant bio climate, microclimate, animal and human bioclimatic, agricultural climate. Point of view of biologist to climate.** |
| **2** | **Verticular structure of atmosphere and radiation events.** |
| **3** | **Temperature and continentality in climate (precipitation, temperature and global continentality and adaptation on Turkey.** |
| **4** | **Atmospheric moisture and precipitation (evaporation, transpiration, importance and measure of relative moisture, type of precipitation events, precipitation regime).** |
| **5** | **Atmospheric pressure, winds and their shaping effect.** |
| **6** | **Classification of the world’s climate.** |
| **7** | **Different climate classification and adaptation on Turkey** |
| **8** | **Köppen and de Martonne methods and adaptation on Turkey.** |
| **9** | **Methods of Emberger and adaptation on Turkey.** |
| **10** | **Methods of Gaussen and adaptation on Turkey.** |
| **11** | **Climate of Turkey** |
| **12** | **Precipitation regime of Turkey** |
| **13** | **Continental and Oceanic climatic regions of Turkey** |
| **14** | **Mediterranean climatic regions of Turkey** |

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| **RECOMMENDED READING** |
| 1. **Akman, Y 1999, İklim ve Biyoiklim . Palme Yayınevi. 350 sayfa. Ankara** |

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| book-icon.gif | **B416 -** **ECONOMICALLY IMPORTANT PLANTS** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Botany branch), Elective (for others) |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | To teach nature and cultivated plants used by men in various ways. Their morphologies, systematics, origins, distributions, economical importance and usages. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **The importance and nature of plant products** |
| **2** | **Relationship between economical and cultivated plants** |
| **3** | **Food plants: Algae and Fungi** |
| **4** | **Food plants: Cereals and Legumes** |
| **5** | **Food plants: Vegetables and fruits** |
| **6** | **Food plants: Oil plants** |
| **7** | **Industrial plants: Fibre plants** |
| **8** | **Industrial plants: Forest plants and products** |
| **9** | **Industrial plants: Tanning and dye materials** |
| **10** | **Industrial plants: Rubber, gums and resins** |
| **11** | **Industrial plants: Fatty oils and waxes** |
| **12** | **Industrial plants: Sugars, starches and cellulose products** |
| **13** | **Spices** |
| **14** | **Beverage plants** |

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| **RECOMMENDED READING** |
| 1. **Ketenoğlu, O. Ve ark., 2003-Ekonomik Bitkiler, Bizim Büro Basım evi, Ankara, ISBN-975-288-641-8, 172 sayfa** |
| 1. **Phillips, R. And Martyn Rix, 1993, Vegetables 270 pp. Raudan House, New York, ISBN 0-679-75024-x** |
| 1. **Albert, F.H., 1937- Economic Botany “A Textbook of Useful Plants and Plant Product” McGraw-Hill Book Company,Inc. New York and London** |

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| book-icon.gif | **B417 -** **ENVIRONMENTAL IMPACT ASSESSMENT** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Ecology and Environmental Biology branch), Elective (for others) |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | Solutions of many environmental problems, Conservation of biological reserves. Importance of natural balance. EIA methods**.** |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Introduction and history of the EIA. EIA approach on the solving environmental problems and its application to the environmental problems of the world.** |
| **2** | **EIA and elimination criteria.** |
| **3** | **National and international agreement and non-governmental organizations for solving the environmental problems.** |
| **4** | **Process and rank of the EIA.** |
| **5** | **Elimination criteria.** |
| **6** | **EIA methods** |
| **7** | **Adaptive methods** |
| **8** | **Control list methods** |
| **9** | **System diagram methods.** |
| **10** | **Biodiversity and it’s in the importance EIA process.** |
| **11** | **Floristic analysis in EIA process.** |
| **12** | **Faunistic analysis in EIA process.** |
| **13** | **IUCN red data book criteria.** |
| **14** | **Endemic, rare and threatened flora and fauna species and it’s in the importance EIA process.** |

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| **RECOMMENDED READING** |
| 1. **Yiğit, N, Çolak, E., Ketenoğlu, O, Kurt, L. ve diğ. 2002. Çevresel Etki Değerlendirme (ÇED). Klavuz Paz. Tic. Ve San. Ltd. Şti. 592 sayfa. Ankara.** |

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| book-icon.gif | **B418 -** **MICROBIAL BIOTECHNOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Molecular Bio. and Biotechnology branch), Elective (for others) |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU |

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| **AIMS AND OBJECTIVES** | The practical use of microorganisms |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Properties of industrial microorganisms** |
| **2** | **Primer and secondary microbial metabolites** |
| **3** | **Fermentation and scale-up** |
| **4** | **Isolation of antibiotic producing microorganisms** |
| **5** | **Industrial production of penicillines and tetcyclines** |
| **6** | **Industrial production of vitamins and amino acids** |
| **7** | **Industrial production of enzymes and biotransformation** |
| **8** | **Industrial production of Vinegar, Citric acid and other organic acids** |
| **9** | **Yeasts and their industrial importance** |
| **10** | **Production of beer** |
| **11** | **Production of vine** |
| **12** | **Production of distilled beverages** |
| **13** | **The use of microorganisms in wastewater treatment** |
| **14** | **Production of mushroom** |

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| **RECOMMENDED READING** |
| 1. Brock Biology of Microorganisms, Madigan, Martinko and Parker, 2003.Prentice Hall |

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| book-icon.gif | **B419 -** **LIMNOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Ecology and Environmental Biology branch), Elective (for others) |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
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| **RECOMMENDED READING** |
| 1. |

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| book-icon.gif | **B420 -** **ENVIRONMENTAL BIOTECHNOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** | The physiological properties of different microbial strains and industrial applications |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **History** |
| **2** | **Microbial evolution** |
| **3** | **Interactions among microbial populations** |
| **4** | **Interactions between plants and microorganisms** |
| **5** | **Interactions between animal and microorganisms** |
| **6** | **Adaptations to environmental conditions** |
| **7** | **Microbial habitats** |
| **8** | **Biogeochemical cycling** |
| **9** | **Microbial wastewater treatment systems** |
| **10** | **Solid waste treatment** |
| **11** | **Microbial interactions with xenobiotic and inorganic pollutants** |
| **12** | **Biotransformation, bioremediation** |
| **13** | **Microorganisms in mineral and energy recovery and fuel and biomass production** |
| **14** | **Microbial control of pests** |

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| **RECOMMENDED READING** |
| 1. Atlas, R. M., Bartha, R. (1997) Microbial Ecology Fundamentals and Applications Wesley Longman Inc  2. Madigan, M. T., Martinko, J. M., Parker, J. (2003) Brock Biology of Microorganisms, Prentice-Hall, Inc  3. Prescott, L. M., Harley, J. P., Klein, D. A. (1996) Microbiology Wm. C. Brown Publishers England |

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| book-icon.gif | **B421 -** **PARASITOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Zoology branch), Elective (for others) |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. İbraham KÜÇÜKBASMACI |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B422 -** **VEGETATION ECOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Ecology and Environmental Biology branch), Elective (for others) |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Kerim GÜNEY |

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| **AIMS AND OBJECTIVES** | Formation and development of vegetation, the factors controlling the development, the effects of the vegetation on its environs. Classification of vegetation. Management and usage of natural plant sources. Opportunities for development of biological sources. Conservation of natural sources and its sustainable usage. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Origin of vegetation and its development** |
| **2** | **Fundamental information about the vegetation researches** |
| **3** | **Environment and station** |
| **4** | **Classification of vegetation and its categories** |
| **5** | **Plant association and general characteristics** |
| **6** | **Formations and biological types** |
| **7** | **Synthetic characteristics of vegetation** |
| **8** | **Analytical characteristics of vegetation** |
| **9** | **Succession and climax** |
| **10** | **Systematics of Phytosociology and nomenclature** |
| **11** | **Various approaches on vegetation researches** |
| **12** | **Sampling and its problems** |
| **13** | **Homogenity and frequency diagrams** |
| **14** | **Sociological units defined in Turkey** |

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| **RECOMMENDED READING** |
| 1. **Akman, Y., Ketenoğlu, O., Geven, F., 2001-Vejetasyon Ekolojisi ve Araştırma Metotları, ISBN-975-97436-1-2** |

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| book-icon.gif | **B423 -** **HUMAN ANATOMY AND PHYSIOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Zoology branch), Elective (for others) |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. İbraham KÜÇÜKBASMACI |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B424 -** **MARINE BIOLOGY** |

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| **TYPE** | Compulsory (for Ecology and Environmental Biology branch), Elective (for others) |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **RECOMMENDED READING** |
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| book-icon.gif | **B425 -** **NUTRITION IN PLANTS** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Fall |
| **CREDITS** | (3+0+0) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | Plant nutrition, macro, micro, and other beneficial plant nutrients, plant nutrients, provide information on the uptake, The symptoms of nutrient deficiency and excess in plants |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | The structural components of plants |
| **2** | Definition and classification of the necessary nutrients for plants |
| **3** | The methods of determining the necessary nutrients |
| **4** | Soil structure as a source of plant nutrients |
| **5** | Nutrient uptake in plants |
| **6** | Factors affecting the intake of plant nutrients |
| **7** | Metabolic functions of plant nutrients within the plant |
| **8** | The importance of nitrogen for plants |
| **9** | The importance of Phosphorus for plants |
| **10** | The importance of Potassium for plants |
| **11** | The importance of Calcium,magnesium and sulfur for plants |
| **12** | Micro elements |
| **13** | The symptoms of nutrient deficiency and excess in plants |
| **14** | The symptoms of nutrient deficiency and excess in plants elimination |

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| **RECOMMENDED READING** |
| 1. Kacar, B. ve Katkat, A.V., 2007. Bitki Besleme (Üçüncü Baskı). Nobel Yayın No: 849, Fen ve Biyoloji Yayınları Dizisi: 29, ISBN: 978-975-591-834-1, Nobel Basımevi, 659 sayfa, Ankara. |

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| book-icon.gif | **B426 -** **ANIMAL GEOGRAPHY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Zoology branch), Elective (for others) |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Gözde GÜRELLİ |

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| **AIMS AND OBJECTIVES** | This course is to acquaint the biology students on geological period, biogeographical and zoogeographical area, distribution of animals in the world. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Geological periods** |
| **2** | **Geological periods** |
| **3** | **Biogeographical area** |
| **4** | **Biogeographical area** |
| **5** | **Biogeographical area** |
| **6** | **Biogeographical area** |
| **7** | **Zoogeographical area** |
| **8** | **Zoogeographical area** |
| **9** | **Zoogeographical area** |
| **10** | **Zoogeographical area** |
| **11** | **Zoogeographical area** |
| **12** | **Distribution of animals in the world** |
| **13** | **Distribution of animals in the world** |
| **14** | **Distribution of animals in the world** |

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| **RECOMMENDED READING** |
| 1. Demirsoy, A, (2008), “Genel Zoocoğrafya ve Türkiye Zoocoğrafyası, Hayvan Coğrafyası” Yedinci baskı, Meteksan Yayınları, Ankara. |

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| book-icon.gif | **B427 -** **AQUACULTURE** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Fall |
| **CREDITS** | (3+0+0) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B428 -** **ICHTHYOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Zoology branch), Elective (for others) |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **RECOMMENDED READING** |
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| book-icon.gif | **B429 -** **MICROPREPARATION TECHNIQUES AND DIGITAL IMAGING** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B430 -** **ENTOMOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Zoology branch), Elective (for others) |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. İbrahim KÜÇÜKBASMACI |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B431 -** **WATER QUALITY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B432 -** **FISHERIES BIOLOGY AND POPULATION DYNAMICS** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B433 -** **VIROLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Yasemin ÇELİK ALTUNOĞLU |

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| **AIMS AND OBJECTIVES** | The students should be able;  1. To define the structure, multiplication and infection types of bacteria, animal and plant virus and viruslike agents. |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Introduction and History** |
| **2** | **Methods in Virology** |
| **3** | **Virus Structure** |
| **4** | **Multiplication of Viruses** |
| **5** | **Viral Taxonomy and Evolution** |
| **6** | **Viruses with ssRNA Genomes** |
| **7** | **Viruses with dsRNA Genomes** |
| **8** | **Viruses Using Reverse Transcription During Replication** |
| **9** | **Viruses with DNA Genomes** |
| **10** | **Other Viruslike Infectious Agents** |
| **11** | **Viral Transformations** |
| **12** | **Immunological Responses to Virus Infection** |
| **13** | **Interferons** |
| **14** | **Viruses As Tools In Medicine and Biotechnology** |

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| **RECOMMENDED READING** |
| 1. Levy, J. (1994) Virology, A Simon Schuster Company, Prentice-Hall, Inc.  2. Madigan, M. T., Martinko, J. M., Parker, J. (2003) Brock Biology of Microorganisms, Prentice-Hall, Inc.  3. www.tulane.edu/~dmsander/garryfavweb.html  4. www.mcw.edu/asv |

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| book-icon.gif | **B434 -** **STRESS PHYSIOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | Stress factors in plants, the effects of these stress factors and learn about the mechanism of stress |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Introduction to the terminology of stress and stress in plants** |
| **2** | **Stress response and stress tolerance** |
| **3** | **Drought stress** |
| **4** | **Salt and nutrient stress** |
| **5** | **Light stress** |
| **6** | **Low and high temperature stress** |
| **7** | **Osmotic and Oxidative Stress** |
| **8** | **The effects of stress on the membranes** |
| **9** | **Stress and fitohormones** |
| **10** | **Air pollution and shortage of oxygen** |
| **11** | **Biotechnological approaches to stress** |
| **12** | **Abiotic stress in plant** |
| **13** | **Student presentations** |
| **14** | **Student presentations** |

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| **RECOMMENDED READING** |
| 1. **Salisburg, F. B. and Ross, C. W., 1985; Plant Physiology,Wadsworth Publishing Company, California.** 2. **Taiz, L. and Zeiger, E. 2007 Bitki Fizyolojisi (Çeviri editörü: İsmail TÜRKAN), Palme yayıncılık, Ankara.** 3. **Kadıoğlu, A. 2007. Bitki Fizyolojisi, Esen Ofset,Trabzon. Ankara.** 4. **Palavan-Ünsal,N.,1993. Bitki Büyüme Maddeleri,İst.Üniversitesi Basımevi.** |

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| book-icon.gif | **B435 -** **ENVIRONMENTAL POLLUTION** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** | To educate individuals sensitive to environment and provide contribution for natural balance |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Definition of environmental pollution, its classification and historical progression (from discover of fire to discover of agriculture and industrial revolution).** |
| **2** | **Demographic history of human** |
| **3** | **Atmospheric pollution, solid, liquid and gaseous pollutants.** |
| **4** | **Acid rains.** |
| **5** | **Effects of atmospheric pollutions on plant, animal and human.** |
| **6** | **Global warming and climate change** |
| **7** | **Thinning of ozone layer and its effects.** |
| **8** | **Effects of atmospheric pollutions on ecosystem.** |
| **9** | **Soil pollution and its ecological effects.** |
| **10** | **Erosion and desertification.** |
| **11** | **Water pollution (biological, thermal and chemical water pollution).** |
| **12** | **Radioactive pollution.** |
| **13** | **Vibration and light pollution** |
| **14** | **Destruction of biosphere and degradetation of natural balance** |

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| **RECOMMENDED READING** |
| 1. **Akman, Y, Ketenoğlu, O, Kurt, L ve dig. 2004, Çevre Kirliliği (Çevre Biologysi). Palme Yayınevi. 300 sayfa. Ankara** |
| 1. **Topbaş, M.T ve diğ. 1998. Çevre Kirliliği. T.C.Çevre Bakanlığı Yayınları. 340 sayfa. Ankara.** |

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| book-icon.gif | **B436 -** **PLANTS THAT FIGHTS CANCER** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Spring |
| **CREDITS** | (3+0+0) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B437 -** **MEDICINAL PLANTS** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Fall |
| **CREDITS** | (3+0+0) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** | The students should be able;  1. To define the history of medicinal plants.  2. To identify types of drugs.  3. To define the different plant groups which are used to obtain pharmaceuticals.  4. To define plant collection methods.  5. To define how to extract pharmaceuticals from plants.  6. To define the methods used to identfy anti-infective properties of pharmaceuticals.  7. To define the methods used to identify unknown pharmaceuticals.  8. To define main concepts in drug design. |
| **ASSESSMENTS METHODS** | **Quiz, Homework, Midterm Exam, Term Homework, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Identification of plants, History of medicinal plants,** |
| **2** | **Types of drugs** |
| **3** | **Pharmaceuticals from Cyanophyta** |
| **4** | **Pharmaceuticals from Phycophyta-Chlorophyceae-Phaeophyceaea** |
| **5** | **Pharmaceuticals from Mycophyta** |
| **6** | **Pharmaceuticals from Lichens** |
| **7** | **Pharmaceuticals from Bryophyta** |
| **8** | **Pharmaceuticals from Pteridophyta** |
| **9** | **Pharmaceuticals from Gymnospermae** |
| **10** | **Pharmaceuticals from Angiospermae** |
| **11** | **Plant collection methods and methods of pharmaceutical extraction from plants** |
| **12** | **Methods to identify anti-infective properties of pharmaceuticals** |
| **13** | **Methods of identifying unknown pharmaceuticals** |
| **14** | **Main concepts of drug design** |

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| **RECOMMENDED READING** |
| 1. Tanker, N., Koyuncu, M., Coşkun, M. (1998) Farmasotik Botanik, A.Ü. Eczacılık Fakültesi. |

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| book-icon.gif | **B438 -** **BRYOPHYTES** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Spring |
| **CREDITS** | (3+0+0) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** | The students should be able;  1. To identify the roles of mosses, liverworts and hornworts on ecosystem.  2. To identify some economically or ecologically important species.  3. To define the importance of preservation of Bryophytes. |
| **ASSESSMENTS METHODS** | **Quiz, Homework, Midterm Exam, Term Homework, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **General Characters of Bryophytes** |
| **2** | **Systematics and Ecological Characters of Anthocerotopsida** |
| **3** | **Hepaticae -Liverworts’ Systematic** |
| **4** | **The Orders of Liverworts, Jungermanniales, Metzgeriales** |
| **5** | **Marchantiales, Calobryales, Sphaerocarpales, Monocleales** |
| **6** | **General Characters of Mosses** |
| **7** | **Development of Gametophyte, Antheridium and Archegonium** |
| **8** | **Sporophyte, Spores and Capsules** |
| **9** | **Capsule Varieties and Spore Dispersal Mechanisms** |
| **10** | **Ecological Diversity of Mosses** |
| **11** | **Hot Springs, Rock Building, Lakes** |
| **12** | **Fire, Hot deserts, Forest Vegetation** |
| **13** | **Collection and Preservation Methods** |
| **14** | **The Moss Flora of Turkey and Ecological Zones** |

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| **RECOMMENDED READING** |
| 1. W.B.Schofield, (2001) Introduction to Bryology, The Blackburn Pres, U.S.A.  2. Smith, A.J.E., (1980), The Moss Flora of Britain and Ireland, Cambridge Uni.Press. |

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| book-icon.gif | **B439 -** **BIOCHEMISTRY OF PHENOLIC COMPOUNDS** |

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| **TYPE** | Elective |
| **SEMESTER** | Fall |
| **CREDITS** | (3+0+0) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** |  |

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| **COURSE CONTENTS** | |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B440 - HISTORY OF BIOLOGY** |

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| **TYPE** | Elective |
| **SEMESTER** | Spring |
| **CREDITS** | (3+0+0) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Gözde GÜRELLİ |

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| **AIMS AND OBJECTIVES** | The purpose of this lesson is to give the main historical events related with history of Biology |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Biology in classical antiquity** |
| **2** | **Biology in classical antiquity** |
| **3** | **The middle ages and the Renaissance** |
| **4** | **The middle ages and the Renaissance** |
| **5** | **The middle ages and the Renaissance** |
| **6** | **Biology in the seventeenth and eighteenth centruies** |
| **7** | **Biology in the seventeenth and eighteenth centruies** |
| **8** | **Biology in the seventeenth and eighteenth centruies** |
| **9** | **Biology in the first half of the nineteenth century** |
| **10** | **Biology in the first half of the nineteenth century** |
| **11** | **Biology in the first half of the nineteenth century** |
| **12** | **Modern biology** |
| **13** | **Modern biology** |
| **14** | **History of biology in Turkey** |

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| **RECOMMENDED READING** |
| 1. Yalçın, Ş., (2007), “Biyolojide Geçmişe Yolculuk” Palme yayıncılık, Ankara. |

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| book-icon.gif | **B441 -** **WASTEWATERS AND WASTEWATER TREATMENT** |

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| **TYPE** | Elective |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
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| **RECOMMENDED READING** |
| 1. |

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| book-icon.gif | **B442 -** **HYDROBOTANY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Spring |
| **CREDITS** | (2+0+2) 3 |
| **ECTS CREDITS** | 5 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
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| **RECOMMENDED READING** |
| 1. |

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| book-icon.gif | **B443 -** **AQUATIC TOXICOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Fall |
| **CREDITS** | (2+0+0) 2 |
| **ECTS CREDITS** | 4 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Özlem FINDIK |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B444 -** **PLANT BIOCHEMISTRY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Elective |
| **SEMESTER** | Spring |
| **CREDITS** | (3+0+0) 3 |
| **ECTS CREDITS** | 6 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Ergin Murat ALTUNER |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
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| **RECOMMENDED READING** |
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| book-icon.gif | **B454 - PLANT EMBRIOLOGY** |

[**Return to list**](#YEAR_4_COURSE_LIST)

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| **TYPE** | Compulsory (for Botany branch), Elective ( for others) |
| **SEMESTER** | Spring |
| **CREDITS** | (3+0+2) 4 |
| **ECTS CREDITS** | 9 |
| **DEPARTMENT** | Biology |
| **INSTRUCTOR(S)** | Assistant Prof. Dr. Talip ÇETER |

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| **AIMS AND OBJECTIVES** |  |
| **ASSESSMENTS METHODS** | **Midterm Exam, Final Exam** |

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| **COURSE CONTENTS** | |
| **WEEK** | **TOPICS** |
| **1** | **Life cycle of plant and pollinations mechanism** |
| **2** | **Gymnosperms and reproductive organs of Gymnosperms** |
| **3** | **Angiosperm and reproductive organs of Gymnosperms** |
| **4** | **Microsporangium** |
| **5** | **Development of Microspores** |
| **6** | **Midterm exam** |
| **7** | **Macrosporangium** |
| **8** | **Development of Macrospores** |
| **9** | **Pollination** |
| **10** | **Development of Embryo** |
| **11** | **Ovule, ovule type and possitions** |
| **12** | **Development of Endosperms** |
| **13** | **Development of seeds** |
| **14** | **Seed type** |

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| **RECOMMENDED READING** |
| 1. Ünal M. 2008. Angiospermlerde Bitki Embriyolojis, Nobel Yayınları, Ankara  2. Büyükkartal N. 2000. Bitki Embriyolojisi Laboratuvar Kılavuzu, Ankara Üniversitesi Yayınları, Ankara  3. Simpson MG. 2010. Plant Systematic, Elsevier-academic Press |

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| CONTACT INFORMATION |

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| **PHONE NUMBER:**  fef_0001.jpg🕾 +90 366 280 19 29  🕾 +90 366 280 19 11  **FAX NUMBER:**  🖷 +90 366 215 49 69  **E-MAIL:**  [kufef@kastamonu.edu.tr](mailto:kufef@kastamonu.edu.tr)  Assist. Prof. Dr. Talip ÇETER  Biology Department Erasmus Coordinator  [tceter@kastamonu.edu.tr](mailto:tceter@kastamonu.edu.tr) , [talipceter@gmail.com](mailto:talipceter@gmail.com)  **ADRESS:**  Kastamonu University,  Faculty of Arts and Sciences,  Department of Biology,  Kuzeykent,  TR-37100, Kastamonu  TURKEY |  |