**2024-2025 AGRICULTURAL BIOTECHNOLOGY DEPARTMENT UNDERGRADUATE EDUCATION PLAN**

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| **I. Semester** | | | | | | | |
| Course Code | Course Name | C/E | Theo | Prac | Lab. | NC | ECTS |
| 251511001 | [Zoology](#Zoology) | C | 2 | 2 | 0 | 3 | 4 |
| 251511002 | [Botany](#Botany) | C | 2 | 2 | 0 | 3 | 4 |
| 251511013 | [Physics](#Physics) | C | 3 | 0 | 0 | 3 | 3 |
| 251511004 | [Chemistry](#Chem) | C | 2 | 2 | 0 | 3 | 4 |
| 251511005 | [Mathematics](#Mathematics) | C | 3 | 0 | 0 | 3 | 3 |
| 251511014 | [Laboratory Technique](#LaboratoryTechnique) | C | 1 | 2 | 0 | 2 | 3 |
| 251511015 | [Turkish Language I](#TurkishLanguageI) | C | 2 | 0 | 0 | 2 | 2 |
| 251511009 | [Atatürk’s Pr. & The History of Rev. I](#AtatürkI) | C | 2 | 0 | 0 | 2 | 2 |
| 251511016 | [English I](#EnglishI) | C | 3 | 0 | 0 | 3 | 2 |
|  | Social Elective Course Group I (1 course to be taken) | E | 2 | 0 | 0 | 2 | 3 |
| Total | | | 22 | 8 | 0 | 26 | 30 |

**C:** Compulsory Course **E:** Elective Course **Theo.:** Theory **Prac.:** Practice **Lab.:** Laboratory **NC:** National Credit **ECTS:** European Credit Transfer System



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| **II. Semester** | | | | | | | |
| Course Code | Course Name | C/E | Theo | Prac | Lab. | NC | ECTS |
| 251512001 | [History of Agriculture and Deontology](#Historyof) | C | 2 | 0 | 0 | 2 | 2 |
| 251512004 | [Biochemistry](#Biochemistry) | C | 2 | 0 | 0 | 2 | 3 |
| 251512017 | [Technical Drawing](#TechnicalDrawing) | C | 1 | 2 | 0 | 2 | 3 |
| 251512018 | [Statistic](#Statistic) | C | 2 | 0 | 0 | 2 | 3 |
| 251512019 | [Microbiology](#Microbiology) | C | 2 | 2 | 0 | 3 | 4 |
| 251512014 | [Career Planning](#CareerPlanning) | C | 1 | 0 | 0 | 1 | 2 |
| 251512020 | [Engineering Mechanics](#EngineeringMechanics) | C | 3 | 0 | 0 | 3 | 4 |
| 251512021 | [Turkish Language II](#TurkishLanguageII) | C | 2 | 0 | 0 | 2 | 2 |
| 251512009 | [Atatürk’s Pr. &The History of Rev. II](#AtatürkII) | C | 2 | 0 | 0 | 2 | 2 |
| 251512022 | [English II](#EnglishII) | C | 3 | 0 | 0 | 3 | 2 |
|  | Social Elective Course Group II (1 course to be taken) | E | 2 | 0 | 0 | 2 | 3 |
| Total | |  | 22 | 4 | 0 | 24 | 30 |

# **C:** Compulsory Course **E:** Elective Course **Theo.:** Theory **Prac.:** Practice **Lab.:** Laboratory **NC:** National Credit **ECTS:** European Credit Transfer System

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| **III. Semester** | | | | | | | |
| Course Code | Course Name | C/E | Theo | Prac | Lab. | NC | ECTS |
| 251513027 | [Analytical Chemistry](#AnalyticalChemistry) | C | 2 | 2 | 0 | 3 | 5 |
| 251513011 | [Genetics](#Genetics) | C | 2 | 0 | 0 | 2 | 3 |
| 251513028 | [Animal Physiology](#AnimalPhysiology) | C | 3 | 0 | 0 | 3 | 4 |
| 251513029 | [Basic Information Technologies](#BasicinformationTechnologies) | C | 2 | 0 | 0 | 2 | 2 |
| 251513030 | [Materials Science](#MaterialsScience) | C | 3 | 0 | 0 | 3 | 4 |
| 251513007 | [Horticulture](#Horticulture) | C | 2 | 0 | 0 | 2 | 3 |
| 251513008 | [Field Crops](#FieldCrops) | C | 2 | 0 | 0 | 2 | 3 |
| 251513031 | [Agricultural Structures and Irrigation](#AgriculturalStructures) | C | 2 | 0 | 0 | 2 | 3 |
|  | Out of Field Elective Course Group I (1 course to be taken) | E | 3 | 0 | 0 | 3 | 3 |
| Total | |  | 21 | 2 | 0 | 22 | 30 |
|  | Out of Field Elective Course Group I (1 course to be taken) |  |  |  |  |  |  |
| 251513032 | [Intelligent Agriculture](#Intelligenta) | E | 3 | 0 | 0 | 3 | 3 |
| 251513033 | [Geographic Information Systems](#GeographicI) | E | 3 | 0 | 0 | 3 | 3 |

# **C:** Compulsory Course **E:** Elective Course **Theo.:** Theory **Prac.:** Practice **Lab.:** Laboratory **NC:** National Credit **ECTS:** European Credit Transfer System

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| **IV. Semester** | | | | | | | |
| Course Code | Course Name | C/E | Theo | Prac | Lab. | NC | ECTS |
| 251514028 | [Introduction to Biotechnology](#IntroductiontoBiotechnology) | C | 2 | 0 | 0 | 2 | 3 |
| 251514029 | [Plant Physiology](#PlantPhysiology) | C | 2 | 2 | 0 | 3 | 5 |
| 251514030 | [Agricultural Law](#AgriculturalLaw) | C | 2 | 0 | 0 | 2 | 2 |
| 251514018 | [Thermodynamics](#Thermodynamics) | C | 3 | 0 | 0 | 3 | 4 |
| 251514010 | [Plant Protection](#PlantProtection) | C | 2 | 0 | 0 | 2 | 3 |
| 251514031 | [Animal Production](#AnimalProduction) | C | 3 | 0 | 0 | 3 | 3 |
| 251514032 | [Agricultural Economics](#AgriculturalEconomics) | C | 2 | 0 | 0 | 2 | 2 |
| 251514033 | [Agricultural Machinery](#AgriculturalMachinery) | C | 2 | 0 | 0 | 2 | 2 |
| 251514034 | [Soil Science](#SoilScience) | C | 2 | 0 | 0 | 2 | 3 |
|  | Out of Field Elective Course Group II (1 course to be taken) | E | 3 | 0 | 0 | 3 | 3 |
| Total | |  | 23 | 2 | 0 | 24 | 30 |
|  | Out of Field Elective Course Group II (1 course to be taken) |  |  |  |  |  |  |
| 251514035 | [Ecology](#Ecology) | E | 3 | 0 | 0 | 3 | 3 |
| 251514036 | [Meteorology](#Meteorology) | E | 3 | 0 | 0 | 3 | 3 |
| 251514037 | [Surveying Technique](#SurveyingTechnique) | E | 3 | 0 | 0 | 3 | 3 |

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| **V. Semester** | | | | | | | |
| Course Code | Course Name | C/E | Theo | Prac | Lab. | NC | ECTS |
| 251515024 | [Molecular Biology and Genetics](#MolecularBiologyandGenetics) | C | 2 | 2 | 0 | 3 | 4 |
| 251515025 | [Cell Biology](#CellBiology) | C | 2 | 0 | 0 | 2 | 2 |
| 251515026 | [Research and Experiment Methods](#ResearchandExperimentMethods) | C | 3 | 0 | 0 | 3 | 3 |
| 251515027 | [Occupational Health and Safety I](#OccupationalHealthandSafetyI) | C | 2 | 0 | 0 | 2 | 2 |
| 251515028 | [Professional Practice I](#ProfessionalPracticeI) | C | 0 | 4 | 0 | 0 | 3 |
|  | Field Elective Course Group I (3 courses to be taken) | E | 2 | 0 | 0 | 2 | 3 |
|  | Field Elective Course Group II (1 courses to be taken) | E | 2 | 2 | 0 | 3 | 4 |
|  | Out of Field Elective Course Group III (1 course to be taken) | E | 3 | 0 | 0 | 3 | 3 |
| Total | |  | 20 | 8 | 0 | 22 | 30 |
|  | Field Elective Course Group I (3 courses to be taken) |  |  |  |  |  |  |
| 251515029 | [Biosafety and Bioethics](#Biosafetyandbioethics) | E | 2 | 0 | 0 | 2 | 3 |
| 251515030 | [Environmental Biotechnology](#EnvironmentalBiotechnology) | E | 2 | 0 | 0 | 2 | 3 |
| 251515031 | [Biotechnological Methods in the Control of Plant Diseases](#BiotechnologicalMethodsintheControl) | E | 2 | 0 | 0 | 2 | 3 |
| 251515032 | [Agricultural Biomass Technologies](#AgriculturalBiomassTechnologies) | E | 2 | 0 | 0 | 2 | 3 |
| 251515033 | [Academic English](#AcademicEnglish) | E | 2 | 0 | 0 | 2 | 3 |
|  | Field Elective Course Group II (1 courses to be taken) |  |  |  |  |  |  |
| 251515034 | [Enzymology](#Enzymology) (Prerequisite: Biochemistry) | E | 2 | 2 | 0 | 3 | 4 |
| 251515035 | [Microbial Biotechnology](#MicrobialBiotechnology) (Prerequisite:  Microbiology) | E | 2 | 2 | 0 | 3 | 4 |
|  | Out of Field Elective Course Group III (1 course to be taken) |  |  |  |  |  |  |
| 251515005 | [Determining Plant Fertilizer Requirements](#DeterminingPlantFertilizerRequirement) | E | 3 | 0 | 0 | 3 | 3 |
| 251515006 | [Agriculture and Environment](#AgricultureandEnvironment) | E | 3 | 0 | 0 | 3 | 3 |
| 251515007 | [Beekeeping and Sericulture](#Beekeepingandsericulture) | E | 3 | 0 | 0 | 3 | 3 |
| 251515010 | [Phytopathology](#Phytopathology) | E | 3 | 0 | 0 | 3 | 3 |
| 251515020 | [Food Science and Technology](#FoodScienceandTechnology) | E | 3 | 0 | 0 | 3 | 3 |
| 251515021 | [Organic Agriculture](#OrganicAgriculture) | E | 3 | 0 | 0 | 3 | 3 |
| 251515036 | [Agricultural Extension](#AgriculturalExtension) | E | 3 | 0 | 0 | 3 | 3 |

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| **VI. Semester** | | | | | | | |
| Course Code | Course Name | C/E | Theo | Prac | Lab | NC | ECTS |
| 251516026 | [Bioinformatics](#Bioinformatics) | C | 1 | 1 | 0 | 1 | 2 |
| 251516027 | [Project preparation](#Projectpreparation) | C | 1 | 0 | 0 | 1 | 1 |
| 251516028 | [Occupational Health and Safety II](#OccupationalHealthII) | C | 2 | 0 | 0 | 2 | 2 |
| 251516029 | [Professional Practice II](#ProfessionalPracticeII) | C | 0 | 4 | 0 | 0 | 3 |
|  | Field Elective Course Group III (1 course to be taken) | E | 2 | 2 | 0 | 3 | 5 |
|  | Field Elective Course Group IV (1 course to be taken) | E | 2 | 2 | 0 | 3 | 5 |
|  | Field Elective Course Group V (3 courses to be taken) | E | 2 | 0 | 0 | 2 | 3 |
|  | Out of Field Elective Course Group IV (1 course to be taken) | E | 3 | 0 | 0 | 3 | 3 |
| Toplam | |  | 17 | 9 | 0 | 19 | 30 |
|  | Field Elective Course Group III (1 course to be taken) |  |  |  |  |  |  |
| 251516030 | [Plant Tissue Culture](#PlantTissueCulture) | E | 2 | 2 | 0 | 3 | 5 |
| 251516031 | [Animal Cell Culture](#AnimalCellCulture) | E | 2 | 2 | 0 | 3 | 5 |
|  | Field Elective Course Group IV (1 course to be taken) |  |  |  |  |  |  |
| 251516032 | [Genetic Engineering](#GeneticEngineering) | E | 2 | 2 | 0 | 3 | 5 |
| 251516033 | [Genomics and Proteomics](#GenomicsandProteomics) | E | 2 | 2 | 0 | 3 | 5 |
|  | Field Elective Course Group V (3 courses to be taken) | E |  |  |  |  |  |
| 251516034 | [Entrepreneurship in Agricultural Biotechnology](#Entrepreneurshipin) | E | 2 | 0 | 0 | 2 | 3 |
| 251516035 | [Synthetic Biology](#SyntheticBiology) | E | 2 | 0 | 0 | 2 | 3 |
| 251516036 | [Seed and Seed Material Biotechnology](#SeedandSeedMaterialBiotechnology) | E | 2 | 0 | 0 | 2 | 3 |
| 251516037 | [Genetically Modified Organisms](#GeneticallyModifiedOrganisms) | E | 2 | 0 | 0 | 2 | 3 |
| 251516038 | [Biotechnological Methods in Plant Pest Control](#BiotechnologicalMethodsinPlantPestC) | E | 2 | 0 | 0 | 2 | 3 |
| 251516039 | [Sectoral Applications in Agricultural Biotechnology](#SectoralApplicationsinAgriculturalBi) | E | 2 | 0 | 0 | 2 | 3 |
|  | Out of Field Elective Course Group IV (1 course to be taken) |  |  |  |  |  |  |
| 251516005 | [Medicinal and Aromatic Plants](#MedicinalandAromaticPlants) | E | 3 | 0 | 0 | 3 | 3 |
| 251516022 | [Entomology](#Entomology) | E | 3 | 0 | 0 | 3 | 3 |
| 251516007 | [Organic Animal Breeding](#OrganicAnimalBreeding) | E | 3 | 0 | 0 | 3 | 3 |
| 251516010 | [Grafting and Pruning Technique](#GraftingandPruningTechnique) | E | 3 | 0 | 0 | 3 | 3 |
| 251516011 | [Agricultural Appraisal and Expertise](#AgriculturalAppraisalandexpertise) | E | 3 | 0 | 0 | 3 | 3 |
| 251516023 | [Landscape Architecture](#LandscapeArchitecture) | E | 3 | 0 | 0 | 3 | 3 |
| 251516006 | [Soilless Culture](#SoillessCulture) | E | 3 | 0 | 0 | 3 | 3 |
| 251516025 | [Food Safety](#FoodSafety) | E | 3 | 0 | 0 | 3 | 3 |

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| **VII. Semester** | | | | | | | |
| Course Code | Course Name | C/E | Theo | Prac | Lab | NC | ECTS |
| 251517032 | [Graduation Thesis](#GraduationThesis) (Prerequisite: Project  Preparation) | C | 0 | 2 | 0 | 1 | 3 |
| 251517033 | [Design in Engineering](#DesigninEngineering) (Prerequisite:  Thermodynamics) | C | 2 | 2 | 0 | 3 | 5 |
| 251517034 | [Artificial Intelligence in Biotechnology](#ArtificialIntelligenceinBiotechnology) | C | 2 | 0 | 0 | 2 | 2 |
| 251517035 | [Plant Breeding and Biotechnology](#PlantBreedingandBiotechnology) | C | 3 | 0 | 0 | 3 | 4 |
| 251517036 | [Animal Breeding and Biotechnology](#AnimalBreedingandBiotechnology) | C | 3 | 0 | 0 | 3 | 4 |
|  | Field Elective Course Group VI (1 course to be taken) | E | 3 | 0 | 0 | 3 | 3 |
|  | Field Elective Course VII (1 course  to be taken) | E | 2 | 0 | 0 | 2 | 3 |
|  | Field Elective Course Group VIII (2 courses to be taken) | E | 2 | 0 | 0 | 2 | 3 |
| Total | |  | 19 | 4 | 0 | 21 | 30 |
|  | Field Elective Course Group VI (1 course to be taken) |  |  |  |  |  |  |
| 251517037 | [Industrial Biotechnology](#IndustrialBiotechnology) | E | 3 | 0 | 0 | 3 | 3 |
| 251517038 | [Biotechnological Methods in Animal Feeding](#BiotechnologicalMethodsinAnimalFeedi) | E | 3 | 0 | 0 | 3 | 3 |
|  | Field Elective Course VII (1 course  to be taken) |  |  |  |  |  |  |
| 251517039 | [Plant Genetic Resources](#PlantGeneticResources) | E | 2 | 0 | 0 | 2 | 3 |
| 251517040 | [Animal Genetic Resources](#AnimalGeneticResources) | E | 2 | 0 | 0 | 2 | 3 |
|  | Field Elective Course Group VIII (2 courses to be taken) |  |  |  |  |  |  |
| 251517041 | [Occupational English](#OccupationalEnglish) | E | 2 | 0 | 0 | 2 | 3 |
| 251517042 | [Reproductive Physiology and Applications](#ReproductivePhysiologyandApplications) | E | 2 | 0 | 0 | 2 | 3 |
| 251517031 | [Biofuels and Energy Crops](#BiofuelsandEnergyCrops) | E | 2 | 0 | 0 | 2 | 3 |
| 251517043 | [Fermented Products Technology](#FermentedProductsTechnology) | E | 2 | 0 | 0 | 2 | 3 |

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| **VIII. Semester** | | | | | | | |
| Course Code | Course Name | C/E | Theo | Prac | Lab | NC | ECTS |
| 251518031 | [Vocational Training Course](#VocationalTrainingCourse) (Workplace Training) \* | C | 5 | 25 | 0 | 18 | 30 |
| Total | |  | 5 | 25 | 0 | 18 | 30 |

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\***Prerequisite: All courses in seven semesters must be successfully completed and the GPA must be 2 and above.**

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| **Course Name** | **Course Code** |
| Zoology | 251511001 |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| I | 2 | 2 | 4 |

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| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
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| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

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| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Present and explain the subjects of zoology and animal groups. |
| **Short Course Content** | Animal cell and its organels, types of cell division, animal tissues, organs and systems, systematics and taxonomy, rules of nomenclature, classification of animal groups, general features of the animal groups, soil animals and their agricultural importance, earthworms and their contibutions to soil and agricultural products, animal ecology and ethology,  faunistic richness of Turkey. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Explaining the importance of the animal kingdom in the living world. | 1, 9 | 1, 4, 5 | A, K |
| **2** | Summarizing the structure and functions of animal cells, tissues, organs and systems. | 1 | 1, 3, 4, 5 | A, I, K |
| **3** | Interpreting animal ecology and behavior. | 1 | 1, 4, 5, 7 | A, K |
| **4** | Summarizing the importance of systematics and taxonomy. | 1 | 1, 4, 5 | A, K |
| **5** | Explaining the general rules of classification and naming. | 1 | 1, 5 | A, K |
| **6** | Summarizing the general characteristics of animal groups. | 1 | 1, 4, 5, 7 | A, K |
| **7** | To be able to present the faunistic richness of our country. | 1, 9 | 1, 7 | A, K |
| **8** | Explaining issues such as what can be done to protect this wealth. | 1, 6, 8, 9 | 1, 2, 5, 10, 13 | A, D, K |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| **Main Textbook** | Koç H. General Zoology Course Notes |
| **Supporting References** | 1. Aktümsek A., Ünsal S., Kalyoncu L. (2007) Genel Zooloji, Ankara, Nobel Yayınları. 2. Kuru M. (2009) Omurgalı Hayvanlar, Ankara, Palme Yayınları. 3. Mısırlıoğlu M. (2011) Omurgasız Hayvanlar Laboratuvar Kılavuzu, Ankara, Nobel Yayınları. 4. Salman S. (2007) Omurgasız Hayvanlar Biyolojisi, Ankara, Palme Yayınları. 5. Documentaries related the course. |
| **Necessary Course Material** | Computer and projection, microscope, stereo microscope, basin, microscope slides, lamels, pens, alcohol, formaldehyde, jars. |

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| **Course Schedule** | |
| **1** | General features of animals |
| **2** | Animal cell and its organels |
| **3** | Types of cell division |
| **4** | Animal tissues |
| **5** | Animal tissues |
| **6** | Organs and Systems |
| **7** | Organs and Systems |
| **8** | Mid-Term Exam |
| **9** | Animal ecology |
| **10** | Ethology |
| **11** | Systematic and taxonomy, Classification of animals |
| **12** | Systematic and taxonomy, Classification of animals |
| **13** | Soil animals and their agricultural importance |
| **14** | Earthworms and their contributions to soil and agriculture |
| **15** | Faunistic richness of Turkey |
| **16,17** | Final Exam |

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| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 3 | 42 |
| Experimental skill | 14 | 2 | 28 |
| Homework | 1 | 5 | 5 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 4 | 2 | 8 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 5 | 2 | 10 |
|  | **Total workload** | | **123** |
| **Total workload / 30** | | **4,1** |
| **Course ECTS Credit** | | **4** |

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| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 20 |
| Homework | 20 |
| Experimental Skill | 20 |
| Bir öğe seçin. |  |
| **Final Exam** | 40 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| **Course Name** | **Course Code** |
| Botany | 251511002 |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| I | 2 | 2 | 4 |

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| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
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| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

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| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Morphological and anatomical structure of plants |
| **Short Course Content** | Description of plant cell Plant tissues  Plant organs Classificationof plants  Photosyntesis and respiration |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Know and recognize the properties of plant cell under the microscope | 1, 2, 3, 7 | 1, 3, 5, 6, 9, 11 | A, D, I |
| **2** | Know and recognize the properties of plant tissues under the microscope | 1, 2, 3, 7 | 1, 3, 5, 6, 9, 11 | A, D, I |
| **3** | Know and distinguish the differences between plant tissues and is under the microscope | 1, 2, 3, 7 | 1, 3, 5, 6, 9, 11 | A, D, I |
| **4** | Know and recognize the properties of plant organs under the microscope | 1, 2, 3, 7 | 1, 3, 5, 6, 9, 11 | A, D, I |
| **5** | Know and distinguish the differences between plant organs and is under the microscope | 1, 2, 3, 7 | 1, 3, 5, 6, 9, 11 | A, D, I |
| **6** | Know classification of plants | 1, 2, 3, 7 | 1, 3, 5, 6, 9, 11 | A, D, I |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| **Main Textbook** | Bozcuk, S. 2011. Genel Botanik, Hatipoğlu Basım ve Yayım, Ankara. |
| **Supporting References** | 1. Akman, Y. ve Güney, K. 2011. Botanik-Bitki Biyolojisi, Palme Yayıncılık. 2. Yentür, S. 2003. Bitki Anatomisi, İstanbul Üniversitesi Yayınları, İstanbul. 3. Vardar, Y. ve Seçmen, Ö. 1993. Bitki Morfolojisinde Temel Bilgiler, Fakülteler Kitabevi, İzmir. |
| **Necessary Course Material** | Projector |

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| **Course Schedule** | | |
| **1** | Plant Cell Structure; call wall, protoplast, nucleus,  vacuol, cell division | Examination of plant cell structure and components. |
| **2** | Plant Tissues; meristematic tissues | Examination of plant cell structure and components. |
| **3** | Parenchyma and Mechanic Tissue | Examination of epidermis derived structures, Feathers. |
| **4** | Transport System and Secretory System | Examination of epidermis derived structures, Stomata. |
| **5** | Plant Organs; Root; general properties, morphology, root structure in relation to function and root  anatomy | Examination of protective tissues and parenchyma. |
| **6** | Plant Organs; Root; general properties, morphology, root structure in relation to function and root  anatomy | Examination of protective tissues and parenchyma. |
| **7** | Stem; general properties, morphology, branching,  metamorphosis and stem anatomy | Examination of support, secretory and conduction  tissues. |
| **8** | Mid-Term Exam |  |
| **9** | Leaf; general properties, morphology, parts,  metamorphosis and leaf anatomy | Examination of support, secretory and conduction  tissues. |
| **10** | Flower, flower symmetry, inflorescence, pollination  and germination | Examination of root and root types. |
| **11** | Fruit, fruit types | Examination of stem and stem types. |
| **12** | Mid-Term - Fruit, fruit types | Morphological and anatomical structure and types of  leaf. |
| **13** | Seed; structure, ovule develepment and structure,  seed types | Morphological and anatomical structure of flower. |
| **14** | Plant Systematic and Plant Classification | Morphological and anatomical structure of flower. |
| **15** | Photosyntesis and respiration | Morphological and anatomical structure of seed. |
| **16,17** | Final Exam |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 20 | 20 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 30 | 30 |
|  | **Total workload** | | **122** |
| **Total workload / 30** | | **4,06** |
| **Course ECTS Credit** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Physics | 251511013 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| I | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 3 |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To provide students with basic information about Newtonian mechanics and conservation laws. Ability to define, formulate and analytically solve problems in physical systems; To improve general problem solving ability. |
| **Short Course Content** | Measurement; vectors; movement in one dimension; movement in two and three dimensions; particle dynamics I; particle dynamics II; work and energy; conservation of energy; dynamics of particle systems; collision; rotational kinematics and dynamics; balance of solid bodies; gravity; oscillations. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | The student recognizes and solves various problems of  physical systems in practice. | 1, 2 | 1 | A |
| **2** | Recognizes the importance of measurement and units. | 1, 2 | 1 | A |
| **3** | Applies physical systems in daily life. | 1, 2 | 1 | A |
| **4** | Recognizes the role of physics in engineering and health  sciences. | 1, 2 | 1 | A |
| **5** | Explains the basic laws and concepts of physics. | 1, 2 | 1 | A |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Halliday, D., Resnick, R., and Walker, J. (2008). Fundamentals of Physics (8th Edition).  John Wiley & Sons, Inc.2. Serway, R.A., Beichner, R.J., Physics For Scientists and Engineers with Modern Physics (2007), Harcourt College Publishers. |
| **Supporting References** | Young, H.D, Freedman, R.A. (2006). University Physics Volume1 (12th Edition).  Pearson/Addison Wesley 2.Ohanian, H.C. (1989). Physics (2nd Edition) New York: W.W. Norton & Company, Inc.3.  Giancoli, D.C. (2004). Physics: Principles with Applications (6th Edition). Pearson Education Inc. |
| **Necessary Course**  **Material** |  |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Measurement and Units |
| **2** | Vectors |
| **3** | One-Dimensional Motion |
| **4** | Two-Dimensional Motion |
| **5** | Newton's Laws of Motion and Applications |
| **6** | Work and Power |
| **7** | Energy |
| **8** | Mid-Term Exam |
| **9** | Energy |
| **10** | Momentum and Collision |
| **11** | Momentum and Collision |
| **12** | Rotational Movement |
| **13** | Rotational Motion Applications |
| **14** | Balance |
| **15** | Harmonic Motion |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework | 5 | 1 | 5 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 7 | 3 | 21 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 14 | 1 | 14 |
|  | **Total workload** | | **99** |
| **Total workload / 30** | | **3,3** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Chemistry | 251511004 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| I | 2 | 2 | 4 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 4 |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To introduce the main subjects of chemistry, to give the fundamentals of chemistry to the agrıculture engineering students. |
| **Short Course Content** | The properties of material and measurements, atoms and atomic theory, periodic table chemical compounds, chemical reactions stoichiometry, gases and gas mixtures, chemical thermodynamics. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Define, classify and explain the properties of materials, | 1 | 1, 5, 10 | A |
| **2** | Explain the concepts of atoms and atomic theory, | 1 | 1, 5, 10 | A |
| **3** | Explain and use the mole concepts and the Avogadro’s law, | 1 | 1, 5, 10 | A |
| **4** | Explain and classify the chemical compounds, | 1 | 1, 5, 10 | A |
| **5** | Define, explain and use the relationship of the gaseous state,  the properties of gases and gas laws, | 1, 4, 7 | 1, 5, 10 | A |
| **6** | Define the basic concepts of thermodynamics, explain the  law of thermodynamics and use them in solving the thermochemistry problems. | 1 | 1, 5, 10 | A |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Petrucci, H., Harwood, W. S., Herring, F. G., 2002 “Genel Kimya: İlkeler ve Modern Uygulamalar” (I. Cilt), Çeviri Editörleri: Uyar. T., Aksoy, S., Palme Yayıncılık, Ankara. |
| **Supporting References** | 1. Mortimer, C. E. , 1988, Modern Üniversite Kimyası, I. ve II. Cilt, Çağlayan Kitabevi,   İstanbul   1. Sienko, M. J., Plane, R. A., 1983, Temel Kimya, Savaş Yayınları, Ankara. 2. Erdik, E., Sarıkaya, Y., 1987, Temel Üniversite Kimyası, Hacettepe Taş Kitapçılık, Ankara. |
| **Necessary Course Material** | Board, projector |

|  |  |  |
| --- | --- | --- |
| **Dersin Haftalık Planı** | | |
| **1** | Properties and Measurement of the Matter | Introduction and content of the application |
| **2** | Atoms and Atomic Theory | Occupational Health and Safety Information |
| **3** | Atoms, Molecules, Ions | Laboratory Material Introduction |
| **4** | Introduction to the Periodic Table | Determination of report writing rules and groups |
| **5** | Chemical Bonds | Determining the Density of Solids |
| **6** | Chemical Compounds | Determining the Density of Liquids |
| **7** | Chemical Compounds | Verification of the Law of Constant Proportions |
| **8** | Ara Sınavlar |  |
| **9** | Chemical Reactions and Equations | Precipitate Formation |
| **10** | Chemical Reactions and Equations | Qualitative Analysis |
| **11** | Chemical Balance | Titrimetric Analysis |
| **12** | Solutions | Solution Preparation |
| **13** | Acids and Bases | Relative Diffusion Rates of Gases |
| **14** | Ideal and General Gas Equation | Compensation Week |
| **15** | Gases | Compensation Week |
| **16, 17** | Yarıyıl sonu sınavları |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 5 | 70 |
| Experimental skill | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) | 12 | 1 | 12 |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 6 | 6 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 6 | 6 |
|  | **Total workload** | | **126** |
| **Total workload / 30** | | **4,2** |
| **Course ECTS Credit** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Report | 10 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Mathematics | 251511005 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| I | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 3 |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To introduce the concepts of function, limit, continuity and derivative, which are the basic knowledge of mathematics, and to develop their skills in using them when necessary |
| **Short Course Content** | Number Sets, Functions, Limits and Continuity, Derivation and Applications of differentiation |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Grasp the basic knowledge of mathematics | 1 | 1,2,5,6,10 | A |
| **2** | Define the functions and reverse functions | 1, 2 | 1,2,5,6,10 | A |
| **3** | Explain limit and continuity. | 1, 2 | 1,2,5,6,10 | A |
| **4** | Grasp the meaning of derivatives and take derivative | 1 | 1,2,5,6,10 | A |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Genel Matematik (Sosyal Yaşam ve Doğa Bilimleri için), Mahmut Koçak Genel Matematik I, Mustafa Balcı. |
| **Supporting References** | Genel Matematik Problemleri I, Mustafa Balcı |
| **Necessary Course Material** | - |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Differential Equations and Solutions |
| **2** | First Order Differential Equations |
| **3** | Function concept and properties |
| **4** | Essential functions and their graphs |
| **5** | Trigonometric, exponential, logarithmic and hyperbolic functions |
| **6** | Limit and continuity |
| **7** | Solving problem |
| **8** | Mid-term exam |
| **9** | Derivatives and derivation rules |
| **10** | Derivatives of Trigonometric, Exponential functions |
| **11** | Derivatives of Logarithmic and Hyperbolic functions |
| **12** | L'Hospital's rule, geometric meaning of derivative |
| **13** | Maximum-minimum problems |
| **14** | Drawing curve |
| **15** | Solving problems |
| **16,17** | Final exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 4 | 2 | 8 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 4 | 3 | 12 |
|  | **Total workload** | | **92** |
| **Total workload / 30** | | **3,06** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Laboratory Technique | 251511014 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| I | 1 | 2 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To train students who know the safety rules to be followed in the laboratory in general and the precautions to be taken in order to work safely in the laboratory, to recognize the general laboratory materials and tools-equipment used in the laboratory, to know and apply the techniques of analysis pre-processing. |
| **Short Course Content** | It covers working discipline and safety in the laboratory, basic tools and equipment used in the laboratory, as well as the principles of utilizing the devices, the method of preparing the solutions to be used in the analysis and calculations and analysis pre-processes. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learns the safety rules that should be followed in general in the laboratory | 1 | 1, 5, 6 | A, B, K |
| **2** | Knows the necessary precautions to be taken in order to work safely in the laboratory. | 1 | 1, 5, 6 | A, B, I, K |
| **3** | Learn about the materials and tools used in laboratories. | 1, 5 | 1, 6, 7 | A, B, C, I, K |
| **4** | Have knowledge about the devices used in laboratories. | 1, 5 | 1, 6, 7 | A, B, C, I, K |
| **5** | Learns about the pre-treatments used in analyses. | 1, 2, 6 | 1, 6, 12 | A, B, I, K |
| **6** | Can make weighing, measurement, calculation and prepare  solutions. | 1, 2, 6 | 1, 6, 11 | A, B, I, K |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Akbulut, N. ve Karagözlü, C., 2000. Laboratuvar Tekniği. Ege Üniversitesi Ziraat Fakültesi Ofset Basımevi, Bornova, İzmir. |
| **Supporting References** | Telefoncu, A., Salnikow, J., Zihnioğlu, F. ve Kılınç, A., 2000. Biyokimyada Temel ve  Modern Teknikler. Biyokimya Lisansüstü Yaz Okulu. Kuşadası, Türkiye.  Üren, A., 1989. Laboratuar Tekniği. Ege Üniversitesi Ege Meslek Yüksekokulu Yayınları no:4. Bornova.  Saygılı,H.,1995. Fitobakteriyoloji. Doğruluk Matbaası, İzmir, 203 p.  Temiz, A.,1996. Genel Mikrobiyoloji Uygulama Teknikleri. Hatipoğlu Yayınevi, Ankara, 274p. |
| **Necessary Course Material** | Computer, projection, basic laboratory tools and equipment. |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Biosafety in the laboratory |
| **2** | Laboratory working rules |
| **3** | First aid |
| **4** | Materials used in the laboratory -1 (glass materials) |
| **5** | Materials used in the laboratory -2 (auxiliary materials) |
| **6** | Properties of chemical substances |
| **7** | Equipment used in the laboratory |
| **8** | Mid-Term Exam |
| **9** | Equipment used in the laboratory |
| **10** | Solution preparation and calculation |
| **11** | Solution preparation and calculation |
| **12** | Solution preparation and calculation |
| **13** | Sampling, homogenization |
| **14** | Separation and purification |
| **15** | Practice Exam |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam | 3 | 0,25 | 0,75 |
| Studying for Quiz Exam | 3 | 0,5 | 1,5 |
| Oral exam | 1 | 1 | 1 |
| Studying for Oral Exam | 1 | 1 | 1 |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 25 | 25 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 2 | 2 |
|  | **Total workload** | | **89,25** |
| **Total workload / 30** | | **2,975** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Quiz | 15 |
| Experimental Skill | 25 |
| **Final Exam** | 30 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Turkish Language I | 251511015 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| I | 2 | 0 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To show the richness of Turkish by informing students about the development and current situation of Turkish, to gain a national language awareness, to ensure that they can speak and write Turkish correctly. To compare Turkish language with major languages in the world. To compare the language policies of major languages with the language policy of  Turkish language. To give speech training. |
| **Short Course Content** | Definition and properties of language; languages of the world and the place of Turkish among the world languages; historical development of Turkish language and the development of Western Turkish; Atatürk's studies and views on Turkish language; phonetics; spelling rules and punctuation; language policies. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | The student explains the language families of the world and  the place of Turkish among the world languages. | 9 | 1, 5 | A, K |
| **2** | Defines the rules of Turkish. | 9 | 1 | A, K |
| **3** | Recognizes sound events. | 9 | 1 | A, K |
| **4** | Applies spelling rules. | 9 | 1 | A, K |
| **5** | Compose written and oral compositions. | 6, 9 | 1 | A, K |
| **6** | Uses Turkish correctly. | 6, 9 | 1 | A, K |
| **7** | |  |  |  |
| **8** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Türk Dili I-II, ed. Ferruh Ağca, Eskişehir Osmangazi Üniversitesi Yayınları, 2022**.** |
| **Supporting References** | Üniversiteler İçin Türk Dili, Bayrak Yayınları, İstanbul, 1997 |
| **Necessary Course Material** | Projection, Board |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Definition of Language |
| **2** | Language-Nationality-Culture Relationship |
| **3** | World Languages and Turkish Language |
| **4** | Age of Turkish Language |
| **5** | Historical Development of Turkish Language |
| **6** | Alphabets Used in Turkish Writing |
| **7** | Writing Revolution |
| **8** | Mid-Term Exam |
| **9** | Phonetics of Turkish Language |
| **10** | Phonetics of Turkish Language |
| **11** | Morphology of Turkish Language |
| **12** | Morphology of Turkish Language |
| **13** | Word Groups |
| **14** | Word Groups |
| **15** | Word Groups |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 3 | 2 | 6 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 5 | 2 | 10 |
|  | **Total workload** | | **60** |
| **Total workload / 30** | | **2** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Atatürk’s Pr. & The History of Rev. I | 251511009 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| I | 2 | 0 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Students can understand the Liberation War under the leadership of Atatürk and the foundation of the young Turkish Republic. In addition to that the students will learn the processes of the liberation war and the conditions before the foundation of the Republic. |
| **Short Course Content** | The description of the revolution; the history of the Ottoman Empire up to the beginning of the Great War; Great War; The Treaty of Mudros; The Life of Mustafa Kemal Pasha; Civil Organizations for the liberation; Mustafa Kemal’s arrival to Samsun; Congresses; National Oath and the Opening of Turkish Grand National Assembly; Liberation War till the Battle  of Sakarya; Büyük Taarruz |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | STUDENTS,  understand the main concepts of the course like reform,  revolution | 9 | 1 | A, K |
| **2** | learn the short history of the Ottoman Empire up to the Great War | 9 | 1 | A, K |
| **3** | understand the join of the Ottoman Empire to the Great War and the fronts in which the Ottoman Empire fought | 9 | 1 | A, K |
| **4** | learn the fronts on which the Ottoman Empire fought in World War I. | 9 | 1 | A, K |
| **5** | learn the Treaty of Mudros and the invasion of the Ottoman lands | 9 | 1 | A, K |
| **6** | understand the life of Mustafa Kemal Pasha (Atatürk) | 9 | 1 | A, K |
| **7** | learn Mustafa Kemal’s arrival to Samsun and the beginning of the Liberation War | 9 | 1 | A, K |
| **8** | understand the opening of Turkish Grand National Assembly and the foundation of national army | 9 | 1 | A, K |
| **9** | learn the victories of Kütahya-Eskişehir Taarruz | 9 | 1 | A, K |
| **10** | learn the victories of Sakarya and Büyük Taarruz | 9 | 1 | A, K |

|  |  |
| --- | --- |
| **Main Textbook** | Turan Şerafettin, *Türk Devrim Tarihi, C.I-II*, İstanbul, 1991–1995 |
| **Supporting References** | Ateş, Toktamış, *Türk Devrim Tarihi*, İstanbul: Der Yayınları, 2001.  Aybars, Ergün, *Türkiye Cumhuriyeti Tarihi*, İzmir: Ercan Kitabevi, 2000. Eroğlu, Hamza, *Türk İnkılap Tarihi*, Ankara: Savaş Yayınları, 1990.  Kongar, Emre, *Devrim Tarihi ve Toplumbilim Açısından Atatürk*, İstanbul: Remzi Kitabevi, 1999.  Selek, Sebahattin, *Anadolu İhtilali,* İstanbul: Kastaç Yayınları, 1987. Timur, Taner, *Türk Devrimi ve Sonrası,* Ankara: İmge Kitabevi, 1997. |
| **Necessary Course Material** | Projection, Maps, Photographs, Statistical Tables, Graphics |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | The teaching of the concepts of Revolution, Evolution, Uprising etc. |
| **2** | The attempts for the modernisation of the Ottoman Empire and the political thoughts |
| **3** | The Wars of Trablusgarp and the Balkans |
| **4** | The Beginning of the Great War and the join of the Ottoman Empire |
| **5** | The fronts in which the Ottoman Empire fought |
| **6** | The end of the war and the partition of the Ottoman |
| **7** | The Treaty of Mudros and the invasion of the Ottoman lands |
| **8** | Mid-Term Exam |
| **9** | The trip of Mustafa Kemal to Samsun and the beginning National Struggle |
| **10** | National Oath and the opening of Turkish Grand National Assembly |
| **11** | National Assembly and the direction of liberation war |
| **12** | National Forces and the foundation of the national army |
| **13** | First and Second Victories of İnönü; The battles of Kütahya-Eskişehir |
| **14** | The Battle of Sakarya |
| **15** | Great Attack of 30th August |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 3 | 2 | 6 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 5 | 2 | 10 |
|  | **Total workload** | | **60** |
| **Total workload / 30** | | **2** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| English I | 251511016 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| I | 3 | 0 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| English | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Students at this level can understand sentences and frequently-used expressions related to areas of most immediate relevance (e.g. very basic personal and family information, shopping, local geography, employment).  Students can understand clear, slow, standard speech related to areas of most immediate personal relevance (e.g. very basic personal and family information, shopping, local geography and employment) and can catch the main point in short, clear, simple messages and announcements.  Students are able to read and understand short, simple texts containing high frequency vocabulary and shared international expressions.  Students can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar topics and activities.  They can write short, simple notes and messages relating to matters in areas of immediate need, linking a series of simple phrases and sentences with simple connectors like ‘and' , ‘but' and ‘because'. |
| **Short Course Content** | The aim of the course is to teach students basic grammar rules in elementary level, give them speaking, writing, reading and listening knowledge of English. It consists of content and activities aimed at having students acquire Beginner Level English language skills according to evaluation and reference system of The Common European Framework. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | The student becomes familiar with basic grammar rules in  English. | 9 | 1, 5, 11 | A |
| **2** | Analyzes English dialogues. | 7, 9 | 1, 4, 5, 11 | A |
| **3** | Understands and explains an English text at the level. | 6, 7, 9 | 1, 4, 5, 11 | A |
| **4** | Communicates in written and spoken English. | 6, 7, 9 | 1, 4, 5, 11 | A |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Warwick L., Williams D. (2020). Roadmap A2 Students' Book & Workbook. Pearson Education Limited. |
| **Supporting References** | Murphy, R. (2004). English Grammar in Use, Cambridge University Press. |
| **Necessary Course Material** | Computer, Webcam, Speakers; or Smart phone |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | 1A: verb be - positive and negative - countries and nationalities contractions with be introduce yourself - write  an online message using capital letters and full stops. |
| **2** | 1B: questions with *be* question words intonation in questions ask and answer questions - understand a simple  conversation understanding question words. |
| **3** | 1C: *this, that, these* and those everyday objects - *this*, *these* talk about things for sale - understand adverts identifying specific information.  1D: tell the time. |
| **4** | 2A: possessive adjectives and possessive '*s* family members possessive *'s* describe your family - understand a conversation about family - and, too and but.  2B: *whose* and possessive pronouns - everyday objects 2 - possessive pronouns say who things belong to - understand online posts - understanding the important words. |
| **5** | *2C: have got -* adjectives describing objects *have*/*has* describe objects English in action buy things in a shop buy things in a shop - write a review of a product using and, but and so.  2D: buy things in a shop. |
| **6** | 3A present simple with *I, you, we* and *they;* adverbs of frequency and time expressions - free-time activities -  talk about free-time Activities - write an online profile - using commas and apostrophes. |
| **7** | 3B present simple with *he, she* and *it -* everyday activities - present simple with *he, she* and *it-* describe daily routines - understand a factual text - using headings to find information. |
| **8** | Mid-Term Exam |
| **9** | 3C present simple questions free-time activities 2 *do*/*does* ask about free-time activities - understand short talks - understanding key words.  3D buy tickets. |
| **10** | 4A there is/are - places in a city - linking - talk about your city - write a description - using word order correctly.  4B articles - things in a home - the - describe your home - understand social media posts - guessing new words. |
| **11** | 4C need + noun, need + infinitive with to - equipment - weak forms - discuss what to take on a trip - understand a short radio programme - understanding weak forms.  4D ask for information. |
| **12** | 5A position of adjectives - appearance - tonic stress on adjectives - describe people's appearance - write a  description of a person - using paragraphs. |
| **13** | 5B was/were - adjectives to describe experiences - weak forms of was/were - describe an experience -  understand a story - linking between words. |
| **14** | 5C can/can't for ability - skills - can/can't - describe your skills - understand information in a brochure - understanding it, they and them.  5D make and respond to requests. |
| **15** | 5C can/can't for ability - skills - can/can't - describe your skills - understand information in a brochure - understanding it, they and them.  5D make and respond to requests. |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework | 1 | 2 | 2 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 4 | 4 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 6 | 6 |
|  | **Total workload** | | **72** |
| **Total workload / 30** | | **2,4** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Homework |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| History of Agriculture and Deontology | 251512001 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| II | 2 | 0 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 2 |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Agricultural activities starting from the formation of humanity on Earth until today. Information on ethical behavior of individuals and society. Definition of agricultural engineering, scope, related legislation and professional organizations, the concept of ethics, professional ethics and agricultural ethical rules. |
| **Short Course Content** | Agricultural activities starting from the formation of humanity on Earth until today. Information on ethical behavior of individuals and society. Definition of agricultural engineering, scope, related legislation and professional organizations, the concept of ethics, professional ethics and agricultural ethical rules. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Have knowledge about the emergence and development of  agriculture | 1 | 1, 2, 5 | A, K |
| **2** | Learns the phases of agricultural history | 1 | 1, 2, 5 | A, K |
| **3** | Have knowledge about the effects of important historical  events on agriculture | 1 | 1, 2, 5 | A, K |
| **4** | Understands the relationship between agricultural morality and new agricultural technologies | 1, 9 | 1, 2, 5 | A, K |
| **5** | Understands the importance of agricultural ethics in terms of scientific research | 1, 9 | 1, 2, 5 | A, K |
| **6** | Gains knowledge of professional ethical rules and gains awareness of responsibility | 1, 9, 11 | 1, 2, 5 | A, K |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | -Lecture notes that prepared by Ece Turhan (unpublished)  -Eriş, A., 2002. Tarım Deontolojisi, U.Ü. Ziraat Fak. Ders Notları, No:88, Bursa. |
| **Supporting References** | Direk, M., 2010. Tarım Tarihi ve Deontolojisi, Eğitim Kitabevi, 160 s.  Özçelik, A., 2005. Tarım Tarihi ve Deontolojisi, A.Ü. Ziraat Fak. Eğitim, Araştırma ve Güçlendirme Vakfı Yayınları No:8, Ankara. |
| **Necessary Course Material** | Computer, projection. |

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| **Course Schedule** | |
| **1** | Definition of agriculture, stages in history of agriculture (primitive agriculture) |
| **2** | Stages of agricultural history (Turkish agriculture in Central Asia, Chinese agriculture, Mesopotamian  agriculture, Egyptian agriculture) |
| **3** | Stages of agricultural history(Anatolian agriculture, agriculture in the Seljuks, agriculture in the Ottoman  Empire) |
| **4** | Agriculture in our recent history, the effects of industrial revolution on agriculture |
| **5** | The World Economic Crisis 1929-1930 and its effects on Turkish Agriculture |
| **6** | Agriculture sector in the Republican period in Turkey |
| **7** | Agricultural Education in Turkey |
| **8** | Mid-Term Exam |
| **9** | Definitions and Concepts (Related to Deontology) |
| **10** | History of Morality and Social Approaches |
| **11** | Professional Ethics and General Ethical Rules |
| **12** | Important Issues Interacting with Agricultural Ethics |
| **13** | Different Dimensions of Agricultural Ethics |
| **14** | Duties and Responsibilities in terms of Agricultural Ethics |
| **15** | Legal Regulations, Unethical Behavior and Consequences |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 0,5 | 7 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 6 | 6 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 8 | 8 |
|  | **Toplam iş yükü** | | **51** |
| **Toplam iş yükü / 30** | | **1,7** |
| **Dersin AKTS Kredisi** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 50 |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Biochemistry | 251512004 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| II | 2 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 3 |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | Yok |
| **Objectives of the Course** | The objective of this course to recognize the molecular basis of living systems and evaluation on biological processes occurring in the living systems. |
| **Short Course Content** | Introduction to biochemistry, biomolecules and cell structure, water and properties of aqueous solutions, proteins, enzymes, carbohydrates, lipids, nucleic acids, vitamins, carbohydrate metabolism, lipid metabolism, metabolism of the nitrogen compounds. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Recognizing of the macromolecules in living system. | 1 | 1, 2, 5 | A |
| **2** | Interpreting of the life in molecular level. | 1, 8 | 1, 2, 5 | A |
| **3** | Recognizing and evaluating of the components of living system. | 1 | 1, 2, 5 | A |
| **4** | Interpreting of the dynamic interaction of molecules in living  system. | 1, 8 | 1, 2, 5 | A |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Nelson, D.L., Cox, M.M., (2004) Lehninger Principles of Biochemistry. 3rd Edition, Worth Publishers, Wisconsin, USA. |
| **Supporting References** | Keha, E.E. and Küfrevioğlu, İ. (2004). Biyokimya, 3rd Edition, Aktif Yayınevi, Erzurum, Turkey.  Timbrell, J., (2000) Principles of Biochemical |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to biochemistry, biomolecules and cell structure. |
| **2** | Water and properties of aqueous solutions. |
| **3** | Amino acids, peptides, proteins. |
| **4** | Amino acids, peptides, proteins. |
| **5** | Enzymes |
| **6** | Enzymes |
| **7** | Carbohydrates |
| **8** | Mid-term Exams |
| **9** | Lipids |
| **10** | Nucleic acids |
| **11** | Vitamins |
| **12** | Carbohydrate metabolism |
| **13** | Carbohydrate metabolism |
| **14** | Lipid metabolism |
| **15** | Metabolsim of the nitrogen compounds |
| **16,17** | Final Exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 3 | 42 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 4 | 4 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **86** |
| **Total workload / 30** | | **2,86** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Technical Drawing | 251512017 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| II | 1 | 2 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 3 |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | This course aims to give the Information to make projections of surfaces and geometrical shapes using technical drawing equipment |
| **Short Course Content** | Fundamentals of AutoCad, projections of surfaces and geometrical shapes, AutoCad commands |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learns the principles of technical drawing software | 1, 4 | 1, 6, 11 | A, B, K |
| **2** | Uses AutoCad commands | 1, 4 | 1, 6, 11 | A, B, K |
| **3** | Learns to make projections of surfaces and geometrical  shapes | 1, 4 | 1, 6, 11 | A, B, K |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Muammer Nalbant, 2007. AutoCAD 2007 ile Çizim ve Tasarım. Alfa Yayınları, ISBN:975- 297-809-6, İstanbul, 964s |
| **Supporting References** | Mehmet Şamil DEMİRYÜREK, 2011. AutoCAD 2012 & AutoLISP, KODLAB Yayıncılık, ISBN:978-605-4205-59-2, İstanbul, 488s. |
| **Necessary Course Material** | Computer, AutoCad software |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Basic concepts in CAD |
| **2** | Autocad Commands (Draw) |
| **3** | Autocad Commands ( Modify: Move, Copy, Scale, Rotate, Mirror) |
| **4** | Autocad Commands (Array, Stretch, Lenghten, Edit Polyline, Explode, Offset) |
| **5** | Layer |
| **6** | Plane surfaces (Basic and advanced) |
| **7** | Isometric perspective drawing |
| **8** | Mid-Term Exam |
| **9** | Isometric perspective drawing-continued |
| **10** | Block Command |
| **11** | Hatch commad and Section |
| **12** | Dimension Commands |
| **13** | Constitution of template |
| **14** | Manufacturing drawings and print settings |
| **15** | Manufacturing drawings and print settings |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 1 | 14 |
| Experimental skill | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam | 1 | 1 | 1 |
| Studying for Quiz Exam | 1 | 1 | 1 |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 3 | 2 | 6 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 5 | 2 | 10 |
|  | **Total workload** | | **90** |
| **Total workload / 30** | | **3** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Experimental Skill | 10 |
| Quiz | 10 |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Statistic | 251512018 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| II | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 3 |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Its goal is to help students understand key statistical principles utilized in agriculture by providing appropriate examples. |
| **Short Course Content** | Definition of statistics and general concepts, types of data, intermittent and continuous data, summary of data, descriptive statistics, central tendency measures and calculation, exchange measures and calculation, concepts of correlation and regression and calculation, classical distributions, normal distribution, Binomial distribution, Poisson distribution and their properties, sampling distributions and related hypothesis controls, one-sided and two-sided hypothesis controls, Type I error probability, hypothesis testing for the difference between two independent group averages, comparison of two dependent groups, hypothesis testing for ratios, hypothesis testing for correlation coefficient, chi-square analysis, control and  calculation of independence in single and two way directional tables. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Planning experiments | 1, 2, 3, 4 | 1, 2, 5, 11 | A, K |
| **2** | Understanding of measurement and data collection methods | 1, 2, 3, 4 | 1, 2, 5, 11 | A, K |
| **3** | Conducting suitable statistical analysis of data and evaluating outcomes | 1, 2, 3, 4, 5 | 1, 2, 5, 11 | A, K |
| **4** | The ability to apply basic statistical techniques and approaches. | 1, 2, 3, 4, 5, 7 | 1, 2, 5, 11 | A, K |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |

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| **Main Textbook** | İsmail KESKİN, Ensar BAŞPINAR, Yasin ALTAY, Nazire MİKAİL (2023). Biyometri  (RStudio Uygulamalı), NEU Press, Konya.  Zahide KOCABAŞ, M. Muhip ÖZKAN ve Ensar BAŞPINAR (2013). Temel Biyometri, Ankara Üniversitesi, Ziraat Fakültesi, Yayın No: 1606, Ders Kitabi: 558.  Orhan DÜZGÜNEŞ, Tahsin KESİCİ ve Fikret GÜRBÜZ (1993). İstatistik Metotları (2. Baskı), Ankara Üniversitesi, Ziraat Fakültesi yayınları: 1291, Ders Kitabı: 369.  Tahsin KESİCİ, Zahide Kocabaş, (2007). Biyoistatistik. Ankara Üniversitesi Eczacılık Fakültesi Yayın, (94), 369.  Mehmet MENDEŞ (2013). Uygulamalı Bilimler için İstatistik ve Araştırma Yöntemleri (3. Baskı), İstanbul, Kriter Yayıncılık  Handan ANKARALI, Şengül CANGÜR, Mehmet Ali SUNGUR (2015). Formülsüz İstatistik, Betim Yayıncılık  Jerrold H. ZAR (2010). Biostatistical Analysis Fifth Edition. Prentice-Hall, Inc., Englewood Cliffs, New Jersey  Miroslav KAPS, William R. LAMBERSON, (2017). Biostatistics for Animal Science. Cabi. |
| **Supporting References** | Fikret GÜRBÜZ; Ensar BAŞPINAR, M. Muhip ÖZKAN, Mehmet MENDEŞ, Sıdık KESKİN ve Handan ÇAMDEVİREN (2000). İstatistik Metotları Dersi Uygulama Kılavuzu, Ankara Üniversitesi, Ziraat Fakültesi, Eğitim, Araştırma ve Geliştirme Vakfı Yayınları No:7 |
| **Necessary Course Material** | Laptop, Calculator, Usb Memory |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | General information about the course, collection of data, summarization, frequency distribution charts,  graphics |
| **2** | Introductory statistics, measures of central tendency, properties of arithmetic mean, place of median value preferred to arithmetic mean and application via statistical package programs. |
| **3** | Relationships between central tendency measures and the frequency distribution table and application via  statistical package programs |
| **4** | Calculation and interpretation of change measures and application via statistical package programs |
| **5** | Calculation and interpretation of change measures from the frequency distribution table and application via  statistical package programs |
| **6** | Calculation and interpretation of Pearson Correlation and Linear Regression coefficient and application via  statistical package programs |
| **7** | Linear Regression Equation and Relations between Correlation and Regression Coefficient and application  via statistical package programs |
| **8** | Mid-Term Exam |
| **9** | Classical populations and distributions, normal and standard normal distribution and application via statistical  package programs |
| **10** | Binomial distribution, Poisson distribution, calculation and interpretation of probability and application via  statistical package programs |
| **11** | Sampling distributions, averages, the difference between the averages and the sampling distribution of the  ratios and application via statistical package programs |
| **12** | Hypothesis control, Two and one sided hypothesis controls and application via statistical package programs |
| **13** | Midterm, Intermediate Difference and Odds Hypothesis Controls (Coefficient t-test for control of Z or t) and  application via statistical package programs |
| **14** | Calculation and interpretation of confidence bounds and confidence bounds for difference between averages  and averages the difference between the averages and application via statistical package programs |
| **15** | Chi-Squared Distribution, Independence check in single and double directional tables and application via  statistical package programs |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 4 | 1 | 4 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 30 | 30 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 40 | 40 |
|  | **Total workload** | | **104** |
| **Total workload / 30** | | **3,46** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Microbiology | 251512019 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| II | 2 | 2 | 4 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 4 |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To teach the diversity of microorganisms and their beneficial or harmful effects on the environment and organisms.  To convey the importance of the roles of microorganisms in soil, water, and air, and to teach their applications in agricultural biotechnology.  To provide a foundation for courses in Microbial Biotechnology and Industrial Biotechnology to be taken in upper semesters. |
| **Short Course Content** | This course focuses on the general principles of microbiology. Topics include the historical development of microbiology, the classification of microorganisms, factors affecting microbial growth, the control of microbial growth, microbial metabolism, microbial ecology, and the roles of microorganisms in food and agriculture. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Explains the historical development of microbiology | 1 | 1, 5 | A, K |
| **2** | Classifies microorganisms and describes microbial diversity | 1 | 1, 3, 5 | A, I, K |
| **3** | Explains the structure, function, and reproduction of  microorganisms | 1 | 1, 3, 5 | A, I, K |
| **4** | Describes common methods used to control microbial  growth | 1, 8 | 1, 2, 3, 5 | A, I, K |
| **5** | Defines viruses and subviral entities | 1 | 1, 5 | A, K |
| **6** | Explains the roles of microorganisms in human health and  agriculture | 1, 8 | 1, 2, 5, 13 | A K |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Brock Biology of Microorganisms (2018) Pearson. ISBN-10: 1292235101 ISBN-13: 978-1292235103 |
| **Supporting References** | S. Özçelik. (2009) Genel Mikrobiyoloji, Süleyman Demirel Üniversitesi, Isparta. Demirbağ Z. (2006). Genel Mikrobiyoloji, Trabzon. |
| **Necessary Course Material** | Computer and projection |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Definition of Microbiology and its Importance in Agricultural Biotechnology |
| **2** | History of Microbiology and Modern Microbiology |
| **3** | Characteristics, Diversity, and Ecology of Microorganisms |
| **4** | Structure and Function of Microorganisms |
| **5** | Microbial Cultures |
| **6** | Microbial Reproduction and Life Cycles |
| **7** | Microbial Life |
| **8** | Mid-Term Exam |
| **9** | Environmental Factors Affecting Microbial Reproduction |
| **10** | Control of Microbial Growth |
| **11** | Microbial Metabolism |
| **12** | Viruses |
| **13** | Subviral Entities, Viroids, Prions |
| **14** | Microbial Symbiosis |
| **15** | Microbial Interactions in Humans |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework | 13 | 2 | 26 |
| Quiz Exam | 1 | 1 | 1 |
| Studying for Quiz Exam | 1 | 3 | 3 |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 6 | 6 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **118** |
| **Total workload / 30** | | **3,93** |
| **Course ECTS Credit** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Quiz | 20 |
| Experimental Skill | 10 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 40 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Career Planning | 251512014 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| II | 1 | 0 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | It is aimed to create awareness among university students about the dynamics and expectations of business life and to guide students to determine their careers in accordance with their intelligence, personality, knowledge, skills, abilities and competencies. |
| **Short Course Content** | It is a course designed to create career awareness in students and support them in their career journey. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Students internalize the concepts of career and career  planning within the scope of Career Planning course | 1, 5, 6, 8, 10 | 1, 2, 5, 13, 14 | A, D, J, K |
| **2** | Learn how to benefit from career centers | 1, 5, 6, 8, 10 | 1, 2, 5, 13, 14 | A, D, J, K |
| **3** | Become aware of their personal qualities; recognize the different sectors where they can do internships, volunteer or work professionally and use the talent gate that they can benefit from both as an undergraduate student and as a  graduate and thus improve themselves | 1, 5, 6, 8, 10 | 1, 2, 5, 13, 14 | A, D, J, K |
| **4** | Learn the points to be considered in CV and job interview issues | 1, 5, 6, 8, 10 | 1, 2, 5, 13, 14 | A, D, J, K |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Kariyer Planlama ve Geliştirme, Kemal ÖZTEMEL, Pegem Akademi Yayıncılık |
| **Supporting References** | <https://www.yetenekkapisi.org/login> |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction |
| **2** | Basic concepts of career |
| **3** | National and international exchange programs |
| **4** | Basic communication skills |
| **5** | Sector days - Civil society organizations |
| **6** | Soft-skills |
| **7** | Sector days-Public sector |
| **8** | Mid-Term Exam |
| **9** | Diction and body language |
| **10** | CV and cover letter preparation |
| **11** | Sector days - Private sector |
| **12** | Effective interview techniques |
| **13** | Sector days - Academy |
| **14** | Sector days - Entrepreneurship |
| **15** | Course evaluation and project details |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 1 | 14 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) | 1 | 4 | 4 |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 8 | 1 | 8 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 12 | 1 | 12 |
|  | **Total workload** | | **55** |
| **Total workload / 30** | | **1,83** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 25 |
| Project Observation | 15 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Engineering Mechanics | 251512020 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| II | 3 | 0 | 4 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  | 4 |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Needed in the design or control of complex building systems; To develop and apply advanced theories in order to analyze the stress, strain and deformation of deformable objects under the loads they are exposed to |
| **Short Course Content** | Defining Engineering Mechanics, Defining Rigid Body Mechanics and its basic principles, Examining the balance of forces acting on a material point and calculating the resultant of these forces, Examination of equivalent force systems acting on rigid bodies,  Investigation of the stability of rigid bodies under static loads, definition of support types and calculation of support responses, Definition of center of gravity, calculation of center of gravity of two-dimensional rigid bodies and distributed loads, Examination of load-bearing systems, calculation of internal forces in plane truss system elements and joint forces in frames, Calculation of internal forces in frame members and cables, Defining the concept of  friction, examining the balance of rigid bodies under the influence of static loads and friction force |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Calculating the resultant of static forces | 1, 2, 5 | 1, 2, 10 | A, K |
| **2** | Establishing the balance equations under static forces,  calculating the unknowns in the equation | 1, 2, 4, 5 | 5, 10 | A, K |
| **3** | Calculating the reaction forces on the supports of rigid bodies  using the balance principles under static forces | 1, 2, 4, 5 | 5, 10 | A, K |
| **4** | Calculating the axial forces on the truss system elements and  the joint forces on the frames using the balance principles under static forces | 2, 7 | 5, 10 | A, K |
| **5** | Calculate internal forces in simple and continuous beams under static loads, draw related bending moment, shear force  and axial force diagrams, | 2, 6, 7 | 5, 10 | A, K |
| **6** | Establish equilibrium equations for rigid bodies under the  influence of static forces and friction force, and calculate the unknowns in the equation | 3, 6 | 5, 10 | A, K |
| **7** | |  |  |  |
| **8** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Vector Mechanics for Engineers; Statics and Dynamics (10. baskı) Yazarlar: BEER, JOHNSTON, MAZUREK, CORNWELL |
| **Supporting References** | Preuveneers, D., & Ilie-Zudor, E., (2017), “The intelligent industry of the future: A survey  on emerging trends, research challenges and opportunities in Industry 4.0”, Journal of Ambient Intelligence and Smart Environments, 9(3):287-298 |
| **Necessary Course**  **Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to Engineering Mechanics |
| **2** | Statics of the Material Point |
| **3** | Application |
| **4** | Rigid Bodies: Equivalent Force Systems |
| **5** | Equilibrium of Rigid Bodies |
| **6** | I. Midterm Exam |
| **7** | Distributed Forces: Center of Gravity, Analysis of Structures |
| **8** | Distributed Forces: Center of Gravity, Analysis of Structures |
| **9** | Distributed Forces: Center of Gravity, Analysis of Structures |
| **10** | Analysis of Structures |
| **11** | In Beams and Cables |
| **12** | Friction |
| **13** | Friction |
| **14** | Friction |
| **15** | Semester final exam |
| **16** | Introduction to Engineering Mechanics |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 4 | 56 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 15 | 15 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **111** |
| **Total workload / 30** | | **3,7** |
| **Course ECTS Credit** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Turkish Language II | 251512021 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| II | 2 | 0 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To show the richness of Turkish by informing students about the development and current situation of Turkish, to gain a national language awareness, to ensure that they can speak and write Turkish correctly. To compare Turkish language with major languages in the world. To compare the language policies of major languages with the language policy of  Turkish language. To give speech training |
| **Short Course Content** | Definition and properties of language; languages of the world and the place of Turkish among the world languages; historical development of Turkish language and the development of Western Turkish; Atatürk's studies and views on Turkish language; phonetics; spelling rules and punctuation; language policies. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | The student explains the language families of the world and  the place of Turkish among the world languages. | 9 | 1, 5 | A, K |
| **2** | Defines the rules of Turkish. | 7, 9 | 1 | A, K |
| **3** | Recognizes sound events. | 9 | 1 | A, K |
| **4** | Applies spelling rules. | 9 | 1 | A, K |
| **5** | Compose written and oral compositions. | 6, 7, 9 | 1 | A, K |
| **6** | Uses Turkish correctly. | 6, 7, 9 | 1 | A, K |
| **7** | |  |  |  |
| **8** | |  |  |  |

|  |  |
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| **Main Textbook** | Türk Dili I-II, ed. Ferruh Ağca, Eskişehir Osmangazi Üniversitesi Yayınları, 2022**.** |
| **Supporting References** | Üniversiteler İçin Türk Dili, Bayrak Yayınları, İstanbul, 1997. |
| **Necessary Course Material** | Projector, Board |

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| --- | --- |
| **Course Schedule** | |
| **1** | Elements of a Sentence |
| **2** | Elements of a Sentence |
| **3** | Sentence Types |
| **4** | Sentence Types |
| **5** | Punctuation Marks |
| **6** | Punctuation Marks |
| **7** | Punctuation Marks |
| **8** | Mid-Term Exam |
| **9** | Written Expression |
| **10** | Written Expression |
| **11** | Oral Expression |
| **12** | Oral Expression |
| **13** | Spelling Rules |
| **14** | Spelling Rules |
| **15** | Expression Disorders |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 4 | 4 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **72** |
| **Total workload / 30** | | **2,4** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Atatürk’s Pr. &The History of Rev. II | 251512009 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| II | 2 | 0 | 2 |

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| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The Students can understand; the victory at the Liberation War; The Treaty of Lausanne which paved the way for the foundation of the republic; The Principles and the Revolutions of Atatürk. Then the course will also provide the students to understand democracy and modern concepts |
| **Short Course Content** | The Armistice of Mudanya, The abolition of the dynasty, The Treaty of Lausanne, the foundation of the Republic, the abolution of Caliphate, the Constitution of 1924, the attempts for the multi-party system, the uprising of Şeyh Sait, the changing of alphabet, university reform, the revolutions of Atatürk towards all sides of life, interior and exterior politics of  Atatürk, the principles of Atatürk, the developments in Turkey and world after the death of Atatürk |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Students,  learn the Armistice of Mudanya and the Treaty of Lausanne | 9 | 1 | A,K |
| **2** | understand the abolition of dynasty and the Caliphate;  foundation of the republic | 9 | 1 | A,K |
| **3** | learn the attempts for multi-party system during Atatürk’s era | 9 | 1 | A,K |
| **4** | see the revolutions on education and law which dedicate to create a secular and modern social structure | 9 | 1 | A,K |
| **5** | learn the revolutions related with socio-economic life | 9 | 1 | A,K |
| **6** | understand the foreign policy of Atatürk | 9 | 1 | A,K |
| **7** | learn the principles of Atatürk | 9 | 1 | A,K |
| **8** | learn the integral principles of the Ataturkist thought system | 9 | 1 | A,K |
| **9** | learn about the internal and external developments during the Ismet Inonu period. | 9 | 1 | A,K |
| **10** | be familiar the rise of the Democrat Party to power and the internal and external developments in the 1950s and 1960s | 9 | 1 | A,K |

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| **Main Textbook** | Gazi Mustafa Kemal Atatürk, Nutuk (Söylev), C. I-II, TTK., Ankara, 1986. |
| **Supporting References** | Fatma Acun (ed.), Atatürk ve Türk İnkılâp Tarihi, Ankara, 2010.  Niyazi Berkes, Türkiye’de Çağdaşlaşma, İstanbul, 1978.  Enver Ziya Karal, Atatürk ve Devrim (Konferanslar ve Makaleler), TTK., Ankara, 1980. Enver Ziya Karal, Atatürk’ten Düşünceler, MEB. Yay., Ankara, 1981.  Bernard Lewis, Modern Türkiye’nin Doğuşu, Çev.M.Kıratlı, TTK., Ankara, 1970. Ahmet Mumcu, Tarih Açısından Türk Devriminin Temelleri ve Gelişimi, Ankara, 1976. |
| **Necessary Course**  **Material** | Projector, Maps, Photographs, Statistical Tables, Graphics. |

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| **Course Schedule** | |
| **1** | The Armistice of Mudanya; the abolition of dynasty and the Peace Treaty of Lausanne |
| **2** | The Foundation of the Republic and the abolition of the Caliphate |
| **3** | The Attempts for multi-party system; Assassination of İzmir and the movement in Menemen |
| **4** | The Revolutions on Law System: The constitutions of New Turkish State |
| **5** | The Revolutions on Law System: The acceptence of Civil Code and the regulations fort he woman rights |
| **6** | The Revolutions on Education and Cultural Life: The unity of education, the acceptance of new letters, the  reforms on language, history and the other fields |
| **7** | The Revolutions for Economic Life: The abolition of aşar, reforms on agriculture and industry, etatism |
| **8** | Mid-Term Exam |
| **9** | The Changes on Social Life: the closing of tekkes and zawiyahs, the law of having surname, weekend  holiday |
| **10** | The Foreign Policy of Atatürk: The problems of Etabli and Mosul, relations with foreign states |
| **11** | The Foreign Policy of Atatürk: membership to the United Nations, the Balkan Agreement, Montreux  Convention, The Pact of Sadabad |
| **12** | The Principles of Atatürk: Republicanism, Secularism, Revolutionism, Nationalism, Populism, Etatism |
| **13** | The Supplementary Principles of Atatürk |
| **14** | The Interior and exterior developments during the period of İsmet İnönü |
| **15** | The Period of Democratic Party |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 4 | 4 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **72** |
| **Total workload / 30** | | **2,4** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| English II | 251512022 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| II | 3 | 0 | 2 |

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| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| English | Undergraduate | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Students can communicate in simple and routine tasks requiring a simple and direct exchange of information on familiar and routine matters. They can describe in simple terms aspects of their background, immediate environment and matters in areas of immediate need. Students can understand standard speech related to areas of most immediate personal relevance (e.g. personal and family information, shopping, local geography and employment) and can catch the main point in simple messages and announcements.  Students can read and find specific, predictable information in simple everyday material such as advertisements, prospectuses and timetables.  Students can handle very short social exchanges, even though they cannot usually keep the conversation going of their own accord.  They can write relating to matters in areas of immediate need, linking a series of phrases and sentences with connectors. |
| **Short Course Content** | The aim of the course is to teach students basic grammar rules in elementary level, give them speaking, writing, reading and listening knowledge of English. It consists of content and activities aimed at having students acquire Elementary Level English language skills according to evaluation and reference system of The Common European Framework. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | The student becomes familiar with basic grammar rules in  English. | 9 | 1, 5, 11 | A |
| **2** | Analyzes English dialogues. | 7, 9 | 1, 4, 5, 11 | A |
| **3** | Understands and explains an English text at the level. | 6, 7, 9 | 1, 4, 5, 11 | A |
| **4** | Communicates in written and spoken English. | 6, 7, 9 | 1, 4, 5, 11 | A |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Warwick L., Williams D. (2020). Roadmap A2 Students' Book & Workbook. Pearson Education Limited. |
| **Supporting References** | Murphy, R. (2004). English Grammar in Use, Cambridge University Press. |
| **Necessary Course Material** | Computer, Webcam, Speakers; or Smart phone |

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| **Course Schedule** | |
| **1** | 6A past simple (regular verbs) - prepositions - describe an event - understand reviews - understanding adjectives  6B past simple (irregular verbs) - describe a good weekend - understand a narrative - understanding the order of events |
| **2** | 6C past simple (questions) - verbs + prepositions - did you? - ask and answer questions - write a short story - using subject pronouns  6D give and accept an apology |
| **3** | 7A countable and uncountable nouns; some, any, lots of and a lot of - food and drink - vowel sounds; connected  speech - describe food shopping items - understand announcements - listening for special information |
| **4** | 7B how much/how many? + quantifiers - food containers - sentence stress - create a dish - write a social  media post - giving opinions and reasons |
| **5** | 7C comparative adjectives - describing places to eat - compare places to eat - follow instructions - understanding instructions  7D order in a cafe |
| **6** | 8A present continuous - geography -ing - describe a travel experience - write a guide - using adjectives  8B present simple and present continuous - weather - contractions - describe the weather - understand a news report - understanding connected speech |
| **7** | 8C superlative adjectives - phrases describing travel - compare places, activities and transport - understand a short article - understanding paragraph topics  8D make a phone call |
| **8** | Mid-Term Exam |
| **9** | 9A should/shouldn't - health - give advice - understand a short talk - dealing with unknown words |
| **10** | 9B be going to - future plans - discuss your goals for the future - write an informal email - organising an  email to a friend |
| **11** | 9C would like/want - activities with go - tonic stress; weak forms - describe what you want to do - understand a blog post - understanding because and so  9D make arrangements and invitations |
| **12** | 10A verb patterns - housework - sentence stress - interview people - write a personal profile - expressing  likes and dislikes |
| **13** | 10B have to/don't have to - clothes - word stress; have to - play a guessing game - understand an opinion  article - identifying opinions |
| **14** | 10C present perfect simple - technology - contractions - talk about past experiences - understand an interview  - understanding time expressions 10D give a compliment |
| **15** | 10C present perfect simple - technology - contractions - talk about past experiences - understand an interview  - understanding time expressions 10D give a compliment |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework | 1 | 2 | 2 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 4 | 4 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 6 | 6 |
|  | **Total workload** | | **72** |
| **Total workload / 30** | | **2,4** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Homework |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Analytical Chemistry | 251513027 |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| III | 2 | 2 | 5 |

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| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 5 |  |  |  |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | No. |
| **Objectives of the Course** | The course aims to teach the basic concepts of Analytical Chemistry, theoretical and practical knowledge, and calculations about chemical analysis to the student. |
| **Short Course Content** | Definition of analytical chemistry, classification of chemical analysis methods, Aqueous solution chemistry, Solutions and concentration units, Ionic balances, Application of equilibrium Solubility calculations, Separations by precipitation, Gravimetric analysis, Acids-bases, Buffer solutions and pH calculations |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Basic terms related to analytical chemistry can be learned | 1,2,5,8 | 1, 5, 10 | A |
| **2** | Students can gain analytical thinking and problem-solving skills | 1,2,4,7 | 1, 5, 10 | A |
| **3** | Solution preparation and concentration units can be learned | 2,4 | 1, 5, 10 | A |
| **4** | The concept of pH, what acid-base solutions are, the  definitions of strong acids and bases can be learned and pH can be calculated. | 1, 2, 5, 8 | 1, 5, 10 | A |
| **5** | It can be learned what buffer solutions are and how to calculate the pH of buffer solutions | 1, 2, 5, 8 | 1, 5, 10 | A |
| **6** | Can learn what solubility is and what factors affect solubility. | 1, 2, 5, 8 | 1, 5, 10 | A |
| **7** | Ability to make theoretical and practical applications of analysis methods commonly used in industry and research  can be gained. | 1,2 | 1, 5, 10 | A |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | D.A. Skoog, D.M. West, F.J. Holler, (2002) Analitik Kimya Temelleri, (Çev.Edit. E Kılıç,  H. Yılmaz) Bilim Yayıncılık, 8. Baskı. |
| **Supporting References** | 1. Harris, D.C. (2015) Nicel Kimyasal Analiz, Çev.Editörü: Ali Rehber Türker, Palme   Yayıncılık.   1. Gündüz T. (2003) Kantitatif Analiz Ders Kitabı, Gazi Kitabevi, 7. Baskı |
| **Necessary Course Material** | Board, projector |

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| --- | --- | --- |
| **Course Schedule** | | |
| **1** | Introduction: Definition of analytical chemistry, Chemical analysis | Introduction and content of the application |
| **2** | Statistical evaluation of analytical data | Determination of report writing rules and groups |
| **3** | Solutions and concentration units | Systematic analysis of 1st group cations |
| **4** | Solutions and concentration units | Systematic analysis of 2nd group anions |
| **5** | Calculation of particle concentrations in aqueous solutions | Preparation of 0.1 M HCl solution |
| **6** | Interactions between particles in aqueous solutions, activity | Preparation of 0.1 M NaOH solution |
| **7** | Solubility of poorly soluble salts, factors affecting solubility | NaOH determination by HCl solution |
| **8** | Mid-term exam |  |
| **9** | Separations with precipitation | Bringing the crucibles to constant weighing |
| **10** | Gravimetric analysis | Gravimetric iron determination |
| **11** | The pH concept, Acid-base solutions | Gravimetric lead determination |
| **12** | Strong acids and bases and pH calculation | Determination of acetic acid with NaOH solution |
| **13** | Weak acids and bases and pH calculation | Determination of boric acid with NaOH |
| **14** | Hydrolysis and salts and pH calculation | Compensation Week |
| **15** | Buffer solutions and pH calculation | Compensation Week |
| **16, 17** | Yarıyıl sonu sınavları |  |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Experimental Skill |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) | 12 | 2 | 24 |
| Project (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 12 | 12 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 12 | 12 |
|  | **Total workload** | | **136** |
| **Total workload / 30** | | **4,5** |
| **Course ECTS Credit** | | **5** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz | 10 |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Genetics | 251513011 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| III | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 3 |  |  |  |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To have basic knowledge about genetics, inheritance and variation and to understand the principles of inheritance genetics. |
| **Short Course Content** | Genetics, inheritance, variation, hybridization, Mendel's rules of inheritance, chromosome theory of inheritance, cell division, linkage and crossing over, sex-linked inheritance, population genetics, structure of DNA and chromosomes, replication and transcription of DNA, genetic code and protein synthesis, properties of genetic code, mutations. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Explain the concepts of gene, chromosome and inheritance. | 1, 2, 4, 8 | 1, 2, 5 | A |
| **2** | Understand Mendelian genetics, describe the concept of allele and the interaction between genes. | 1, 2, 4, 8 | 1, 2, 5 | A |
| **3** | Explain the structure of genetic material. | 1, 2, 4, 8 | 1, 2, 5 | A |
| **4** | Define mutations. | 1, 2, 4, 8 | 1, 2, 5 | A |
| **5** | Learn deviations from Mendel's rules and solve problems  related to the subject. | 1, 2, 4, 8 | 1, 2, 5, 10 | A |
| **6** | Solve problems related to population genetics. | 1, 2, 4, 8 | 1, 2, 5, 10 | A |
| **7** | Solve problems related to gene linkage maps. | 1, 2, 4, 8 | 1, 2, 10 | A |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | [S Yüce,](https://www.nobelkitap.com/arama?q=S%C3%BCer%2BY%C3%BCce) [G Bilgen,](https://www.nobelkitap.com/arama?q=%2BG%C3%BCldehen%2BBilgen) [İ Demir,](https://www.nobelkitap.com/arama?q=%2B%C4%B0brahim%2BDemir)2010, Genetik, [Nobel Akademik Yayıncılık](https://www.nobelkitap.com/yayinevleri/nobel-akademik-yayincilik-2165.html)  Genetik Kavramlar, 11th Edition, 2015. By William S. Klug, Michael R. Cummings, Charlotte A. Spencer, Michael A. Palladino |
| **Supporting References** | - |
| **Necessary Course Material** | Computer, projection |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Genetics, inheritance, variation, cross-breeding |
| **2** | Mendelian inheritance rules |
| **3** | Chromosomes |
| **4** | Cell division |
| **5** | Allele and gene interactions |
| **6** | Linkage and crossing over |
| **7** | Sex-linked inheritance |
| **8** | Mid-Term Exam |
| **9** | Quantitative genetics Genetic code and protein synthesis |
| **10** | Population genetics |
| **11** | Concept of genome, molecular structure of DNA, structure of chromosomes |
| **12** | Replication of DNA |
| **13** | Transcription of DNA |
| **14** | Genetic code and protein synthesis |
| **15** | Mutations |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
|  |  |  |  |
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|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 20 | 20 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **86** |
| **Total workload / 30** | | **2,87** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Animal Physiology | 251513028 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| III | 3 | 0 | 4 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 4 |  |  |  |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Provide basic informationabout the physiologyof animals. All the anabolic and catabolic events that occur in animals, and growth and development inmotionthe eventsthat have occurred with the realization disclosure. |
| **Short Course Content** | For the understanding ofthe functions ofliving organisms body cells, tissues and organ systems, structures and working mechanisms. Animal bone, muscle and joint science,digestive, respiratory, nervous, circulatory and excretorysystems,structures and functioning, cell physiology, reproductive, physiology of the nervous and hormones. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Recognition of species ascreaturesof structural and functional coupling. | 1,2 | 1,2,4 | A,B,K |
| **2** | Recognizing the cells, tissues, organs and organ systems that make up living things and understanding their functions. | 4,8 | 1,2,5 | A,B,K |
| **3** | Biological processes of organisms exposed to physical, chemical and mathematical basis evaluation. | 9,10 | 1,2,5 | A,B,K |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Ö Bozdogan, 2010. Fizyoloji, Nobel Akademik Yayıncılık. Ankara. |
| **Supporting References** | -Gelir, E., Koz, M. ve Ersöz, G. 2011. Fizyoloji Ders Kitabı. 3. Basım. Nobel Akademik Yayıncılık. Ankara.  - Silverthorn, D.U. 2010. Human Physiology: An Integrated Approach. Fifth Edition. Pearson International Edition. San Francisco. |
| **Necessary Course Material** | Computer, projector. |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Animal Cell physiology, tissues and organ systems, Homeostase |
| **2** | Metabolism |
| **3** | Digestive System Physiology |
| **4** | Respiration System Physiology |
| **5** | Circulatory System Physiology |
| **6** | Nervous System Physiology |
| **7** | Animal bone System Physiology |
| **8** | Mid-Term Exam |
| **9** | Muscle Physiology |
| **10** | Joint Physiology |
| **11** | Excretory System Physiology |
| **12** | Endocrine System Physiology |
| **13** | Endocrine System Physiology |
| **14** | Sense organs |
| **15** | Sense organs |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam | 2 | 2 | 4 |
| Studying for Quiz Exam | 10 | 2 | 20 |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 16 | 1 | 16 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 16 | 1 | 16 |
|  | **Total workload** | | **114** |
| **Total workload / 30** | | **3.8** |
| **Course ECTS Credit** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz | 10 |
| Quiz | 10 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 40 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Basic Information Technologies | 251513029 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| III | 2 | 0 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 2 |  |  |  |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Main objective of the course is to inform basic Information systems and technologies, and introduce usage areas in education to the students. |
| **Short Course Content** | Hardware of computer, functions of hardware units, Windows XP, Microsoft Word, Microsoft Excel, Data, formatting cells, page operations, functions, mathematical process, preparing Powerpoint presentation, general knowledge on internet will be discussed |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To know Information technologies | 6, 7, 8, 10 | 1, 6, 11, 12, 13 | A, D, K |
| **2** | To comprehend place of computer in Information  technologies | 6, 7, 8, 10 | 1, 6, 11, 12, 13 | A, D, K |
| **3** | To understand working principles of computer hardwares | 6, 7, 8, 10 | 1, 6, 11, 12, 13 | A, D, K |
| **4** | To be able to use Windows operating system | 6, 7, 8, 10 | 1, 6, 11, 12, 13 | A, D, K |
| **5** | To be able to use Microsoft Word program | 6, 7, 8, 10 | 1, 6, 11, 12, 13 | A, D, K |
| **6** | To be able to use Microsoft Excel program | 6, 7, 8, 10 | 1, 6, 11, 12, 13 | A, D, K |

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| --- | --- |
| **Main Textbook** | Bal, Hasan Ç., "Bilgisayar ve İnternet Kullanımı", 11. Basım, Akademisyen Yayınevi,  2002  Halvorson, M and Young, J.M., “Microsoft Office 97 ile çalışmak”, Arkadaş Yayınevi, 1999 Borland, R., “Microsoft Word 97 ile çalışmak”, Arkadaş Yayınevi, 1997 |
| **Supporting References** | Dodge, M.,Kinita, C. and Stinson ,C., “Microsoft Excel 97 ile çalışmak”, Arkadaş Yayınevi,  1997  Güneş, A., Erkan, K., Koyuncu, B., Meder, M., Sağıroğlu, Ş., Yıldırım, M. ve Yıldız, F.,  “Temel Bilgi Teknolojisi Kullanımı”, Pegem A Yayıncılık, 2003 |
| **Necessary Course Material** | Informatics laboratory, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Hardware of computer, functions of hardware units |
| **2** | Windows XP, symbols in Windows desktop, Windows communication boxes, taskbar, general Windows  operations, file and folder operatins |
| **3** | Windows XP, start menu, Windows passenger, care of computer and other operations, backup |
| **4** | Safety of data and viruses, potential threats for data and precautions, how to keep backup, cleaning viruses |
| **5** | Microsoft Word, file operations, text operations, page view, adding file, object and picture/wordart, |
| **6** | Microsoft Word, working on tables, working on drawings, page layout, sending the text to more than one  person, equation organizing |
| **7** | Microsoft Word, printouts from a file, important points of Word program, adjustments and clues |
| **8** | Mid-Term Exam |
| **9** | To recognise Microsoft Excel working sheet and cells, create formula, moving between cells, choosing cells |
| **10** | Data, forming cells, page operations, functions |
| **11** | Mathematical process and create formula, comparison functions, logical functions |
| **12** | Text functions, trigonometric functions, creating graphic |
| **13** | Preparing Powerpoint presentation |
| **14** | Preparing Powerpoint presentation |
| **15** | Information on internet, connection to internet, making search in internet, internet concepts |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework | 1 | 1 | 1 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 2 | 2 | 4 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 3 | 3 | 9 |
|  | **Total workload** | | **73** |
| **Total workload / 30** | | **2,43** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 25 |
| Homework | 15 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Materials Science | 251513030 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| III | 3 | 0 | 4 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  | 4 |  |  |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

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| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To introduce the materials used in engineering applications, to teach the basic concepts of materials science, to introduce the internal structures of materials, to explain the structure- property relations of the materials, to define the relationships between property- composition-mechanical properties. |
| **Short Course Content** | Classification of engineering materials according to their different properties. Atomic structure, atomic bonds. Arrangements of atoms, crystalline and amorphous structures. Lattice systems, crystal defects, allotropy and diffusion phenomena in metallic materials. Melting and solidification. Mechanical properties of materials, effects of elastic and plastic deformation on atomic and macro scale, dislocation movements, strength increasing mechanisms. Polymer, ceramic, composite materials and their properties. Biomaterials.  Importance of course content information in material selection and examples. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Recognize engineering materials with the help of basic  concepts of materials science. | 6, 9 | 1, 7 | A, K |
| **2** | Gains the knowledge of relating the structure, properties and  performance of engineering materials. | 1, 6, 9 | 1, 7, 11 | A, K |
| **3** | Gains knowledge of interpreting preferences related to the  properties of metal and non-metal materials. | 6, 9 | 1, 2, 11 | A, K |
| **4** | It improves the perspective of building properties by  recognizing traditional and high-tech materials. | 6, 9 | 1, 7, 11 | A, K |
| **5** | Gains the experience of adapting theoretically learned  material knowledge to engineering problems. | 1, 6, 9 | 1, 5, 10, 11, 12 | A, K |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |

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| --- | --- |
| **Main Textbook** | W.D. Callister, D.G. Rethwishch, Materials Science and Engineering-An Introduction, John Wiley &Sons, Inc. 2010 |
| **Supporting References** | D.R. Askeland, P.P. Fulay, W.J. Wright, The Science and Engineering of Materials, Cengage Learning, 2011. |
| **Necessary Course Material** | Computer, Projection |

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| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to Materials Science and Engineering. Historical background of materials. Identification,  classification and sampling of engineering materials with their properties. |
| **2** | Atom, the electronic structure of the atom. |
| **3** | Interatomic bonds, bond forces and energies in solids. Ionic bond, covalent bond, metallic bond, van der Waals  bonds, hydrogen bond. Atomic bonds-property relationships. |
| **4** | Layout differences of atoms. Amorphous and crystalline structures. Atomic order in metals, crystal structure,  unit lattice, Bravais lattice systems, lattice parameter, coordination number, atomic packing factor. |
| **5** | Miller indices, linear, planar and volumetric densities, problems. |
| **6** | Crystaline imperfections. Point defects, line defects (dislocations), surface defects, volumetric defects. |
| **7** | Dislocation motions, slip planes, directions and slip systems. Lattice-strain characteristics. |
| **8** | Mid-Term Exam |
| **9** | Allotropy. Diffusion phenomena, steady and unsteady state diffusions, problem solutions related to  diffusion. |
| **10** | Interstitial sites, octahedral and tetrahedral sites and formations in lattice systems. Ionic crystals, NaCl and  CsCl structures |
| **11** | General examination of mechanical properties of materials. Tensile test, ductile-brittle behavior,  compression, notch-impact, fatigue, creep, hardness (Brinell, Vickers, Rockwell) tests. |
| **12** | Strengthening treatments applied to materials. Plastic deformation in single crystal and polycrystalline  materials. Grain size reduction, cold working, solid solution formation, precipitation strengthening. |
| **13** | Nonmetallic materials; Polymer materials. |
| **14** | Ceramic materials, composite materials, nano materials. |
| **15** | Biomaterials |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 20 | 20 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **114** |
| **Total workload / 30** | | **3,8** |
| **Course ECTS Credit** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGYDEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Horticulture | 251513007 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| III | 2 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | It is an introductory course in which students will be given a general introduction to Horticulture and students will be able to recognize all horticultural crop groups.  This course, which will be taught in the first semester of the Horticulture program, will enable students to adapt to the department. |
| **Short Course Content** | Definition of horticultural crops, their history, their place in the national economy, general introduction and classification of fruit, vegetable, vineyard and ornamental plants in horticultural crops, their nutrient contents and economic importance, ecological requirements of horticultural crops, important physiological characteristics will be  explained, important propagation methods will be mentioned. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Recognize the important horticultural crops grown in the  world and in Turkey. | 1, 2 | 1, 2, 5, 6 | A |
| **2** | Have knowledge about the place and importance of  horticultural crops in the national economy. | 2, 3, 4 | 1, 2, 5, 6 | A |
| **3** | To have knowledge about ecological requirements,  Biological characteristics, physiology, propagation, conservation and marketing of horticultural plants. | 3, 4, 9, 10 | 1, 2, 5, 6 | A |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| **Main Textbook** | Genel Bahçe Bitkileri, Y.Sabit Ağaoğlu, Hasan Çelik, Menşure Çelik, Yılmaz Fidan,  Yücel Gülşen, Atila Günay, Nilgün Halloran, İlhami Köksal, Ruhsar Yanmaz, Ankara Üniversitesi Ziraat Fakültesi Eğitim, *Araştırma ve Geliştirme Vakfı Yayınları No:4,* 1995. |
| **Supporting References** | Bahçe Bitkileri, Atilla Eriş, Vedat Şeniz, *Uludağ Üniversitesi Ziraat Fakültesi Yayınları,*  No:28, Bursa, 1997.  Meyve Yetiştirme İlkeleri, Arif Soylu, Uludağ Üniversitesi Ziraat Fakültesi, *Ders Notları No: 20,* Bursa, 1992. |
| **Necessary Course**  **Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Importance of horticulture and covered area in the country |
| **2** | Economical and raw material importance of horticultural crops and nutritional facts |
| **3** | Ecological factors of horticultural crops |
| **4** | Biological principals of horticulture |
| **5** | Physiological principals of horticulture |
| **6** | Generative propagation and grafting |
| **7** | Stool propagation, cutting and layering |
| **8** | Mid-Term Exam |
| **9** | In vitro culture in horticulture |
| **10** | Cultural practices and soil cultivation in horticulture |
| **11** | Pruning and training |
| **12** | Fertilization and irrigation |
| **13** | Pest and disease maintenance |
| **14** | Maturity and harvest in horticulture |
| **15** | Storage of horticultural crops |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
|  |  |  |  |
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|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 20 | 20 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **86** |
| **Total workload / 30** | | **2,87** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Field Crops | 251513008 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| III | 2 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | By explaining to basic principles and general situation of field crops, in terms of identifying and growing techniques of these species give generally Information about cereals, edible grain legumes, industrial crops, forage crops , medicinal and aromatic plants |
| **Short Course Content** | Cereals and edible legumes, industrial crops and forage crops will be given general Information. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | About cultivation of field crops give information. | 1, 3, 9 | 1, 5 | A, K |
| **2** | By learning field crops problems can take part in their  projects. | 1, 3, 9 | 1, 5, 7, 10 | A, K |
| **3** | Applications in field crops may be environmentally  conscious individuals. | 9, 11 | 1, 7 | A, K |
| **4** | By learning important morphological characteristics of field  crops species may make the diagnosis. | 1, 9 | 1, 7 | A, K |
| **5** | Field crops can be suggested to according of purpose | 1, 9 | 1, 5, 7 | A, K |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Geçit H.H., Çiftçi C.Y., Emeklier Y., İkincikarakaya S., Adak M.S., Kolsarıcı Ö., Ekiz H., Altınok S., Sancak C., Sevimay C.S., Kendir H. 2009. Tarla Bitkileri.Ankara Üniv. Ziraat  Fak. Yayın No.1569, 540, Ankara. |
| **Supporting References** | Kün E. 1996. Tahıllar I (Serin iklim tahılları). Ankara Üniv. Ziraat Fak. Yayın No. 1451, 322, Ankara.  Kün E. 1985. Sıcak iklim tahılları. Ankara Üniv. Ziraat Fak. Yayın No. 953, 287, Ankara.  Er C. ve Uranbey S. 1998. Nişasta ve Şeker Bitkileri. Ankara Üniv. Ziraat Fak. Yayın No. 1504, 334, Ankara.  Sağlamtimur T., Tansı V. ve Baytekin H. 1998. Yem bitkileri yetiştirme. Çukurova Üniv.  Ziraat Fak. Yayın No. C-74, 237, ADANA. |
| **Necessary Course**  **Material** | - |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Arable farming (Tillage, planting, maintenance, etc.) |
| **2** | Plant Breeding |
| **3** | Cool Season Cereals |
| **4** | Temperate Cereals |
| **5** | Edible grain legumes |
| **6** | Fiber and rubber plants |
| **7** | Oil Seed Crops |
| **8** | Mid-Term Exam |
| **9** | Stimulants Plants |
| **10** | Medicinal plants |
| **11** | Starch and Sugar Plants |
| **12** | Graminous Forage Crops |
| **13** | Forage Legumes |
| **14** | Turf Grasses Cultivation |
| **15** | Meadow-Range Management and Improvement |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 3 | 42 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 20 | 20 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **86** |
| **Total workload / 30** | | **2,87** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Agricultural Structures and Irrigation | 251513031 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| III | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To teach the basic concepts of agricultural irrigation and to ensure that this information is used in agricultural production. |
| **Short Course Content** | Soil-plant water relations, plant water consumption, irrigation efficiency, irrigation scheduling, irrigation methods, irrigation-plant nutrition relations |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learns about the elements that make up the soil | 1, 2, 3 | 1 | A |
| **2** | Learns about the soil water holding capacity | 1, 4, 8 | 1 | A |
| **3** | Understands irrigation efficiency | 1, 8 | 1 | A |
| **4** | Learns the measurement methods of plant water consumption | 1, 8 | 1 | A |
| **5** | Learns about irrigation methods | 1, 2, 3 | 1 | A |
| **6** | Gains ability to plan irrigation in fields | 1, 2, 3 | 1 | A |
| **7** | Gains ability to calculate energy costs in irrigation | 1, 2, 3 | 1 | A |
| **8** | Learns the relationships between irrigation and plant  nutrition | 1, 2, 3 | 1 | A |

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| --- | --- |
| **Main Textbook** | Güngör, Y., Erözel, Z., Yıldırım, O. Sulama, Ankara Üniversitesi Ziraat Fakültesi Yayın No:1540, ders kitabı:493 |
| **Supporting References** | - |
| **Necessary Course Material** | Computer and projector. |

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| **Course Schedule** | |
| **1** | Hydrological cycle and its elements |
| **2** | Soil Plant Water Relations |
| **3** | Soil Plant Water Relations |
| **4** | Plant Water Consumption |
| **5** | Irrigation Efficiency |
| **6** | Plant irrigation Periods |
| **7** | Irrigation Scheduling |
| **8** | Mid-Term Exam |
| **9** | Irrigation Methods (Border Irrigation) |
| **10** | Irrigation Methods (Furrow Irrigation) |
| **11** | Irrigation Methods (Sprinkler Irrigation) |
| **12** | Irrigation Methods (Drip Irrigation) |
| **13** | Irrigation and Plant Nutrition Relationships |
| **14** | Irrigation and Fertilization |
| **15** | Irrigation and Fertilization |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 3 | 42 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 3 | 2 | 6 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 5 | 2 | 10 |
|  | **Total workload** | | **88** |
| **Total workload / 30** | | **2,93** |
| **Course ECTS Credit** | | **3** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Intelligent Agriculture | 251513032 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| III | 3 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 3 |  |  |  |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No. |
| **Objectives of the Course** | The aim of this course is to enable students to comprehend the basic information about Smart agriculture practices, recommend and apply appropriate methods for agricultural production to be realized with the awareness of food safety, traceability and sustainability, while taking care of the environment, human and animal health, protecting natural resources. |
| **Short Course Content** | Food Safety, Traceability, Sustainability, Regulations, Certification, EUREP-GAP, Intelligent Agricultural Practices in terms of Industrial Agriculture,. İntellegent agriculture Application Advice and Examples |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Comprehend the basic information about smart agricultural  practices. | 1,2,3 | 1 | A,K |
| **2** | Understand what smart farming practices are | 1,2,3 | 1 | A,K |
| **3** | Recommend smart farming practices, | 3,4,5,8,10 | 1 | A,K |
| **4** | Realize of smart agriculture applications | 2,3,4,5,10 | 1 | A,K |
| **5** | Prepare reports or projects on the subject and evaluate them | 2,3,5,6 | 1,14 | A,J,K |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| **Main Textbook** | Preuveneers, D., & Ilie-Zudor, E., (2017), “The intelligent industry of the future: A survey  on emerging trends, research challenges and opportunities in Industry 4.0”, Journal of Ambient Intelligence and Smart Environments, 9(3):287-298 |
| **Supporting References** | - |
| **Necessary Course Material** | Computer, Projection |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Definition, importance and scope of intelligent farming practices |
| **2** | Legal regulations and basic principles regarding intellegent agriculture practices |
| **3** | Food safety, sustainability and traceability concepts |
| **4** | Certification and protocols that manufacturers must comply with |
| **5** | İntellegent agriculture applications in terms of industrial agriculture |
| **6** | İntellegent agriculture applications in terms of industrial agriculture |
| **7** | İntellegent agriculture applications in terms of industrial agriculture |
| **8** | Mid-Term Exam |
| **9** | İntellegent agriculture applications in terms of industrial agriculture |
| **10** | İntellegent agriculture applications in terms of industrial agriculture |
| **11** | İntellegent farming practices recommendations |
| **12** | İntellegent farming practices recommendations |
| **13** | Examples of intellegent farming practices |
| **14** | Past, present, future of certification bodies |
| **15** | Benefits of good agricultural practices to producers, retailers and consumers |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
|  |  |  |  |
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|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **102** |
| **Total workload / 30** | | **3,4** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
|  |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Geographic Information Systems | 251513033 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| III | 3 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 3 |  |  |  |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | It is the carrying out of studies on any feature of the earth in a computer environment.. |
| **Short Course Content** | It can be defined as a method with its own methodology that includes the collection, storage and analysis of information on the characteristics and relationships of the natural environment at each scale. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Presenting the processes that include the collection, storage, processing and reporting of applicable results of data on soil  properties in the Geographic Information Systems (GIS) database as a systematic information sharing. | 1,5 | 1,5 | A,K |
| **2** | Teaching the contribution of GIS to agricultural research. | 1,2,5 | 1 | A,K |
| **3** | Dissemination of GIS and remote sensing techniques. | 5,8 | 1,11 | A,K |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| **Main Textbook** | Coğrafi Bilgi Sistemlerinin Temel Esasları, İstanbul Üniversitesi Edebiyat fakültesi Coğrafya Bölümü, İstanbul, 2000 |
| **Supporting References** | - |
| **Necessary Course Material** | Computer, Projection |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Processing and interpretation of images of soil properties into GIS database. |
| **2** | Processing and interpretation of images of soil properties into GIS database. |
| **3** | Points to be considered when interpreting important soil characteristics with GIS. |
| **4** | The role of soil physical and morphological properties in mapping soils. |
| **5** | Reflection characteristics of soils spread over the earth's surface and the vegetation cover that grows on them and their interpretation in images. |
| **6** | Fundamentals of Remote Sensing |
| **7** | Vector and Raster data |
| **8** | Mid-Term Exam |
| **9** | Geographical appearance of lands |
| **10** | Reflection characteristics of geographical objects |
| **11** | Data storage and processing techniques |
| **12** | Evaluation of soil and land concepts in GIS |
| **13** | GIS data processing techniques |
| **14** | The role of soil physical and morphological properties in soil mapping. |
| **15** | The role of soil physical and morphological properties in soil mapping. |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
|  |  |  |  |
|  |  |  |  |
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|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **102** |
| **Total workload / 30** | | **3,4** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
|  |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Introduction to Biotechnology | 251514028 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| IV | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Provide information to students with the basic knowledge in the field of biotechnology. To teach the basic principles and current applications in various industrial fields of biotechnology. To ensure that applications of biotechnology aimed at increasing quality and efficiency in plant and animal breeding and production are learned. |
| **Short Course Content** | Definition of biotechnology and its history, the importance of biotechnology in the world, basic information about plant, animal enzyme and microbial biotechnology. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understand the basic concepts and techniques in biotechnology, including genetic engineering, fermentation,  and cell culture | 1 | 1, 2, 5 | A, K |
| **2** | To learn about applications of biotechnology in fields such  as medicine, agriculture, environmental science | 1, 4, 8 | 1, 2, 5, 8 | A, K |
| **3** | To gain the ability to analyze and evaluate the ethical and  social impacts of biotechnology | 9 | 1, 2, 5 | A, K |
| **4** | To gain critical thinking, problem solving, and scientific  communication skills related to biotechnology | 8 | 1, 2, 5, 8 | A, K |
| **5** | To design basic processes in biotechnology | 1, 5, 3 | 1, 2 | A, K |
| **6** | To gain knowledge about the effects of biotecthnological  applications on biosafety | 11 | 1 | A, K |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Biyoteknolojiye Giriş, Thieman WJ, Palladino MA. 2013. Palme Yayıncılık.  -Her Yönüyle Biyoteknoloji, Editör: Dr.Öğr. Üyesi Mehtap USTA. Ocak 2022, Nobel Akademik Yayıncılık. |
| **Supporting References** | -Biyoteknoloji ve Biyoprotein Üretimi, Kükem Derneği Bilimsel Yayınları No:5,1996.  -Arda, M., Biyoteknoloji (Bazı Temel İlkeler), 3. Baskı, Kükem Derneği Bilimsel Yayılar No:3, Ankara, 1995. |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to biotechnology and historical development |
| **2** | Introduction to genes and genomes |
| **3** | Recombinant DNA technology |
| **4** | Recombinant DNA technology |
| **5** | Cell culture |
| **6** | Microbial biotechnology |
| **7** | Proteins production |
| **8** | Mid-Term Exam |
| **9** | Medicinal biotechnology |
| **10** | Plant biotechnology |
| **11** | Animal biotechnology |
| **12** | Animal biotechnology |
| **13** | Environmental biotechnology |
| **14** | Aquatic biotechnology |
| **15** | Biotechnological regulations, ethics and biotechnology |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
|  |  |  |  |
|  |  |  |  |
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|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **88** |
| **Total workload / 30** | | **2,93** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 50 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Plant Physiology | 251514029 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| IV | 2 | 2 | 5 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 5 |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To provide basic Information about plant physiology. All the anabolic and catabolic events that occur in plants, and growth and development in motion the events that have occurred with the realization disclosure |
| **Short Course Content** | Structure of plant cells, plant-water relationship, the importance of basic plant nutrients in plant physiology, photosynthesis, respiration, growth and some important physiological processes in development, plant resistance to various environmental conditions. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
|  | Understands the importance of physiological events in crop | 1, 2, 3, 6, 7, 8, | 1, 2, 3, 5, 6, 7, | A, B, C, D, E, |
| **1** | cultivation, analyses the physiological problems; develops | 10 | 10, 11, 12, 15 | G, I, K |
|  | solutions |  |  |  |
| **2** | Knows the fundamentals of growth and development of | 1, 2, 3, 4, 6, 7, | 1, 3, 6, 7, 11, | A, B, C, D, E, |
| crops; and transfer to practice. | 8, 10 | 12, 15 | G, I, K |
|  | Knows the effective internal and external factors of growth | 1, 2, 3, 4, 6, 7, | 1, 3, 6, 7, 11, | A, B, C, D, E, |
| **3** | and development; learns the application of control and  management techniques and transfer these techniques to | 8, 10 | 12, 15 | G, I, K |
|  | practice |  |  |  |
| **4** | Controls and manages the unfavorable environmental | 1, 2, 3, 4, 6, 7, | 1, 3, 6, 7, 11, | A, B, C, D, E, |
| conditions in plant cultivation | 8, 10 | 12, 15 | G, I, K |
| **5** | Knows the basic principles of water uptake and water loss in | 1, 3, 4, 6, 7, 10 | 1, 2, 3, 5, 6, 11, | A, B, C, D, E, |
| plants |  | 12, 15 | G, I, K |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| **Main Textbook** | * Bitki Fizyolojisi (B Kacar, A. V Katkat, Ş Öztürk), Nobel Yayınları * Bahçe Bitkileri Fizyolojisi (Atilla Eriş, Uludağ Üniversitesi Ziraat Fakültesi Yayınları). |
| **Supporting References** | - Bitki Fizyolojisi (Taiz&Zeiger, Çeviri Editörü: İsmail Türkan, Palme Yayıncılık).  - Plant Physiology (Salisbury&Ross, Wadsworth Publishing) |
| **Necessary Course Material** | Computer, Projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to Plant Physiology, Subjects and Concepts, The Structureo Plant Cells |
| **2** | Enzymes and their Functions |
| **3** | Relationship Between Water and The Cell |
| **4** | Water Collection and Transport, Water Loss |
| **5** | Plant Nutrient Elements, Collection and Transport of Nutrient Elements |
| **6** | Photosynthesis |
| **7** | Nitrogen and Sulphur Assimilation, Transportation of Photosynthesis Products |
| **8** | Mid-Term Exam |
| **9** | Respiration |
| **10** | Growth, Development, Factors Affecting Growth and Development |
| **11** | Plant Hormons and Their Functions |
| **12** | Growth Movements (Dormancy, germination, spouting and rooting,apical dominancy) |
| **13** | Growth Movements (Flowering, photoperiodicity, sterility and incompatibility, parthenocarpy and apomixes,  flower and fruit drop) |
| **14** | Growth Movements (Maturity,aging, tropisms, vernalisation, thermoperiodism and regeneration) |
| **15** | Stress Physiology |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework | 1 | 4 | 4 |
| Quiz Exam | 2 | 0,25 | 0,5 |
| Studying for Quiz Exam | 1 | 1 | 1 |
| Oral exam | 1 | 1 | 1 |
| Studying for Oral Exam | 1 | 4 | 4 |
| Report (Preparation and presentation time included) | 1 | 4 | 4 |
| Project (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 24 | 24 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 24 | 24 |
|  | **Toplam iş yükü** | | **150,5** |
| **Toplam iş yükü / 30** | | **5,01** |
| **Dersin AKTS Kredisi** | | **5** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 20 |
| Quiz | 10 |
| Presentation | 20 |
| Experimental Skill | 20 |
| **Final Exam** | 30 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Agricultural Law | 251514030 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| IV | 2 | 0 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  |  | 2 |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | This course examines the areas of law which are applicable to agriculture. At the end of this course, students will be able to learn acquisition and transfer of agricultural lands; ownership, tenancy, partnership relations, rights and limitations in the use of agricultural lands, water law, environmental protection, protection of agricultural lands, productivity of agricultural lands, animal welfare, individual, business and public obligations arising from agricultural production, the existence and objectives of legislation on factors of production (natural resources, especially land, labor, capital and the entrepreneur), and learn the duties  and responsibilities they have legally as well as social and ethical values related to agricultural production. |
| **Short Course Content** | General information on Law and Agricultural Law; Historical development of land; Civil law in terms of Agricultural Law (Right in rem; movable-immovable property, possession, land registry, concept of property, acquisition-loss of immovable property, etc.); Law of obligations in terms of agricultural law (crop and ordinary rent, rules on tenancy and partnership); Expropriation, land distribution, land consolidation within the scope of major reform efforts in Turkey. Law of obligations in terms of agricultural law (rules on product and ordinary rent, tenancy and partnership); Expropriation within the scope of major reform efforts in Turkey, land distribution; land consolidation; examples of misuse of agricultural land and preventive legal regulations from the world; Pasture law; Water law; Agricultural  workers and working conditions, organic farming, good agriculture, animal welfare, legislation on environmental issues, European Green Deal. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed**  **PO(s)** | **Teaching**  **Methods \*** | **Measuring**  **Methods \*\*** |
| **1** | To be able to comprehend the problems of agriculture | 8, 9, 11 | 1, 5 | A, K |
| **2** | To be able to understand the legal responsibilities of every  sector working in agriculture | 6, 9, 11 | 1, 5 | A, K |
| **3** | To be able to learn the institutional regulations related to the  sustainability of natural resources | 6, 9, 11 | 1, 5 | A, K |
| **4** | To be able to comprehend the limits of responsibility of  public and legal persons working in the agriculture | 9, 11 | 1, 5 | A, K |
| **5** | To be aware of the duties and responsibilities of real persons  working in agriculture | 9, 11 | 1, 5 | A, K |
| **6** | To be able to learn the actors in the management of the  agricultural sector and to understand their functions | 6, 9, 11 | 1, 5 | A, K |
| **7** | To be able to learn the Turkish Agricultural Law | 9, 11 | 1, 5 | A, K |
| **8** | To be able to learn legal issues arising from agricultural  production and environmental relations | 9, 11 | 1, 5 | A, K |
| **9** | To be able to learn about the European Green Deal | 9, 11 | 1, 5 | A, K |
| **10** | To be able to the Laws Regulating the Working Life of  Agricultural Engineering and Expertise in Agriculture | 9, 11 | 1, 5 | A, K |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Definition, Regulation Area, Subject and Importance of Land Law |
| **2** | Historical Development of Ottoman Land Law |
| **3** | Historical Development of Land Law in the Republican Era |
| **4** | Provisions on Agriculture in the Turkish Constitution and Civil Code |
| **5** | Land and agrarian reform law |
| **6** | Agricultural farms: Types of farms, subsistence, commercial and industrial farms, Special inheritance rules  for agricultural farms |
| **7** | Water Law, Pasture Law, Forest Law, Environmental Law |
| **8** | Mid-Term Exam |
| **9** | Misuse of Agricultural Lands and Evaluation of the Legal Regulations to Prevent This in Terms of  Environmental Policies |
| **10** | Laws on producer organizations in agriculture |
| **11** | Legislation on organic farming, good agricultural practices, animal welfare, production and environmental  relations |
| **12** | Agricultural workers, Social Security in Agriculture |
| **13** | Laws Regulating the Working Life of Agricultural Engineering, Expertise in Agriculture |
| **14** | European Green Deal |
| **15** | The Agriculture Law ((5488/2006) |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 3 | 2 | 6 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 5 | 2 | 10 |
|  | **Total workload** | | **60** |
| **Total workload / 30** | | **2** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Thermodynamics | 251514018 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| IV | 3 | 0 | 4 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  | 4 |  |  |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | This course aims to introduce the basic concepts of thermodynamics and its laws, to explain the properties of pure substances, to introduce the pressure-volume-temperature relations of ideal gases, to give basic information about entropy and heat engines |
| **Short Course Content** | Basic concepts in thermodynamics, reversible-irreversible processes, properties of pure substances, Gibbs’ law, 0th and 1st laws of thermodynamics, PV processes of ideal gases, 2nd law of thermodynamics, entropy, power cycles, properties of steam, steam tables, heat engines, liquid-vapor systems |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learns the basic principles of thermodynamics | 1 | 1 | A |
| **2** | Summarizes the properties of pure substances | 1,8 | 10,11 | A |
| **3** | Interprets about the entropy and heat engines | 1,6 | 10,11 | A |
| **4** | Learns the power cycles | 1,9 | 10,11 | A |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Smith, J.M., Van Ness, H.C. and Abbott, M.M. (2005) Introduction to Chemical  Engineering Thermodynamics. 7th Edition, McGraw-Hill Chemical Engineering Series, Boston. |
| **Supporting References** | Cengel, Y. and Boles, M. (2015) Thermodynamics: An Engineering Approach. 8th Edition, McGraw-Hill. |
| **Necessary Course Material** | - |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to the basic concepts of thermodynamics |
| **2** | Pressure, temperature, work, energy, power, and force |
| **3** | 1st law of thermodynamics, internal energy, enthalpy, energy balance, reversible and irreversible processes |
| **4** | Properties of pure substances, calculations of phase change, Gibbs’ law |
| **5** | Pressure-volume-temperature relations of ideal gases, introduction to processes |
| **6** | İsochoric, isothermal, isobaric, adiabatic and polytropic processes |
| **7** | 2nd law of thermodynamics, Entropy and heat engines |
| **8** | Mid-term Exam |
| **9** | Maxwell equations and their relations |
| **10** | Power cycles |
| **11** | Carnot and Rankine machines |
| **12** | Properties of saturated and superheated steam, applications and problem solving |
| **13** | Steam power cycles, applications and problem |
| **14** | Properties of liquid-vapor systems in equilibrium |
| **15** | Approaches for the estimation of vapor pressure in liquid-vapor systems |
| **16, 17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
|  |  |  |  |
| Quiz Exam | 3 | 4 | 12 |
| Studying for Quiz Exam | 3 | 6 | 18 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 6 | 6 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 12 | 12 |
|  | **Total workload** | | **120** |
| **Total workload / 30** | | **4** |
| **Course ECTS Credit** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz | 10 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Plant Protection | 251514007 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| IV | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The general information about plant diseases and pests will be given. |
| **Short Course Content** | General information about insects and their importance, insect morphology and physiology, reproduction biology, insect ecology, plant diseases, symptoms, abiotic and biotic factors of diseases, and agricultural management techniques will be given. |

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | They will be able to explain the concept of plant disease and  symptoms. | | 1, 9 | 1,2,5 | A |
| **2** | They will be able to find out the relationship between plant  diseases, abiotic and biotic factors. | | 1, 9 | 1,2,5 | A |
| **3** | They will be able to apply knowledge of basic agricultural  pest management. | | 1, 2, 3, 9, 11 | 1,2,5 | A |
| **4** | Students will be able to express what plant pest insects and  diseases. | | 1, 9 | 1,2,5 | A |
| **5** | They will be able to apply knowledge of general entomology such as insect morphology, physiology, reproduction biology | | 1, 2, 3, 9 | 1,2,5 | A |
| and insect ecology. | |  |
| **6** | | |  |  |  |
| **7** | | |  |  |  |
| **8** | | |  |  |  |
| **9** | | |  |  |  |
| **10** | | |  |  |  |

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| --- | --- |
| **Main Textbook** | Tarımsal Savaşım Yöntem ve İlaçları. 1993. Delen, N. Ege Üniversitesi Ziraat Fakültesi Ofset Basımevi, İzmir. |
| **Supporting References** | Agricultural Chemicals. 1991. Thomson, W. T. Book IV-Fungicides, Thomson Puplication,  California.  Agricultural Chemicals. 1991. Thomson, W. T. Book III-Miscellaneous Agricultural Chemicals, Thomson Puplication, California. Agricultural Chemicals. 1991. Thomson, W. T. Book I-Insecticides, Thomson Puplication, California.  The Pesticide Manual. 1995. Tomlin, C. Incorporating the Agrochemicals Handbook, Crop Protection Publication, U.K.  Tarımsal Zararlılarla Savaş Yöntem ve İlaçları. 1993. Öncüer, C. Ege Üniversitesi Basımevi, İzmir.  Tarımda İlaçlı Mücadelenin Temel Prensipleri. 1996. Kaygısız, H. Hasad Yayıncılık LTD. ŞTİ. Rebel Ofset, İstanbul.  Bitki Koruma El Kitabı. 2002. Anonymous. T.C. tarım ve Köyişleri Bakanlığı İzmir İl Müdürlüğü Yayınları No:352. |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to concept of pest control and the methods used in IPM |
| **2** | Cultural precautions using against agricultural pests |
| **3** | Domestic and foreign quarantine precautions used against to pests. |
| **4** | Domestic and foreign quarantine precautions used against to pests |
| **5** | Biotechnique methods used against to pests. |
| **6** | Biological and all control methods used against to pests. |
| **7** | Chemical control used against to pests and properties of pesticide. |
| **8** | |
| **9** | Introduction to concept of disease control and the methods used in IPM |
| **10** | Cultural precautions used against to plant disease |
| **11** | Biologic control methods used against to plant disease |
| **12** | Domestic and foreign quarantine precautions used against to plant disease. |
| **13** | Chemical control methods used against to plant pathogens. |
| **14** | Chemical control methods used against to plant pathogens. |
| **15** | Properties of fungucides used in chemical control |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **90** |
| **Total workload / 30** | | **3** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL TECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Animal Production | 251514031 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| IV | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of the course is to teach the basic concepts of animal production mentioned in the brief content of the course, as well as to know the species and breeds of farm animals, and to teach the basic information necessary to carry out profitable, sustainable animal  husbandry by knowing the tasks such as breeding, feeding, care and herd management in these animals. |
| **Short Course Content** | Definition and scope of agricultural activities; definition and scope of animal production activities; The current situation of Türkiye's animal husbandry; Extensive and intensive agriculture concepts; Terms of constitution, conditioning and acclimatization; The importance of animal breeding and the definition and scope of some terms; Some economically important efficiencies; Commonly produced farm animal species and breeds; Definitions related to cattle, buffalo, sheep, goat, poultry and bee breeding; Feeds and  animal nutrition. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Knows general terms related to animal science | 1,2,4,8 | 1,2,5 | A |
| **2** | Understands the importance of animal husbandry in agriculture | 1,2,4,8 | 1,2,5 | A |
| **3** | Learns the concepts of species and breeds in farm animals and knows the important species and races in Turkey and  the world. | 1,2,4,8 | 1,2,5 | A |
| **4** | Knows the names of farm animal species based on gender  and age. | 1,2,4,8 | 1,2,5 | A |
| **5** | Knows the livestock products | 1,2,4,8 | 1,2,5 | A |
| **6** | Knows the concept of performance in farm animals | 1,2,4,8 | 1,2,5 | A |
| **7** | Understands breeding in animal husbandry at entry level | 1,2,4,8 | 1,2,5 | A |
| **8** | Knows breeding in animal husbandry at entry level | 1,2,4,8 | 1,2,5 | A |
| **9** | Knows feeds and nutrition in animal husbandry at entry level | 1,2,4,8 | 1,2,5 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Genel Hayvan Yetiştirme 2014 (Prof. Dr. Saim Boztepe, Dr. Yusuf Çuhadar, Arş. Gör.  İbrahim Aytekin, Arş. Gör. Selçuk Kaplan, Yrd. Doç. Dr. Ali Karabacak, Prof. Dr. İskender Yıldırım) |
| **Supporting**  **References** | Presentation notes |
| **Necessary Course Material** | Computer, projection |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Definition and scope of Animal Production activities, employment opportunities |
| **2** | The place and importance of animal production in agriculture, important terms related to animal production |
| **3** | Current situation of animal husbandry in Türkiye and the world (statistics), problems of animal husbandry  and solution suggestions |
| **4** | Classification and evaluation of animal products |
| **5** | Extensive and intensive agriculture concepts, advantages and disadvantages, Constitution, conditioning and  acclimatization concepts |
| **6** | Herd management and its importance |
| **7** | Reproduction in farm animals |
| **8** | Mid-Term Exam |
| **9** | Cattle and buffalo breeding in Turkey and the World |
| **10** | Cattle and buffalo breeding in Turkey and the World |
| **11** | Sheep and goat breeding in Turkey and the World |
| **12** | Broiler chicken farming |
| **13** | Egg poultry farming |
| **14** | Feeds and animal nutrition |
| **15** | Feeds and animal nutrition |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **89** |
| **Total workload / 30** | | **2.97** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL TECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Agricultural Economics | 251514032 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| IV | 2 | 0 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To give students the basic Information and basic principles of agricultural economics, to teach the production activities, problems and solutions of agribusiness. |
| **Short Course Content** | Basic principles, theories and concepts of economics and agricultural economics and their implementation on practical life. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Defining agriculture, | 2 | 1, 5 | A, K |
| **2** | Understanding, explaining and evaluating the importance of agriculture and its contribution to the sectors, | 2 | 1, 5 | A, Ö, K, G |
| **3** | Understanding the basic elements of agricultural structure, | 4 | 1, 5, 13 | A, K |
| **4** | To be able to apply the basic principles of economy to agriculture, | 4, 9 | 1, 10 | A, K |
| **5** | Determining the production type and method of the agribusiness, making production and evaluating the product, | 4 | 1, 2, 11 | A, K |
| **6** | Determining product costs and revenues by making business analysis, | 4, 6 | 1, 2, 11 | A, K |
| **7** | Understanding the market system to produce and converting it to income, monitoring market conditions, | 4, 9 | 1, 2, 11 | A, K |
| **8** | Finding the means of providing the necessary finance for production, benefiting from the power of the organization, | 6, 9 | 1, 2, 11, 12 | A, K |
| **9** | Making business decisions taking into account the tools of agricultural policy, | 4, 9, 10 | 1, 2, 11 | A, Ö, K |
| **10** | Monitoring international agricultural relations | 8, 9, 10 | 1, 12 | A, K |

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| **Main Textbook** | **Karagölge, C., 1987. Tarım Ekonomisi, Atatürk Üniversitesi Yayınları;No.642.Ziraat Fakültesi Yayınları;No.290.Ders Kitapları Serisi No.48, Erzurum, 173s.**  Cramer, G.L. and C.W. Jensen, 1988. Agricultural Economics and Agribusiness: John Wiley-Sons, New York. |
| **Supporting References** | Rehber, E., Ekonomi, III.Baskı, Uludag Üniversitesi, Ziraat Fakültesi, Ders Notları No: 21,  Bursa 1995.  Erkuş, A., M. Bülbül, T. Kıral, F. Açıl Ve R. Demirci, 1995. Tarım Ekonomisi, Ankara  Üniversitesi Ziraat Fakültesi, Eğitim, Araştırma ve Geliştirme Vakfı Yayınları No: 5, 298 s., Ankara. |
| **Necessary Course Material** | Projector and computer. |

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| **Course Schedule** | |
| **1** | Definition of agriculture, types of agricultural production, feature |
| **2** | The place and importance of the agricultural sector in the Turkish economy |
| **3** | Principles of agricultural economics |
| **4** | Principles of agricultural economics |
| **5** | Agricultural production factors |
| **6** | Agricultural production economy |
| **7** | Supply and demand characteristics of agricultural products, markets and price formation of agricultural  products |
| **8** | Mid-Term Exam |
| **9** | Characteristics of agricultural holdings in Turkey, classification of agricultural holdings |
| **10** | Agricultural business types |
| **11** | Annual operating results of agribusiness |
| **12** | Creating and developing the financial resources of enterprises, making loan conditions, payment plans |
| **13** | Importance of organization in agriculture, types of organization, cooperatives, |
| **14** | Cost calculation in agricultural products |
| **15** | General Information on agricultural policy, general Information on Turkey-EU relations |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 3 | 2 | 6 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 5 | 2 | 10 |
|  | **Total workload** | | **60** |
| **Total workload / 30** | | **2** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Homework | 10 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Agricultural Machinery | 251514033 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| IV | 2 | 0 | 2 |

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| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To inform students for the following subjects; development of agricultural mechanization; energy and agriculture; engines; tractors; soil tillage tool and machines; sowing; planting; fertilizing and husbandry machines; irrigation machines; crop protection machines; harvesters; machinery in animal production; greenhouse mechanization; farm machinery  management. |
| **Short Course Content** | Basic concepts related to farm machinery, description of the power and work, classification, basic Information about construction properties and working principles. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Description of general concepts related to farm machinery | 8, 9 | 1, 5 | A, K |
| **2** | Explanation of internal combustion engines, soil tillage tools and machinery, sowing; planting; fertilizing and husbandry machines; irrigation machines; crop protection machines;  harvesters | 8, 9 | 1, 5 | A, K |
| **3** | Selects suitable machines for farm enterprises | 8, 9 | 1, 11 | A, K |
| **4** | Make plans in farm enterprises and enables machines to work in convenient times | 8, 9 | 1, 11 | A, K |
| **5** | Has knowledges with usage and adjustments of farm machinery. | 8, 9 | 1, 5, 11 | A, K |
| **6** | Protects farm machines in good conditions and shape | 8, 9 | 1, 11 | A, K |
| **7** | Solves problems related to farm machinery | 8, 9 | 1, 10 | A, K |
| **8** | |  |  |  |
| **9** | |  |  |  |

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| **Main Textbook** | ERDOĞAN, D., 2005. Farm Machiney. Ankara Uni., Ziraat Fakültesi, Yayın No: 1548, Ders Kitabı: 501, Ankara Üniversitesi Basımevi, 142 s., Ankara |
| **Supporting References** | KESKİN, R. ve d. ERDOĞAN, 1984. Tarımsal Mekanizasyon. Ankara Ünv, Ziraat Fak. Yayınları: 927, Yardımcı Ders Kitabı: 262, 325 s., Ankara  -SARAL, A. ve A. ONURBAŞ AVCIOĞLU, 2002 Motorlar ve Traktörler. Ankara Ünv, Ziraat Fak. Yayınları: 1529, Ders Kitabı: 482, 294 s., Ankara. |
| **Necessary Course Material** | Course books, other books with course contents, semposium, etc. Power point presentations, catalogues; farm tools and machineries. |

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| **Course Schedule** | |
| **1** | Machinery in agriculture |
| **2** | Energy and agriculture |
| **3** | Engines |
| **4** | Tractors |
| **5** | Soil tool and machinery |
| **6** | Planting machines |
| **7** | Fertilizing and husbandry machines |
| **8** | Mid-Term Exam |
| **9** | Irrigation machines |
| **10** | Crop protection machines |
| **11** | Harvesting machines |
| **12** | Threshing machines |
| **13** | Barn and poultry mechanization |
| **14** | Greenhouse mechanization |
| **15** | Selection and management of farm machinery |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
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| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 6 | 1 | 6 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 5 | 2 | 10 |
|  | **Total workload** | | **60** |
| **Total workload / 30** | | **2** |
| **Course ECTS Credit** | | **2** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Soil Science | 251514034 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| IV | 2 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of the course is to teach students the classification, nature and origin of parent materials, soil formation and related factors, soil classification, physical, chemical and biological properties of mineral soils and plant nutrients. |
| **Short Course Content** | Soil formation, physical, chemical and biological properties of soil, recognition of plant nutrients |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Define the formation and morphology of the soil, | 2, 6, 9, 11 | 1, 5 | A, K |
| **2** | Learn about the properties of soil, | 2, 6, 9, 11 | 1, 5 | A, K |
| **3** | Gain knowledge of plant nutrients and their benefits to  plants. | 2, 6, 9, 11 | 1, 5 | A, K |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| **Main Textbook** | * Özbek H., Kaya Z., Gök M ve Kaptan H. (1993). Toprak Bilimi**,** Ders Kitabı. No: 16. Çukurova Üniversitesi Ziraat Fakültesi, Adana. * Kacar B ve Katkat V. (2009). Bitki Besleme. Nobel Yayın, No:849. |
| **Supporting References** | * Altınbaş Ü, Çengel M, Uysal H, Okur B, Okur N, Kurucu Y ve Delibacak S, (2008). Toprak Bilimi. Ders Kitabı. No: 557. Ege Üniversitesi Ziraat Fakültesi, İzmir. * Horst Marschner, (1997). Mineral Nutrition of Higher Plants |
| **Necessary Course Material** | - |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to soil science and description of soil. |
| **2** | Soil formation, soil morphology and horizons |
| **3** | Physical properties of soil |
| **4** | Soil water types. |
| **5** | Chemical properties of soil |
| **6** | Organic matter |
| **7** | Land Use and Soil environment relations |
| **8** | Mid-Term Exam |
| **9** | Soil and plant transport mechanisms of plant nutrition |
| **10** | The definition and history of plant nutrition |
| **11** | Classification of plant nutrients, |
| **12** | Macro nutrients (N, P, K, Ca, Mg, S) |
| **13** | Micro nutrients (Fe, Cu, Zn, Mn, Mo, B, CI…) |
| **14** | Beneficial nutrients (Se, Al,Na, Si, Co, et) |
| **15** | The relations of plant nutrient disorders and disease |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 3 | 42 |
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|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 4 | 2 | 8 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 10 | 1 | 10 |
|  | **Total workload** | | **90** |
| **Total workload / 30** | | **3** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Ecology | 251514035 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| IV | 3 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 3 |  |  |  |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No. |
| **Objectives of the Course** | This course can contribute to understand the role of environmental factors on agricultural production. Thus, this course can be considered as a prerequested course for agronomy major. |
| **Short Course Content** | Description of ecology and classification of ecology, fundamental principles of ecology, light, temperature, water, atmosphere, geographic and topographic factors, soil, fire, ecosystems, relation among organism in ecosystem, nutrient cycle in ecosystem, energy flow |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Student taken this course; can learn the role of environmental  factors on agricultural production. | 1 | 1 | A, K |
| **2** | Can understand more easly the course related to plant and  animal prodution in the advance class. | 1, 3 | 1 | A, K |
| **3** | Can aware environmental limist which restrict crop diversity | 1, 9 | 1 | A, K |
| **4** | Can have a sense to protect environment and livings in it. | 1, 9, 10 | 1, 11 | A, K |
| **5** | Can understand the importance of sustainable resource use | 1, 9, 10 | 1 | A, K |
| **6** | Can understand the relations among organism | 1 | 1, 11 | A, K |
| **7** | |  |  |  |
| **8** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Unpublished course notes |
| **Supporting References** | Andiç, C. 2002. Tarımsal Ekoloji. Atatürk Üniv Yay. no: 106  Kılınç, M. ve H.G. Kutbay, 2004. Bitki Ekolojisi.Palme yay. Özkütük K., Hayvan Ekolojisi. Çukurova Univ. Ders Kit. no: C-79  Gliessman, S.R., 2007. Agroecology, The Ecology of Sustainable Food Systems: CRC Press |
| **Necessary Course Material** | Projector and computer |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Description of ecology and fundamental principles of ecology |
| **2** | Description of light and its related environmental factors |
| **3** | Description of the role of light on plant and animal production |
| **4** | Description of temperature and its related environmental factors |
| **5** | Description of the role of temperature on plant and animal production |
| **6** | Description of water and its related environmental factors |
| **7** | Description of the role of water on plant and animal production |
| **8** | Mid-term Exam |
| **9** | Description of atmospheric factor and its role on agricultural production |
| **10** | Description of geographic and topographic factors and theirs role on agricultural production |
| **11** | Description of soil factors and its role on agricultural production |
| **12** | Description of fire and its role on natural and agricultural ecosystems |
| **13** | Description of ecosystems and principles of community ecology |
| **14** | Description of relation among organism and theirs role in ecosystem |
| **15** | Description of energy flow and nutrient cycle in ecosystem |
| **16** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 4 | 4 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **86** |
| **Total workload / 30** | | **2,86** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Meteorology | 251514036 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| IV | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 3 |  |  |  |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The main aim of the course is to teach atmosphere’s event and change, explain this event’s conclusion, describe effects on agriculture of meteorology and meteorological events. |
| **Short Course Content** | Importance of meteorology, composition and layer of atmosphere, solar energy, temperature, frost, air humudity, precipitation, evaporation, air pressure, wind, clouds. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Know the meteorological events | 1, 3 | 1 | A, K |
| **2** | Know how formation meteorological events | 1, 2 | 1 | A, K |
| **3** | Know how effects agriculture of meteorological events | 1, 2, 3 | 1 | A, K |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

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| **Main Textbook** | Sezgin, F. 2001. Meteorology, Adnan Menderes University Agricultural Faculty, 85 p. |
| **Supporting References** | - |
| **Necessary Course Material** | Projector and computer |

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| --- | --- |
| **Course Schedule** | |
| **1** | Definition of meteorology, history, weather events-agriculture relationships |
| **2** | Atmosphere |
| **3** | Solar energy, affecting factors on solar energy |
| **4** | Solar energy measurement, temperature |
| **5** | Affecting factors on temperature, thermic regime |
| **6** | Agricultural importance of temperature, temperature measuring |
| **7** | Frost, frost forecast methods, methods of fighting with frost event |
| **8** | Mid-term Exam |
| **9** | Air humidity |
| **10** | Precipitation, precipitation types, precipitation shapes |
| **11** | Precipitation regimes, agricultural importance of precipitation, precipitation measuring |
| **12** | Evaporation, agricultural importance of evaporation, air pressure |
| **13** | Wind, wind kinds |
| **14** | Agricultural importance of wind |
| **15** | Clouds |
| **16** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 4 | 4 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **86** |
| **Total workload / 30** | | **2,86** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Surveying Technique | 251514037 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| IV | 3 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
| 3 |  |  |  |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Learning of basic field - map measures and coordinate systems. Calculating and drawing from the obtained measurements. |
| **Short Course Content** | Fundamentals of plan surveying. Units of measurement. Basicplanetrigonometry, scale concept. Measurements madewithsimplemeasuring instruments. Distance Measurement. A simplemeasure ofthe methods of measuringthe land. Simplemeasurementsof thedrawingwork. Errortheory. Areacalculations. Theodoliteandangle measurement.  Coordinatesystemsandmap projections. Essential coordinates computations. Traverse surveys. Geometric and trigonometric leveling. Tacheometry. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understanding of basic horizontal and vertical field measurement | 1, 2, 4 | 1, 10, 11 | A, K |
| **2** | Performing of three dimensional calculation and drawing applications. | 1, 2 | 1, 10, 11 | A, K |
| **3** | |  |  |  |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Diker S., Ölçme Bilgisi Ders Notları |
| **Supporting References** | 1. Şerbetci M., Songu C., Gülal E., Ölçme Bilgisi 1-2, Birsen Yay. İst. 2. Koç İ., Ölçme Bilgisi 1, YTÜ Yayınları, İst. 1998 3.Koç İ., Ölçme Bilgisi 2, YTÜ Yayınları, İst. 2003   4.Özbenli E., Tüdeş T., Ölçme Bilgisi, KTÜ, Trabzon, 1995 |
| **Necessary Course Material** | Calculator, drawing tools |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Fundamentals of plan surveying. Units of measurement. |
| **2** | Basic plane trigonometry, scale concept, the scale and types of calculations. |
| **3** | Measurements made with simple measuring instruments. |
| **4** | Measure of length, a simple length measures, electronic length measurement, measurement of lengths Disabled |
| **5** | Meters with the application of a right angle. |
| **6** | A simple measure of the methods of measuring the land and the drawing work |
| **7** | Error theory and investigate the types of errors. Length measure errors |
| **8** | Mid-term Exam |
| **9** | Area calculations |
| **10** | Theodolite and angle measurement, sources of error and correcting theodolites |
| **11** | Coordinate systems and map projections |
| **12** | Essential coordinates computations. Traverse surveys. |
| **13** | Geometric and trigonometric leveling, Instruments and errors. |
| **14** | Tacheometry and its instruments |
| **15** | Creation of cross-sections. |
| **16** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 15 | 15 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **97** |
| **Total workload / 30** | | **3,23** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Molecular Biology and Genetics | 251515024 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 2 | 2 | 4 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 4 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Define the structure of molecules that generate living things, their synthesis ways and usage fields, and the structure of the cell at the molecular level. |
| **Short Course Content** | Definition, scope, history and importance of molecular biology, cells and organisms, structure and function of plasma membrane, nucleic acids, genetic code and protein synthesis |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To understand advanced topics of molecular biology. | 1,5,8 | 1, 5, 6 | A, I |
| **2** | Understanding the relationships between DNA, RNA and related concepts | 1,2,3,4,5 | 1, 5, 6 | A, I |
| **3** | Understanding the functioning of gene expression | 2,3,4 | 1, 5, 6 | A, I |
| **4** | Understanding the formation and effects of mutations. | 2,3,4,5 | 1, 5, 6 | A, I |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Moleküler Biyoloji, Mehmet Karataş, Nobel Yayıncılık Eğitim Danışmanlık Tic. Ltd. Şti.,  Ankara, 2014.  Concepts of Genetics, 11th Edition, 2015. By William S. Klug, Michael R. Cummings, Charlotte A. Spencer, Michael A. Palladino, Published by Pearson |
| **Supporting References** | Moleküler Biyoloji (Temel Bilgiler), Atilla Eriş ve Hatice Gülen, Uludağ Üniversitesi Ziraat Fakültesi Ders Notları, No:98, Bursa, 2004.  G Temizkan, 2013. Moleküler Genetik, Nobel Tıp Kitabevleri |
| **Necessary Course Material** | Computer, projector, molecular biology laboratory. |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Definition, scope, history and importance of molecular biology |
| **2** | Chemical bonds |
| **3** | Biomolecules |
| **4** | Biomolecules, Cells and organisms |
| **5** | Nucleic acids |
| **6** | Nucleic acids |
| **7** | Replication |
| **8** | Mid-Term Exam |
| **9** | Transcription |
| **10** | Transcription |
| **11** | Translation |
| **12** | Translation |
| **13** | Control of Gene Expression |
| **14** | Control of Gene Expression |
| **15** | Mutations |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Experimental Skill | 14 | 2 | 28 |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **108** |
| **Total workload / 30** | | **3,6** |
| **Course ECTS Credit** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Homework |  |
| Experimental Skill | 10 |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Cell Biology | 251515025 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 2 | 0 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To teach the structure, function, and biochemical events occurring throughout the lifespan of the cell, from its formation to its death. |
| **Short Course Content** | This course focuses on the general principles of cell biology. Topics include cell structure and function, genetic mechanisms, cell membrane, cytoskeleton, cellular energy acquisition, and cell death. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understands the fundamental concepts and principles of cell  biology | 1 | 1, 5 | A |
| **2** | Explains the basic cellular biochemical events | 1 | 1, 5 | A |
| **3** | Understands the molecular and biochemical foundations of  diseases occurring at the cellular level | 1, 8 | 1, 5 | A |
| **4** | Develops critical thinking and problem-solving skills in cell  biology topics | 1, 8 | 1, 2, 13 | A, D, G |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Molecular Cell Biology (Lodish) ISBN-13: 978-0716776017 |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projection |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Fundemantals of cell and cell types |
| **2** | Chemical basics of the cell |
| **3** | Cellular Energetics |
| **4** | Structure of the Molecular Membrane |
| **5** | Cell Components I |
| **6** | Cell Components II |
| **7** | Cell Components III |
| **8** | Mid-Term Exam |
| **9** | Intracellular Trafficking |
| **10** | Cell Signaling |
| **11** | Cell Organization and Movement |
| **12** | Transformation of Cells into Tissues |
| **13** | Cell Cycle |
| **14** | Cell Death |
| **15** | Cell biology techniques |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 0,5 | 7 |
| Homework | 1 | 1 | 1 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) | 1 | 3 | 3 |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 7 | 7 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 12 | 12 |
|  | **Total workload** | | **60** |
| **Total workload / 30** | | **2** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Homework | 10 |
| Presentation | 10 |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Research and Experiment Methods | 251515026 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No. |
| **Objectives of the Course** | In theResearch and Experiment Methods course, which is the second stage after the statistics course, different experimental designs are explained with examples and analysis of the obtained data and interpretation of the results are explained.  -To get the researcher's mission to the students,   * Development of analytical thinking, * It is aimed to increase the ability to comment on different branches of the agricultural |
| **Short Course Content** | Planning of the experiments, Basic principles in designing an experiment, Experimental error, Concept of Replication and Parallel, Comparison of two independent groups, F distribution and variance analysis (ANOVA) technique, Completely Randomized Design, sample problem solutions and interpretation of results. Multiple comparison methods, Little Significant Difference method, Duncan test, sample problem solutions and interpretation of results. Relation of F = t2. Assumptions of ANOVA, homogeneity control of variances, sample problem solutions and interpretation of results. Randomized Block Design, Latin Square design, Relative Efficiency, Factorial Experiments, Factorial Experiments in Completely Randomized Design, The concept of interaction, Simple and main effects, Factorial Experiments in Randomized Block Design, Split-plots in randomized block design, Repeated measurements experiments, One Factor experiments with Repeated  Measurements, Two Factor experiments with Repeated Measurements |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | The student learns and explains the course content. | 1, 2, 3, 4, 5, 7,  10 | 1, 2, 5, 10, 11,  12, 13 | A, K |
|  | |
| **2** | |  |  |  |
| **3** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | İsmail KESKİN, Ensar BAŞPINAR Yasin ALTAY, Nazire MİKAİL, Deneysel İstatistik  Yöntemler (RStudio Uygulamalı) (Basılmamış)  Orhan DÜZGÜNEŞ, Tahsin KESİCİ, Orhan KAVUNCU ve Fikret GÜRBÜZ (1987). Araştırma ve Deneme Metodları (istatistik Metodları-II). Ankara Üniversitesi, Ziraat fakültesi Yayınları:1021, Ders Kitabı: 295.  Mehmet MENDEŞ (2013). Uygulamalı Bilimler için İstatistik ve Araştırma Yöntemleri (3. Baskı), İstanbul, Kriter Yayıncılık  Douglas C. MONTGOMERY, Design and Analysis of Experiments,Fifth Edition (2001). Arizona State University John Wiley & Sons, Inc |
| **Supporting References** | Fikret GÜRBÜZ, Ensar BAŞPINAR ve Zahide KOCABAŞ (1995). Araştırma ve Deneme  Metodları Uygulama Kılavuzu (II. Baskı). Ankara Üniversitesi, Ziraat fakültesi, Yayın No: 1431, Uygulama Kılavuzu: 244. |
| **Necessary Course Material** | Laptop, Calculator, Usb Memory. |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Planning of the experiments, Basic principles in designing an experiment, Experimental error, Concept of  Replication and Parallel, Comparison of two independent groups, and application via statistical package programs. |
| **2** | F distribution and variance analysis (ANOVA) technique, Completely Randomized Design, sample problem  solutions, interpretation of results and application via statistical package programs. |
| **3** | Multiple comparison methods, Little Significant Difference method, Duncan test, sample problem solutions,  interpretation of results and application via statistical package programs. |
| **4** | Relation of F = t2. Assumptions of ANOVA, homogeneity control of variances, sample problem solutions,  interpretation of results and application via statistical package programs. |
| **5** | Completely Block Design, Latin Square Design, Relative Efficiency, Missing observations, sample problem  solutions, interpretation of results and application via statistical package programs. |
| **6** | Factorial Experiments, Factorial Experiments in Completely Randomized Design, sample problem solutions, interpretation of results and application via statistical package programs. |
| **7** | The concept of interaction, Simple and main effects, sample problem solutions, interpretation of results and  application via statistical package programs. |
| **8** | Mid-Term Exam |
| **9** | Completely Block Factorial Experiments Design, sample problem solutions, interpretation of results and  application via statistical package programs. |
| **10** | Split-plots in Completely Randomized Design, sample problem solutions, interpretation of results and  application via statistical package programs. |
| **11** | Split-plots in Completely Block Design, sample problem solutions, interpretation of results and application  via statistical package programs. |
| **12** | Repeated measurements experiments, sample problem solutions, interpretation of results and application via  statistical package programs. |
| **13** | Repeated measurements experiments, sample problem solutions, interpretation of results and application via  statistical package programs. |
| **14** | One Factor experiments with Repeated Measurements, sample problem solutions, interpretation of results and  application via statistical package programs. |
| **15** | Two Factor experiments with Repeated Measurements, sample problem solutions, interpretation of results and  application via statistical package programs. |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 4 | 3 | 12 |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 15 | 15 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **91** |
| **Total workload / 30** | | **3,03** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Occupational Health and Safety I | 251515027 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 2 | 0 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this course is to enable the student to comprehend the rights and responsibilities of the employee and the employer within the framework of the employment contract, to understand the effects and importance of occupational accidents, to raise awareness about occupational health and safety. |
| **Short Course Content** | The Labour Law consists of occupational safety, occupational accidents, occupational diseases and risk assessment. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learn the basic concepts of individual labour law. | 6, 9, 11 | 1 | A, K |
| **2** | Will be able to explain the conclusion of the employment contract, its content, its termination and the consequences of  its termination. | 6, 9, 11 | 1 | A, K |
| **3** | Will be able to explain the regulation of work in terms of  time. | 6, 9, 11 | 1 | A, K |
| **4** | Will be able to explain the concepts related to occupational  health and safety and the importance of occupational health and safety. | 6, 9, 11 | 1 | A, K |
| **5** | Will be able to analysis the general view of occupational  health and safety in Turkiye. | 6, 9, 11 | 1 | A, K |
| **6** | Gain knowledge and skills about occupational accidents and  occupational diseases. | 6, 9, 11 | 1 | A, K |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Kahya, E. ve Özkar, D. (2022). *İş güvenliği.* Eskişehir: Eskişehir Osmangazi Üniversitesi  Yayınları, No: 246. |
| **Supporting References** | Labour Law of Turkiye |
| **Necessary Course Material** | Computer, Projection |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Lesson scope, execution and assessment |
| **2** | The subject, importance, historical development, application area and basic concepts of labour law |
| **3** | The concept of labour contract and its features, types, establishment |
| **4** | Obligations arising from the employment contract, termination of the employment contract |
| **5** | Regulation of job in terms of time and regulation of job in terms of persons |
| **6** | Video: work on scaffolding  OHS culture |
| **7** | Occupational Safety |
| **8** | Mid-Term Exam |
| **9** | Occupational accidents  Statistics, theories of formation |
| **10** | Occupational diseases |
| **11** | Risk factors affecting the business environment  Physical factors (+videos) |
| **12** | Risk factors affecting the business environment  Chemical, biological |
| **13** | Work safety in workshops   1. Basic safety rules in workshops    1. Basic safety rules (+videos, safety tape)    2. Health and safety signs (+videos, warning signs) |
| **14** | Safety in hand tools (+videos) |
| **15** | Risk Assessment Basic concepts  Risk assessment steps  Risk assessment methods (2 methods, matrix and checklist) |
| **16, 17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **66** |
| **Total workload / 30** | | **2,2** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Professional Practice I | 251515028 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 0 | 4 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No. |
| **Objectives of the Course** | To provide students with practical knowledge on subjects within the scope of Basic Agriculture and Agricultural Biotechnology, under the supervision of faculty members. |
| **Short Course Content** | Providing practical training regarding the faculty and department. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learn profession and areas of interest | 1, 2 | 1, 6, 7, 9 | A |
| **2** | Recognizes the application areas and laboratories of the Department of Agricultural Biotechnology | 4 | 1, 6, 7, 9 | A |
| **3** | Obtains general information about laboratory work and its functioning and practical information about the use of  laboratory tools and devices. | 6 | 1, 6, 7, 9 | A |
| **4** | Gains practical knowledge about basic agricultural subjects | 1, 2, 9 | 1, 6, 7, 9 | A |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** |  |
| **Supporting References** |  |
| **Necessary Course Material** |  |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introducing the application areas and laboratories of the Department of Agricultural Biotechnology |
| **2** | Providing general information about laboratory studies and their functioning and the use of laboratory tools  and devices. |
| **3** | Preperation of laboratory analysis |
| **4** | Presentation techniques |
| **5** | Microscope applications |
| **6** | Microscope applications |
| **7** | Technical visiting |
| **8** | Mid-Term Exam |
| **9** | Basic Agricultural Practices |
| **10** | Basic Agricultural Practices |
| **11** | Basic Agricultural Practices |
| **12** | Basic Agricultural Practices |
| **13** | Student presentations |
| **14** | Student presentations |
| **15** | Technical Visiting |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
|  |  |  |  |
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|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 5 | 5 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 5 | 5 |
|  | **Total workload** | | **84** |
| **Total workload / 30** | | **2,8** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz |  |
| Homework |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Biosafety and Bioethics | 251515029 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The main objective of the course is to teach national and international regulations and ethical rules related to the production and use of transgenic crops. Other objectives of the course are to teach biosafety issues, biosafety and biotechnological applications, biosafety rules in the laboratory, recording, bioethics, bioethical issues in agriculture, environment and  genetics. |
| **Short Course Content** | Safety, ethics and legal regulations in transgenic plants, animals and microorganisms. Biosafety protocol, Intellectual Property rights - patent system, patent examples, patenting living organisms, global standards, ethics in patenting, Technology protection system, Cost of biosafety, benefits of biosafety, environmental risks of transgenic organisms, bioethics in biodiversity. Risk analysis and regulation for the environment, humans and animals,  Biosafety in nutrition, impact of transgenic crops and foods. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To have detailed knowledge about biosafety | 1, 7, 8, 9, 11 | 1, 2, 5, 7, 9, 10, | A, D, E, F, |
| **2** | Learning the production standards and legal regulations of transgenic plants, animals and microorganisms | 1, 7, 8, 9, 11 | 1, 2, 5, 7, 9, 10, | A, D, E, F, |
| **3** | Identify ethical theories and methods related to bioethics | 1, 7, 8, 9, 11 | 1, 2, 5, 7, 9, 10, | A, D, E, F |
| **4** | Demonstrate responsibility for professionalism and ethical behavior | 1, 7, 8, 9, 11 | 1, 2, 5, 7, 9, 10, | A, D, E, F |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Globalization, Biosecurity, and the Future of the Life Sciences-Institute of Medicine and  National Research Council of the National Academies, National Academies press, 2006. Tom L. Beauchamp, LeRoy Walters, Jeffey p. Kahn, Mastroianni “Contemporary Issues in Bioethics” Wadsworth Publishing Company, 7th edition, 2007 |
| **Supporting References** | Laboratory Biosecurity Handbook-Reynolds M. Salerno, Jennifer Gaudioso, CRC Press; 1  edition, 2007. |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Biosafety in the laboratory; Chemicals and Microorganisms, risks and safety, |
| **2** | Safety management in the laboratory, Biosafety levels, |
| **3** | Contaminations, Sterilization, Disinfection, Antisepsis |
| **4** | Impacts of modern biotechnology applications on biodiversity |
| **5** | World Biodiversity conservation efforts |
| **6** | International biosafety conventions |
| **7** | National biosafety law |
| **8** | Mid-Term Exam |
| **9** | What is bioethics The foundations and history of bioethics |
| **10** | Ethics in Agricultural Practices |
| **11** | Food Safety and Ethics |
| **12** | Environmental Ethics and Agriculture |
| **13** | Animal Welfare and Ethics |
| **14** | Technology Use and Ethics in Agriculture |
| **15** | Justice and Resource Allocation |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework | 2 | 3 | 6 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam |  | 20 | 20 |
|  | **Total workload** | | **82** |
| **Total workload / 30** | | **2,73** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 35 |
| Homework | 10 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 55 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Environmental Biotechnology | 251515030 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 2 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Aim of the course is to teach issues about environment and environmental components, environmental pollution and removal. For this purpose, the human-nature relationship, the effects of human activity on the use of resources, basic ecological cycles of nutrients (N, C, S, etc.) and the effect of human on these cycles, impact of pesticides and detergents on the environment, bioaccumulation and effects, use of biosystems against environmental  pollution will be described. |
| **Short Course Content** | Description of some terms on the environment and environmental pollution, biogeochemical cycles, environmental pollution, environmental microbiology, microorganisms used in biotechnological applications, wastewater and biotechnological applications in purification of wastewater, heavy metal pollution and remediation. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To explain the environment and environmental problems | 1, 4 | 1, 2 | A |
| **2** | To explain the biogeochemical cycles and effects of human  on these cycles | 3 | 1, 2 | A |
| **3** | To explain the environmental pollution, the methods relating  to removal and ecological restoration | 9, 11 | 1, 2 | A |
| **4** | To explain of metabolic functions of microorganisms and  possible damages and benefits to the environment | 8 | 1, 2 | A |
| **5** | To explain use of microorganisms in biological treatment  systems, washing etc. processes | 2 | 1, 2 | A |
| **6** | To explain and specify the contribution of microorganisms to  remediation, degradation and recycle processes | 8 | 1, 2 | A |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Beyatlı, Y & Aslım, B. Çevre Biyoteknolojisi Ders Notları, Gazi Üniversitesi, 2004. |
| **Supporting References** | Alosman, M. S., Çevre Teknolojisi 1, Seç Yayın Dağıtım, İstanbul, 2002. Recep, İ. Çevre Biyoteknolojisi, değişim yayınları, Adapazarı, 2000. |
| **Necessary Course Material** | Computer and projector |

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| --- | --- |
| **Course Schedule** | |
| **1** | Introduction,to environmentel bitecnology |
| **2** | Environmental pollution |
| **3** | Environment and international organizations |
| **4** | Biogeochemical cycles |
| **5** | Nutrition, growth conditions and reproduction of microorganisms |
| **6** | Biological remediation techniques |
| **7** | Enzyme properties and functions in the soil |
| **8** | Mid-Term Exam |
| **9** | Soil fauna |
| **10** | Soil microbiology |
| **11** | Decomposition of organic matter in soil and carbon cycle |
| **12** | Environmental impact assessment regulation |
| **13** | Bioremediation |
| **14** | Phytoremediation |
| **15** | Oil pollution and bioremedation |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **88** |
| **Total workload / 30** | | **2,93** |
| **Course ECTS Credit** | | **3** |

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| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Biotechnological Methods in the Control of Plant Diseases | 251515031 |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 2 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Biotechnological control methods against pathogens that threaten agricultural production play a critical role in modern agriculture. The aim of this course is to provide a comprehensive coverage of methods to develop resistance against plant pathogens using advanced biotechnological techniques such as the use of antimicrobial proteins (AMPs), gene silencing by RNA interference (RNAi), microbial metabolites, genetic engineering and transgenic plants, and molecular markers and Marker Assisted Selection (MAS). Antimicrobial proteins strengthen plants' natural defense systems, while RNAi technology provides resistance to pathogens through silencing of targeted genes. Microbial metabolites can be used as biopesticides, replacing chemical pesticides and reducing environmental impacts. Genetic engineering techniques can be used to introduce foreign genes into plants to develop resistant plant varieties, while molecular markers and MAS methods are effectively used to identify and select resistance genes. This course aims to enable students to understand and apply these biotechnological methods and learn how they can be used in sustainable agriculture and environmental protection. |
| **Short Course Content** | This course covers biotechnological control methods against pathogens that threaten agricultural production. The use of antimicrobial proteins (AMPs), gene silencing by RNA interference (RNAi), microbial metabolites, genetic engineering and transgenic plants, molecular markers and Marker Assisted Selection (MAS) techniques will be covered. Students will learn how to apply these biotechnological methods and their impact on sustainable agriculture and environmental protection. |

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| **Learning Outcomes of the Course** | | **Contributed**  **PO(s)** | **Teaching**  **Methods \*** | **Measuring**  **Methods \*\*** |
| **1** | To have the knowledge to understand the biology of plant  pathogens and their effects on agricultural production | 2, 3, 6, 8, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **2** | To be able to explain how antimicrobial proteins (AMPs)  work in plant defense systems and how they provide protection against pathogens | 1, 2, 3, 6, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **3** | Understand the basics of RNA interference (RNAi) and how this technology is used to combat plant diseases | 1, 6, 8, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **4** | To be able to describe how microbial metabolites and  biopesticides are effective against plant pathogens | 1, 2, 6, 8, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **5** | To have the knowledge to learn genetic engineering  techniques and transgenic plant production methods in practice | 1, 2, 3, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **6** | To be able to explain how molecular markers and marker-  assisted selection methods are used in the identification and selection of resistance genes | 1, 2, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **7** | To be able to define and apply the breeding techniques used  in the development of disease-resistant plant varieties | 3, 6, 8, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **8** | Knowing the genes that affect mycotoxin resistance and the  applications of these genes | 1, 2, 3, | 1, 2, 5, 8, 11, 13 | A, K |
| **9** | To know about the transfer of genes affecting herbicide resistance and to understand how these genes are used in the  control of plant diseases | 1, 2, 3, 6, 8, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **10** | To possess comprehensive knowledge of genome editing  techniques and the role of CRISPR/Cas9 technology in combating plant diseases | 1, 3, 6, 8, 9 | 1, 2, 5, 8, 11, 13 | A, K |

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| --- | --- |
| **Main Textbook** | Keen, N.T. (1999). Plant Disease Resistance: Progress in Basic Understanding and Practical Application. Advances in Botanical Research. |
| **Supporting References** | Agrios, G.N. (2005). Plant Pathology. Elsevier Academic Press. |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | General information and plant pathogens and their effects on agricultural production |
| **2** | Mechanisms of AMPs and their importance in plant defense systems |
| **3** | Fundamentals of RNA interference (RNAi) and gene silencing in plants |
| **4** | Agricultural applications of RNAi technology and case studies |
| **5** | The use of microbial metabolites against pathogens and the importance of biopesticides |
| **6** | Fundamentals of genetic engineering and transgenic plant production techniques |
| **7** | Agricultural applications of genetic engineering and case studies |
| **8** | Mid-Term Exam |
| **9** | Fundamentals of molecular markers and identification of resistance genes |
| **10** | Agricultural applications of MAS methods and case studies |
| **11** | Environmental risks of transgenic plants and biosafety measures |
| **12** | Genes affecting mycotoxin resistance and their applications |
| **13** | Genes affecting herbicide resistance and transfer of the chromosome fragment containing the resistance gene |
| **14** | Pathogen virulence phylogenetics and plant-pathogen interactions |
| **15** | Genome editing techniques and the use of CRISPR/Cas9 technology in the control of plant diseases |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 8 | 2 | 16 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 12 | 3 | 36 |
|  | **Total workload** | | **97** |
| **Total workload / 30** | | **3,23** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Agricultural Biomass Technologies | 251515032 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To teach the technologies used in the use of products obtained using agricultural biomass. |
| **Short Course Content** | As bioproducts obtained from lignocellulosic biomass gain importance in our era, the technologies that make use of biomass and its wastes will constitute the content of this course. The definition of lignocelluosic biomass, its types, contents, its use in renewable  energy fields such as biofuels, industrial uses and emerging bioproducts, applications of biomass in agricultural biotechnology will be among the subjects of the course. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learn about the structure and types of agricultural biomass. | 1, 4 | 1, 2 | A |
| **2** | Learn and comprehends the applications of lignocellusic  biotechnology. | 1, 4 | 1, 2 | A |
| **3** | Evaluate the applications of lignocellulosic biotechnology and apply them when necessary. | 1, 2, 3, 4, 8 | 1, 2, 8, 10 | A, D |
| **4** | Become competent in the types and potential and industrial uses of bioproducts obtained from different agricultural  biomass. | 1, 2, 3, 4, 8 | 1, 2, 8, 10 | A, D |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Biotechnology of Lignocellulose. Hongzhan Chen, 2014. ISBN 978-94-007-6897-0 |
| **Supporting References** | Introduction to Chemicals from Biomass. Clark JH, Deswarte F, John Wiley and Sons,  2008 Print ISBN:9781118714485 |Online ISBN:9781118714478 |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to agricultural biomass technologies |
| **2** | Basic concepts-I |
| **3** | Basic concepts-II |
| **4** | Biomass structure |
| **5** | Biomass types |
| **6** | Agricultural biomass sources |
| **7** | Biomass conversion processes |
| **8** | Mid-Term Exam |
| **9** | Lignocellulosic biomass |
| **10** | Production of renewable energy from biomass |
| **11** | Biofuel production technologies |
| **12** | Microbial conversion of biomass |
| **13** | Production of organic bioproducts from biomass |
| **14** | Production of activated charcoal from biomass |
| **15** | Value added bioproducts from biomass |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 1 | 14 | 14 |
| Homework | 1 | 4 | 4 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 14 | 14 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **82** |
| **Total workload / 30** | | **2,73** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Homework | 20 |
| Presentation |  |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Academic English | 251515033 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 2 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To give information about proffesional terminology in foreign language and to give ability to use proffesional terminology |
| **Short Course Content** | To teach words and patterns required in programs, help to express oneself and prepare to career in future. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To have general knowlegde about agricultural biologic terminology in foreign language | 1,6,8 | 1 | A,K |
| **2** | Understands proffesional terminology while reading, speaking, listening and writing | 1,6,8 | 1,5,11 | A,D,F,K |
| **3** | Understands the importance of international communication | 1,6,8,9 | 1,5,12 | A,D,F,K |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Grammerway(1-2-3-4), JennyDooley, Virginia Evans, Express Publishing, 2004.  Dictionary of Agriculture, A&C Black Publishers Ltd., (2006).  Campbell Biology (11th RevisedEdition), JaneB. Reece, Lisa A. Urry, Peter V. Minorsky, Michael L. Cain, Steven A. Wasserman(2016). |
| **Supporting References** | Eser, D., Tarımsal Ekoloji Terimler Sözlüğü II.Baskı Ankara Üniversitesi Ziraat Fakültesi Yayınları  Ebcioğlu, N., Bitki Adları Sözlüğü, İnkılap kitabevi |
| **Necessary Course Material** | Computer and projection, dictionary |

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| --- | --- |
| **Course Schedule** | |
| **1** | Repetition of the general knowledge of English |
| **2** | Repetition of the general knowledge of English |
| **3** | Proffesional terms, concepts and terminology in agriculture |
| **4** | Proffesional terms, concepts and terminology in agriculture |
| **5** | Proffesional terms, concepts and terminology in agriculture |
| **6** | Proffesional terms, concepts and terminology in agricultural biotechnology |
| **7** | Proffesional terms, concepts and terminology in agricultural biotechnology |
| **8** | Mid-Term Exam |
| **9** | Turkish- English Translation exercise in documents about agricultural biotechnology I |
| **10** | Turkish- English Translation exercise in documents about agricultural biotechnology II |
| **11** | Turkish- English Translation exercise in documents about agricultural biotechnology II |
| **12** | English- Turkish Translation exercise in documents about agricultural biotechnology I |
| **13** | English- Turkish Translation exercise in documents about agricultural biotechnology II |
| **14** | English- Turkish Translation exercise in documents about agricultural biotechnology III |
| **15** | Turkish- English Translation exercise in documents about agricultural biotechnology I |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework | 2 | 8 | 16 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **90** |
| **Total workload / 30** | | **3** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Homework | 10 |
| Homework | 10 |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Enzymology | 251515034 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 2 | 2 | 4 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 4 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | Biochemistry |
| **Objectives of the Course** | Understand the general structures of enzymes, the factors affecting enzyme activity, enzyme kinetics, purification methods, and their biotechnological applications. |
| **Short Course Content** | This course focuses on the properties and applications of enzymes. Topics include enzyme structure and characteristics, factors affecting their activity, classification, production, purification, and various applications. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Comprehend the general structure and functions of enzymes. | 1, 7 | 1, 6, 7 | A, I |
| **2** | Identify and describe factors that affect enzyme activity | 1, 7 | 1, 6, 7 | A, I |
| **3** | Understand the system of enzyme nomenclature. | 1, 7 | 1, 6, 7 | A, I |
| **4** | Learn various methods for the production and purification of  enzymes. | 1, 7 | 1, 6, 7 | A, I |
| **5** | Explore the use of enzymes in industrial and  biotechnological applications. | 1, 2, 7, 8 | 1, 5, 6, 7 | A, I |
| **6** | Develop critical thinking and problem-solving skills related  to enzymatic reactions and applications. | 1, 2, 7, 8 | 1, 5, 6, 7 | A, I |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Palmer,T., Understanding Enzymes, 3rd Ed., Ellis Harwood Ltd., 1991 |
| **Supporting References** | Nelson, D.L., Cox, M.M., Lehninger Principles of Biochemistry, 4th Ed.,Worth  Publishers, 2005. |
| **Necessary Course Material** | Computer, projector, laboratory tools and equipment |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to Enzymology |
| **2** | Protein Structure and Function |
| **3** | Discovery and Structure of Enzymes |
| **4** | Nomenclature of Enzymes |
| **5** | Classification of Enzymes |
| **6** | Enzyme Kinetics I |
| **7** | Enzyme Kinetics II |
| **8** | Mid-Term Exam |
| **9** | Factors Affecting Enzyme Activity |
| **10** | Proenzyme, Isoenzyme, Alloenzyme, Ribozyme, Allosteric Regulation |
| **11** | Enzyme Data |
| **12** | Purification and Isolation of Enzymes I |
| **13** | Purification and Isolation of Enzymes II |
| **14** | Enzyme Technology |
| **15** | Immobilization of Enzymes |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) (Theory) | 14 | 2 | 28 |
| Course Time (number of course hours per week) (Practice) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Practice Exam | 1 | 1 | 1 |
| Studying Practice Exam | 1 | 10 | 10 |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 17 | 17 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 22 | 22 |
|  | **Total workload** | | **122** |
| **Total workload / 30** | | **4,06** |
| **Course ECTS Credit** | | **4** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Quiz | 30 |
|  |  |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** | 40 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Microbial Biotechnology | 251515035 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 2 | 2 | 4 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 4 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | Microbiology |
| **Objectives of the Course** | Teaching microbial biotechnology involves discussing the microorganisms, methods, and processes used, as well as the applications of microbial biotechnology. |
| **Short Course Content** | The course will cover the characteristics of microorganisms used in microbial biotechnology, how they are utilized, and the products obtained. It will also address which microorganisms are important in agriculture, both theoretically and practically. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Gain knowledge about microorganisms. | 1, 2 | 1, 3, 6 | A, I |
| **2** | Learn and understand the areas of biotechnology where  microorganisms are used. | 1, 2 | 1, 3, 6 | A, I |
| **3** | Evaluate and apply microbial biotechnology applications as  needed. | 1, 2, 3, 7 | 1, 3, 6 | A, I |
| **4** | Become proficient in the types of bio-products obtained  through microbial biotechnology and their areas of use. | 1, 2, 3, 7 | 1, 3, 6 | A, I |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| **Main Textbook** | Endüstriyel Mikrobiyolojiye Giriş (2016) ISBN: 9786053553120 |
| **Supporting References** | Microbial Biotechnology in Agriculture and Aquaculture (2006) ISBN-13: 978-1-57808- 367-1 |
| **Necessary Course Material** | Computer, projector, laboratory tools and equipment |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to Microbial Biotechnology |
| **2** | Microoorganisms |
| **3** | Microbial production |
| **4** | Protein production from bacteria and yeast |
| **5** | Industrial uses of microorganisms |
| **6** | Primer metabolites |
| **7** | Seconder metabolites |
| **8** | Mid-Term Exam |
| **9** | Soil Enzymes Biotechnology |
| **10** | Nitrogen Fixation and Bacteria |
| **11** | Mycorrhizal Fungi |
| **12** | Sulfur and agricultural biotechnology |
| **13** | Microbial biotechnology in barren and arid soils |
| **14** | Trichoderma applications |
| **15** | Biomass and microbial biotechnology |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) (Theory) | 14 | 2 | 28 |
| Course Time (number of course hours per week) (Practice) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Practice Exam | 1 | 1 | 1 |
| Studying Practice Exam | 1 | 10 | 10 |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 17 | 17 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 22 | 22 |
|  | **Total workload** | | **122** |
| **Total workload / 30** | | **4,06** |
| **Course ECTS Credit** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Quiz | 30 |
|  |  |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** | 40 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Determining Plant Fertilizer Requirements | 251515005 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 3 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | It is aimed to provide information on the importance of fertilizers and fertilization, the properties of organic and chemical fertilizers, fertilization methods and how to determine plant fertilizer requirements. |
| **Short Course Content** | Organic and chemical fertilizers, fertilization methods, determination of plant fertilizer requirements |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understanding the importance of fertilization | 1 | 1, 5 | A, K |
| **2** | Having knowledge about the transport of plant nutrients | 1 | 1, 5 | A, K |
| **3** | Learning composting and fertilization techniques | 1, 2, 3, 4 | 1, 5 | A, K |
| **4** | Learning about organic and chemical fertilizers and leaf  fertilizers | 1, 2, 3, 4 | 1, 5 | A, K |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Gübrelemenin Temel İlkeleri – Nuray Mücellâ Müftüoğlu, Yakup Çıkılı. Nobel Akademik Yayıncılık, 188 sf. |
| **Supporting References** | Organik Gübreler ve Yeşil Gübreleme Bitkileri – Mevlüt Mülayim, Mehmet Zengin. Atlas  Akademi, 186 sf.  Kimyasal Gübrelerin Üretim Teknolojileri – Rövşen Guliyev. Nobel Bilimsel Eserler, 340 sf. |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction and basic concepts |
| **2** | Fertility status of our lands |
| **3** | Transport of plant nutrients |
| **4** | What is fertilizer and fertilization? |
| **5** | Organic fertilizers |
| **6** | Composting |
| **7** | Composting |
| **8** | Mid-Term Exam |
| **9** | Chemical fertilizers |
| **10** | Chemical fertilizer applications |
| **11** | Chemical fertilizer applications |
| **12** | Chemical fertilizer applications |
| **13** | Chemical fertilizer applications |
| **14** | Foliar fertilizers |
| **15** | Foliar fertilizers |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 4 | 2 | 8 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 5 | 2 | 10 |
|  | **Total workload** | | **90** |
| **Total workload / 30** | | **3** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Agriculture and Environment | 251515006 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this course is to teach students the effects of environmental pollution on agriculture and solutions. |
| **Short Course Content** | To have knowledge about environmental problems, the effects of air, water and soil pollution on agriculture, off-purpose use of agricultural land, pollution control regulations. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Define environmental problems. | 1, 3 | 1 | A, K |
| **2** | Explain the effects of environmental problems on agriculture. | 1,3 | 1 | A, K |
| **3** | Identify pollution problems caused by agricultural practices. | 8, 9 | 1 | A, K |
| **4** | Explain the effects of misuse of agricultural land on the  environment and agriculture. | 8, 9 | 1 | A, K |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Pickering K.T. and Owen, L. A. (1994). An introduction to Global environmental issues.  Published by Routledge, New York. |
| **Supporting References** | 1.Çınar, Ö. (2008). Çevre kirliliği ve kontrolü. Nobel Yayın dağıtım. 2.Güney, E., (2004) .Çevre sorunları. Nobel Yayın dağıtım.  3.Kışlalıoğlu, M. Ve Berkes, F. (2001). Ekoloji ve çevre bilimleri. Remzi Kitabevi. |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Definition of the environment, environmental terms and definition of environmental pollution |
| **2** | Determination of environmental pollution problems and pollution types |
| **3** | Definition of air pollution and pollution sources |
| **4** | Effects of air pollution and climate change on agriculture |
| **5** | Definition of water pollution and pollution sources |
| **6** | Effects of water pollution on agriculture |
| **7** | Definition of radioactive pollution and its effects on agriculture |
| **8** | Mid-Term Exam |
| **9** | Effects of soil pollution on agriculture |
| **10** | Pollution caused by wrong agricultural practices |
| **11** | Pollution problems caused by excessive fertilizer use |
| **12** | Pollution problems caused by excessive use of pesticides |
| **13** | Misuse of agricultural land |
| **14** | Cleaning methods of contaminated agricultural soils and waters |
| **15** | Pollution control regulation and its implementation and Environmental Impact Assessment (EIA). |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 2 | 3 | 6 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 20 | 20 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 25 | 25 |
|  | **Total workload** | | **95** |
| **Total workload / 30** | | **3,16** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Beekeeping and Sericulture | 251515007 |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 3 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To emphasize the role of bee products in human health and nutrition and the importance of bees in pollination of plants. To provide basic information on creating healthy colonies in beekeeping to ensure profitable production and to provide quality and efficiency increase in plant production with pollination, and to provide information on silk production and its  importance in creating an infrastructure for profitable production. |
| **Short Course Content** | The importance of bee and silkworm breeding, honeybee breeds, morphological characteristics used to determine breeds, bee functions inside and outside the hive, bee products, honey formation and composition of honey, bee care according to season, honey milking, life stages of silkworm, silk formation and obtaining silk, care of silkworms,  problems of beekeeping and silkworm breeding and solution suggestions. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Explaining the importance of the existence of bees and their benefits for the entire ecosystem. | 1, 3, 4 | 1, 5 | A, K |
| **2** | To introduce honeybees and teach technical bee breeding by giving theoretical information and examples from field  applications, supported by visuals. | 1, 4, 8 | 1, 5 | A, K |
| **3** | Teaching the variety of products obtained from honeybees and the conditions required to obtain quality honey. | 1, 8 | 1, 5 | A, K |
| **4** | Introducing the silkworm and providing information about its growing conditions. | 1, 3, 4 | 1, 5 | A, K |
| **5** | Definition of sericulture and explanation of its past and present status. | 1, 4, 8 | 1, 5 | A, K |
| **6** | Providing information about sericulture product inputs and government incentives. | 1, 8 | 1, 5 | A, K |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| **Main Textbook** | Şahan Ü., 2011. İpekböcekciliği. Dora Yayınları, Bursa.  Akbay, R., 1986. Arı ve İpekböceği Yetiştirme. A.Ü.Zir. Fak. Yayın. 956 / 276. Ankara. |
| **Supporting References** | Genç, F., Dodoloğlu, A., 2003. Arıcılığın Temel Esasları. Atatürk Üniversitesi Yayınları  No: 931. Atatürk Üniversitesi Ziraat Fakültesi Ofset Tesisi, Erzurum.  Güler, Ahmet, Bal Arısı (Apis mellifera L.) . Ondokuzmayis Universitesi Ziraat Fakultesi Ders Kitabı No:55 |
| **Necessary Course**  **Material** | Computer and projector |

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| --- | --- |
| **Course Schedule** | |
| **1** | The place and importance of beekeeping in agricultural production, the general situation of beekeeping in  the world and in Türkiye, bee races. |
| **2** | Colony development in honey bees, nutrition, functions and basic structural differences of colony individuals,  annual life cycle of the colony |
| **3** | Honey bee anatomy and physiology, honey bee behavior: age-related division of labor |
| **4** | Honey bee genetics and breeding, getting started in beekeeping, equipment, record keeping |
| **5** | Colony management in bees: early spring care, spring care; feeding, combining, queen renewal, swarm  control and prevention methods, summer care; honeycomb addition methods, honey harvest. |
| **6** | Queen and drone |
| **7** | Colony management: autumn care and wintering, colony division, prevention of raiding, water supply |
| **8** | Mid-Term Exam |
| **9** | Silkworm species, their place in systematics, their origin and distribution story, their place in the world, Europe  and Türkiye, their economic importance, their morphological and physiological characteristics. |
| **10** | Life cycle of silkworm, classification and distribution, cocoon selection, sex determination, disease control |
| **11** | Preparation of production seeds, storage of eggs, incubation conditions, larval period, preparation of  maintenance areas, temperature and humidity conditions |
| **12** | Care and feeding according to age periods, types of suspension, characteristics, suspension methods |
| **13** | Cocoon harvest, strangulation, classification, cocoon characteristics, silk pulling, cooking, characteristics of  silk |
| **14** | Main diseases and pests, legal status and organization, mulberry grove establishment for sericulture |
| **15** | Problems of sericulture and solution suggestions |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **78** |
| **Total workload / 30** | | **2,6** |
|  | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 50 |
|  |  |
|  |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Phytopathology | 251515010 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Objective of this course is to teach definition, characteristics, symptom development and classification of biotic and abiotic disease agents that damage cultivated plants. |
| **Short Course Content** | History of plant pathology, symptomology, etiology, pathology and epidemiology. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | They have knowledge about the economic importance of diseases. They have knowledge about sypmptoms caused  biotic and abiotic factors on plants. | 1, 2, 3, 5 | 3, 5, 7 | A |
| **2** | They have knowledge about the general characteristics of  disease agents. | 1, 2, 3 5 | 3, 5, 7 | A |
| **3** | They have knowledge about the distribution and  epidemiology of disease agents. | 1, 2, 3, 5 | 3, 5, 7 | A |
| **4** | They have knowledge about important agents in the  epidemiology of disease agents. | 1, 2, 3, 5 | 3, 5, 7 | A |
| **5** | They have knowledge about control methods against disease  groups. | 1, 2, 3, 5 | 3, 5, 7 | A |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Döken, M.T., E. Demirci ve H. Zengin, 2011. Fitopatoloji (Sekizinci Baskı). Atatürk  Üniversitesi Ziraat Fakültesi Ofset Tesisi, Erzurum, 258s.. |
| **Supporting References** | Agricultural Chemicals. 1991. Thomson, W. T. Book IV-Fungicides, Thomson  Puplication, California. |
| **Necessary Course Material** | Projector and computer |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | History of plant pathology |
| **2** | Symptomology |
| **3** | Etiology |
| **4** | Abiotic factors caused plants diseases |
| **5** | Abiotic factors caused plants diseases |
| **6** | Plant diseases caused by phytoplazmas and spiroplasmas |
| **7** | Plant diseases caused by phytoplazmas and spiroplasmas |
| **8** | Mid-term Exam |
| **9** | General Bacteriology |
| **10** | General Virology |
| **11** | Classification of Plant Pathogenic fungi |
| **12** | Classification of Plant Pathogenic fungi |
| **13** | Plant pathology |
| **14** | Harmful aspects of weeds |
| **15** | Control methods of diseases |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 7 | 7 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 14 | 14 |
|  | **Total workload** | | **95** |
| **Total workload / 30** | | **3.16** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Food Science and Technology | 251515020 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of the Food Science and Technology course is to provide information on the definition of food technology, raw materials and their compositions in ready-made food technology, food spoilage factors and control, physical food preservation methods, chemical  food preservation methods, biological food preservation techniques, grain, meat, milk, oil, sugar processing technology and quality control principles in processed foods. |
| **Short Course Content** | Definition of food technology, raw materials and their compositions in food industry, food spoilage factors and control, physical food preservation methods, chemical food preservation methods, biological food preservation techniques, grain, meat, milk, oil, sugar processing technology and quality control principles in processed foods. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learning the basic chemical structures of foodstuffs | 1, 4 | 1, 11 | A |
| **2** | Learning the benefits of chemical properties of foodstuffs in  terms of production, nutrition and health | 1, 4 | 1, 11 | A |
| **3** | Knows the changes that occur in food from production to  consumption. | 1, 4 | 1, 11 | A |
| **4** | Knows food preservation conditions, rules and methods. | 1, 3 | 1, 11 | A |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Food Processing Technology, Second Tech Fellows, PJ |
| **Supporting References** |  |
| **Necessary Course Material** | PC, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Food Components |
| **2** | Food Microbiology |
| **3** | Preservation Techniques |
| **4** | Cereal Technology |
| **5** | Oil Technology |
| **6** | Dairy Technology |
| **7** | Canning Technology |
| **8** | Midterm Exam |
| **9** | Sugar and Sugary Products Technology |
| **10** | Meat Technology |
| **11** | Fermented Products Technology |
| **12** | Alcoholic Products Technology |
| **13** | Food Safety and Legislation |
| **14** | Food Additives |
| **15** | Food Toxicology |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 6 | 6 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 12 | 12 |
|  | **Total workload** | | **90** |
| **Total workload / 30** | | **3** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT**

**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Organic Agriculture | 251515021 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Teaching the general principles of organic agriculture that it's healty production methods for environment and human, sertification systems, low and instruction of organic agriculture, faced problems and analysis methods in organically production systems |
| **Short Course Content** | Organic agriculture and general principles, law and instruction of organic agriculture, sertification system, production methods of organic fruit and vegetable growing and organic viticulture |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | They learn the importance of organic farming. | 3, 8 | 1, 4, 5, 7, 8 | A, K |
| **2** | They learn the general principles of organic farming. | 3, 8, 11 | 1, 4, 5, 7, 8 | A, K |
| **3** | They learn the cultivation techniques in organic farming. | 3, 8 | 1, 4, 5, 7, 8 | A, K |
| **4** | They learn about the problems and solutions in organic  farming. | 3, 8, 11 | 1, 4, 5, 7, 8 | A, K |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Zengin,M. (2007). Organik Tarım, Hasad Yayıncılık, 136s.  İlbaş, A.İ. (2009). Organik Tarım İlkeler ve Ulusal Mevzuat, Efil Yayınevi, 267s. Anonim (2010). Organik Tarım Araştırma Sonuçları 2005-2010, (Ed. Ayşen Alay Vural), Tarımsal Araştırmalar Genel Müdürlüğü, Ankara, 362s. |
| **Supporting References** | Agriculture, Environment and Food Security (2002) (Edited: N. Scialabba and C. Hattam), Environment and Natural Resources Series No:4, FAO, Rome, 258 p. |
| **Necessary Course Material** | Projector and computer |

|  |  |
| --- | --- |
| **Course Schedule** | |
| 1 | General basis of organic agriculture |
| 2 | Developing prosess of organic agriculture in the World and Turkey |
| 3 | Low and instruction of organic agriculture |
| 4 | Sertification system of organic agriculture |
| 5 | Inrease of soil productivity in organic agriculture |
| 6 | Alternative systems in production of organic horticultural crops |
| 7 | Green manuring and effects |
| 8 | Midterm exam |
| 9 | Soil process in organic agriculture; planting rotation in organic agriculture |
| 10 | Principles of organic fruit growing |
| 11 | Principles of organic vegetable growing |
| 12 | Organic horticultural production areas and special locations |
| 13 | Principles of organic viticulture; Plant protection basis in organic agriculture |
| 14 | Economic analysis in organic agriculture |
| 15 | Faced problems and analysis methods in organic agriculture |
| 16,17 | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 4 | 3 | 12 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 20 | 20 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 30 | 30 |
|  | **Total workload** | | **92** |
| **Total workload / 30** | | **3,06** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT**

**COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Agricultural Extension | 251515036 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| V | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To explain the importance of agricultural extension and communication, to give information about the development, theory, applications and methods of agricultural extension, to introduce the methods of transferring research results and innovations to producers, to raise awareness about producer behaviour and the process of adoption of innovations by  producers |
| **Short Course Content** | Definition of agricultural extension, its effects on rural development, agricultural extension governance in public and private sectors, individual and group methods, practices and effects in extension education, producer behaviours, adoption process of innovations, development and practice of agricultural extension and consultancy in the world and in Türkiye, field studies, participatory techniques will be covered and application examples  will be explained. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understands the importance of agricultural extension and communication. | 2, 8 | 1, 5 | A, K |
| **2** | To have key information for an effective extension work. | 2, 8 | 1, 2, 5 | A, K |
| **3** | Have knowledge about the planning and implementation of  extension methods that they will use throughout their professional life | 2, 8 | 1, 2, 5 | A, K |
| **4** | Understands the importance and place of agricultural extension and communication in rural development. | 2, 8 | 1, 2, 5 | A, K |
| **5** | Knows and can practice different agricultural extension and advisory approaches implemented in the world and in Türkiye. | 2, 8 | 1, 2, 11 | A, K, Ö |
| **6** | Can identify the needs of rural people and prepare appropriate programmes. | 2, 8 | 1, 6, 7 | A, K, Ö |
| **7** | Can work with groups of different structures. | 2, 8 | 1, 2, 12 | A, K |
| **8** | Understands the relations between research, extension and producer and their importance. | 2, 8 | 1, 2, 12 | A, K, F |
| **9** | Learns the difficulty of changing producer behaviour, the necessity of social learning and the role of agricultural extension  in this field. | 2, 8 | 1, 2, 12 | A, K |
| **10** | Understands the importance of innovation, knowledge and technology transfer and the ways to realise it. can transfer knowledge and techniques using different (individual, group and mass) methods within the framework of adult education  principles. | 2, 8 | 1, 2, 5 | A, K, G |

|  |  |
| --- | --- |
| **Main Textbook** | 1.Ceylan, C.İ., Köksal, Ö., Akın, A. GAP Bölgesinde Tarımsal Üretim Sürecinde Bilgi  İhtiyaçlarının Karşılanmasında Tarım Danışmanlarının Yeri. 2.Ceylan,C. Tarımsal Yayım İletişimi Ders Notu (2006/2007 Güz).  3. Presentations |
| **Supporting References** | 1.Ceylan, C., 2005. Yayımcı Rehberi, TKB Yayım Dairesi Başkanlığı, Tarımsal Yayım  Serisi, 2005/1.  2 .Değirmenci, Y., Manyaz, İ., Güzelaydın, I., Erkuş, E., Koçak, F., Arı, B., 2008. Tarımsal Yayım ve Danışmanlık, Ankara.  3. Current articles in this field, scientific studies on implementation examples |
| **Necessary Course Material** | Projection device, coloured papers for group work and board markers, scissors and computer |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Definition, concept and effects of agricultural extension on rural development |
| **2** | Organisation chart of relevant public institutions, related institutions, extension services and regulations |
| **3** | Agricultural extension and counselling process, development and practices |
| **4** | Characteristics of extension education, school education and comparisons |
| **5** | General information about the methods used in agricultural extension |
| **6** | Individual methods in agricultural extension |
| **7** | Individual methods, an overview of group methods |
| **8** | Mid-Term Exam |
| **9** | Innovation and innovativeness concept, innovation adoption process |
| **10** | Producer behaviour and the process of adopting innovations |
| **11** | Agricultural extension in rural development, participatory techniques and examples from practices |
| **12** | Communication techniques and agricultural extension |
| **13** | Visiting sample projects in the field and evaluating them in terms of agricultural extension-participation |
| **14** | Information about the Ministry of Agriculture and Forestry Agricultural Extension and Consultancy Exam,  question samples and preparation process |
| **15** | Agricultural extension and communication techniques and discussion of the appropriate agricultural  extension and counselling model for Türkiye by taking into account all the learnt information (debate) |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework | 2 | 1 | 2 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 3 | 3 | 9 |
| Studying for Mid-Term Exam | 1 | 1 | 1 |
| Final Exam | 5 | 3 | 15 |
| Studying for Final Exam | 14 | 3 | 42 |
|  | **Total workload** | | **84** |
| **Total workload / 30** | | **2,8** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Homework | 10 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Bioinformatics | 251516026 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 1 | 1 | 2 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | In this course, it is aimed for students to become familiar with current bioinformatics methods and tools, to learn the principles behind these methods, to be able to use the methods and interpret the results. |
| **Short Course Content** | Biological databases, phylogenetic analyses, protein structures, promoter and gene structure, primer design |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Recognizes biological databases | 1, 8 | 1, 5 | A |
| **2** | Distinguishes primary and secondary protein databases. | 1, 5, 8 | 1, 5 | A |
| **3** | Can access biological data by scanning databases. | 1, 8 | 1, 5 | A |
| **4** | Recognizes binary and multiple sequence alignment  algorithms and score matrices. | 1, 8 | 1, 5 | A |
| **5** | Can perform similarity searches and interpret the results. | 1, 8 | 1, 5, 6 | A |
| **6** | Have basic knowledge about the structure of proteins. | 1, 8 | 1, 5 | A |
| **7** | It can predict the primary, secondary and tertiary structures  and functions of proteins. | 1, 8 | 6 | A |
| **8** | Can use protein identification and analysis tools. | 1, 5, 8 | 6 | A |
| **9** | Can make primer design. | 1, 5, 8 | 6 | A |
| **10** | Can use cluster analysis tools | 1, 5, 8 | 6 | A |

|  |  |
| --- | --- |
| **Main Textbook** | Uygulamalı Biyoinformatik. Çeviri: Prof. Dr. Münir Tunçer, Dr. Hilal Ay. Palme Yayınevi |
| **Supporting References** | Genomik analiz için biyoinformatik yöntemler. Muhammet Şakiroğlu Palme Yayınevi |
| **Necessary Course Material** | Computers. |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Biological databases, bioinformatics resources and access to information |
| **2** | Sequence comparison methods: Pairwise sequence comparison algorithms, database similarity scans,  conservation of amino acid residues and score matrices |
| **3** | Multiple sequence alignments and phylogenetic trees |
| **4** | Multiple sequence alignments and phylogenetic trees |
| **5** | Protein families, motifs, patterns; |
| **6** | Screening of secondary protein databases; pattern, motif scanning |
| **7** | Protein sequence databases: detailed study of the SwissProt/TrEMBL database; other sequence databases |
| **8** | Mid-Term Exam |
| **9** | Classification of proteins and determination of their secondary structures |
| **10** | Classification of proteins according to their secondary structure |
| **11** | Determination of three-dimensional structures of proteins |
| **12** | Protein identification and analysis tools: EXPASY server |
| **13** | Protein identification and analysis tools: EXPASY server |
| **14** | Gene and promoter determination |
| **15** | Primer design |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 1 | 14 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 6 | 1 | 6 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 10 | 1 | 10 |
|  | **Total workload** | | **60** |
| **Total workload / 30** | | **2** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz |  |
| Homework |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Project preparation | 251516027 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 1 | 0 | 1 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 1 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To teach students the process of project preparation and to develop relevant skills. It also serves as preparation for the Graduation Thesis course. |
| **Short Course Content** | The project preparation course will cover topics related to developing project management skills and using these skills to prepare a project. This includes learning how to develop and apply the necessary abilities for writing a project. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Knows different types of projects. | 2, 3, 4, 6, 8, 9,  10 | 1, 14 | A |
| **2** | Understands the project development process. | 2, 3, 4, 6, 8, 9,  10 | 1, 14 | A |
| **3** | Generates project ideas. | 2, 3, 4, 6, 8, 9,  10 | 1, 10, 11, 12,  14, 15 | A, E, J |
| **4** | Conducts a literature review. | 2, 3, 4, 6, 8, 9,  10 | 1, 10, 11, 12,  14, 15 | A, E, J |
| **5** | Knows how to write a project report. | 2, 3, 4, 6, 8, 9,  10 | 1, 10, 11, 12,  14, 15 | A, E, J |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Tarımda Proje Hazırlama Tekniği (2020) ISBN 9786257983716 |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector. |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | **Project and its Characteristics** |
| **2** | **Different Types of Projects** |
| **3** | **Project Development Process** |
| **4** | **Project Topic Selection Process** |
| **5** | **Literature Review** |
| **6** | **Project Management** |
| **7** | **Project Planning** |
| **8** | Mid-Term Exam |
| **9** | **Project Report Preparation** |
| **10** | **Project Report Preparation (continued)** |
| **11** | **Project Report Preparation** |
| **12** | **Sample Projects** |
| **13** | **Student Project Idea Presentations** |
| **14** | **Student Project Idea Presentations (continued)** |
| **15** | **Student Project Idea Presentations (continued)** |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 1 | 14 |
| Classroom Studying Time (review, reinforcing, prestudy,….) |  |  |  |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) | 1 | 10 | 10 |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 2 | 2 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 4 | 4 |
|  | **Total workload** | | **32** |
| **Total workload / 30** | | **1,067** |
| **Course ECTS Credit** | | **1** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Project Observation | 20 |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** | 40 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Occupational Health and Safety II | 251516028 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 2 | 0 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this course is to enable the student to comprehend the rights and responsibilities of the employee and the employer within the framework of the employment contract, to understand the effects and importance of occupational accidents, to raise awareness about occupational health and safety. |
| **Short Course Content** | The Labour Law consists of occupational safety, occupational accidents, occupational diseases and risk assessment. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Will learn Occupational Health and Safety legislation. | 6 | 1 | A |
| **2** | Will be able to explain the principles of fire protection in  working areas. | 6,9 | 1 | A |
| **3** | Will be able to analysis the legal responsibility of the  employer. | 6,9 | 1 | A |
| **4** | Will be able to adopt risk, prevention and safety culture. | 9,11 | 1 | A |
| **5** | Will be able to comprehend their responsibilities in terms of  occupational safety in business life. | 9.11 | 1 | A |
| **6** | Will be able to define occupational hygiene and explain the  risk factors of occupational hygiene. | 9 | 1 | A |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Kahya, E. ve Özkar, D. (2022). *İş güvenliği.* Eskişehir: Eskişehir Osmangazi Üniversitesi Yayınları, No: 246. |
| **Supporting References** | Labour Law of Turkiye |
| **Necessary Course Material** | Computer, projection |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Lesson scope, execution and assessment |
| **2** | Occupational Accidents, Definition, types, classification  Factors causing work accidents, Notification obligations of work accidents |
| **3** | Personal protective equipment (+videos) |
| **4** | Fire (+videos) |
| **5** | OHS Law |
| **6** | Examination of sample decisions of the Court of Cassation related to occupational accidents |
| **7** | Occupational hygiene |
| **8** | Emergency plan |
| **9** | Mid-Term Exam |
| **10** | Examination of statistics on occupational accidents and occupational diseases, common accidents and diseases  and precautions |
| **11** | Legislation ; Noise, Vibration  Manual handling (load lifting) |
| **12** | Legislation; Working with screen devices (office ergonomics)  OHS trainings |
| **13** | OHS in food and livestock sector |
| **14** | OHS in food and livestock sector |
| **15** | OHS in Agriculture |
| **16,**  **17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **64** |
| **Total workload / 30** | | **2,1** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Professional Practice II | 251516029 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 0 | 4 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To provide students with practical knowledge on subjects within the scope of Basic Agriculture and Agricultural Biotechnology, under the supervision of faculty members. |
| **Short Course Content** | Providing practical training regarding the faculty and department. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learn profession and areas of interest | 1, 2 | 1, 6, 7, 9 | A |
| **2** | Recognizes the application areas and laboratories of the Department of Agricultural Biotechnology | 4 | 1, 6, 7, 9 | A |
| **3** | Obtains general information about laboratory work and its functioning and practical information about the use of  laboratory tools and devices. | 6 | 1, 6, 7, 9 | A |
| **4** | Gains practical knowledge about basic agricultural subjects | 1, 2, 9, 11 | 1, 6, 7, 9 | A |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** |  |
| **Supporting References** |  |
| **Necessary Course Material** |  |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Laboratory Practices |
| **2** | Laboratory Practices |
| **3** | Laboratory Practices |
| **4** | Laboratory Practices |
| **5** | Laboratory Practices |
| **6** | Laboratory Practices |
| **7** | Technical Visiting |
| **8** | Mid-Term Exam |
| **9** | Basic Agricultural Practices |
| **10** | Basic Agricultural Practices |
| **11** | Basic Agricultural Practices |
| **12** | Basic Agricultural Practices |
| **13** | Student presentations |
| **14** | Student presentations |
| **15** | Technical Visiting |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 5 | 5 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 5 | 5 |
|  | **Total workload** | | **84** |
| **Total workload / 30** | | **2,8** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 40 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Plant Tissue Culture | 251516030 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 2 | 2 | 5 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 5 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Basic laboratory techniques of tissue culture, historical development and application areas of plant tissue cultures, application areas in plant breeding, organogenesis, somatic embryogenesis, secondary metabolite |
| **Short Course Content** | To give Information about the principles of plant tissue culture, how it is done and different plant tissue culture. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understands the principles of plant tissue culture. | 2, 4 | 1 | A |
| **2** | Learns and compares tissue culture methods. | 7 | 1, 15 | A |
| **3** | Explains and applies the techniques used in the basic tissue culture laboratory. | 6, 7 | 3, 12, 15 | A, B, I |
| **4** | Learns to use tissue culture techniques to meet the  requirements of plant breeding. | 3 | 1, 2, 5 | A, B, G |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Özcan, S. Gürel, E. Babaoğlu, M. (2001). Bitki Biyoteknolojisi -1, S.Ü. Vakfı yayınları Konya |
| **Supporting References** |  |
| **Necessary Course Material** |  |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to plant biotechnology |
| **2** | Tissue culture basic laboratory techniques |
| **3** | Historical development of plant tissue cultures |
| **4** | Application areas of tissue culture in plant breeding |
| **5** | Organogenesis |
| **6** | Somatic embryogenesis |
| **7** | Protoplast culture and somatic hybridization |
| **8** | Mid-term Exam |
| **9** | Haploid plant production |
| **10** | Haploid plant production |
| **11** | Disease free plant production |
| **12** | Secondary metabolite production |
| **13** | Micropropagation |
| **14** | Germplasm protection |
| **15** | Germplasm protection |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 3 | 42 |
| Homework | 2 | 3 | 6 |
| Quiz Exam | 1 | 1 | 1 |
| Studying for Quiz Exam | 1 | 4 | 4 |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 6 | 2 | 12 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 12 | 1 | 12 |
|  | **Total workload** | | **135** |
| **Total workload / 30** | | **4,5** |
| **Course ECTS Credit** | | **5** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 20 |
| Quiz | 10 |
| Presentation | 10 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Animal Cell Culture | 251516031 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 2 | 2 | 5 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 5 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim is to provide students with information about the propagation of animal cells in in vitro culture and testing techniques related to the produced cells. |
| **Short Course Content** | Basic cell culture laboratory plan, materials used in cell culture and preparation of them, sterilization techniques, cell culture medium, techniques using in selection of cells, cell counting and identification tests, primary cell culture, culturing of  different types of cells |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Students learn the animal cell culture | 1,3, 4, 5, 6, 7, 8 | 1, 2, 3, 6, 9, 11,  12 | A, B, D, E, I, K |
| **2** | Learn techniques for working with animal cells in vitro | 1,3, 4, 5, 6, 7, 8 | 1, 2, 3, 6, 9, 11,  12 | A, B, D, E, I, K |
| **3** | Freezing and thawing of animal cells | 1,3, 4, 5, 6, 7, 8 | 1, 2, 3, 6, 9, 11,  12 | A, B, D, E, I, K |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Culture of animal cells: A manual of basic technique, R. Ian Freshney, Wiley, 2005  Hücre Kültürü Teknikleri I-Kuramsal, Ş. Topal, Cemturan Ofset Matbaası, 2004 Hücre Kültürü Teknikleri II-Kuramsal, Ş. Topal, Cemturan Ofset Matbaası, 2004 |
| **Supporting References** | Çiltaş, A., 2011. Hayvan Doku Kültürü Teknikleri Ders Notları |
| **Necessary Course**  **Material** | Computer, projection, molecular laboratory |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Basic cell culture laboratory |
| **2** | Biology of cultured cells |
| **3** | Cultured cells properties |
| **4** | Summarize of literature data |
| **5** | Equipments which are used in cell culture |
| **6** | Sterilization techniques |
| **7** | culturing of different types of cells and passage |
| **8** | Mid-Term Exam Moleculer structure of GMO and gene expession |
| **9** | Primary cell cultur and different types of cell |
| **10** | Continue cell line preparing |
| **11** | Examination of cells under an inverted microscope |
| **12** | Cell counting |
| **13** | Cell counting |
| **14** | Cryo preservation |
| **15** | Stem cells |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy) | 14 | 2 | 28 |
| Homework | 4 | 2 | 8 |
| Lab | 14 | 2 | 28 |
| Quiz | 3 | 1 | 3 |
| Studying for Quiz | 3 | 2 | 6 |
| Experimental Skill | 1 | 2 | 2 |
| Studying for Experimental Skill | 1 | 4 | 4 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **141** |
| **Total workload / 30** | | **4,7** |
| **Course ECTS Credit** | | **5** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Quiz | 8 |
| Homework | 7 |
| Experimental Skill | 10 |
| **Final Exam** | 45 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Genetic Engineering | 251516032 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 2 | 2 | 5 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 5 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Understanding the basic techniques used in genetic engineering, Using genetic engineering techniques, Obtaining information about the production and use of genetically modified and edited organisms |
| **Short Course Content** | Learn the general principles of genetic engineering. Learn DNA manipulation methods and enzymes, Learn DNA sequencing techniques.  Learn cloning vector design. Recombinant DNA technology,  Learn gene transfer and editing methods |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learn general molecular DNA techniques and modern applications in genetic engineering. | 1, 2, 3, 4, 5, 8,  9, 11 | 1, 2, 3, 5, 6, 9,  10, 12 | A, B, D, F, I, K |
| **2** | Clones a gene in a different organism with recombinant DNA technologies and provides its expression | 1, 2, 3, 4, 5 | 1, 2, 3, 5, 6, 9,  10, 12 | A, B, D, F, I, K |
| **3** | |  |  |  |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

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| **Main Textbook** | T. A. Brown,2016. Gene Cloning and DNA Analysis : An Introduction. Wiley-Blackwell |
| **Supporting References** | Bitki Biyoteknolojisi I ve II, Özcan, S., Gürel, E., ve Babaoğlu, M. |
| **Necessary Course Material** | Computer, projector, molecular laboratory. |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | DNA manipulative enzymes |
| **2** | DNA Sequencing |
| **3** | Plazmide and vectors |
| **4** | Promoters, terminators, selective genes |
| **5** | Recombinant DNA technologies |
| **6** | Recombinant DNA technologies |
| **7** | Gene transfer techniques |
| **8** | Mid-Term Exam |
| **9** | Direct gene transfer techniques |
| **10** | Microenjection |
| **11** | Protoplast techniques |
| **12** | Gene transfer by bacteria |
| **13** | Gene transfer by virus |
| **14** | Antisense RNA technologies |
| **15** | Gene editing techniques |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework | 4 | 2 | 8 |
| Quiz | 3 | 1 | 3 |
| Studying for Quiz | 3 | 2 | 6 |
| Experimental Skill | 1 | 2 | 2 |
| Studying for Experimental Skill | 1 | 4 | 4 |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **141** |
| **Total workload / 30** | | **4,7** |
| **Course ECTS Credit** | | **5** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Homework | 10 |
| Experimental Skill | 10 |
| Quiz | 10 |
| **Final Exam** | 40 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Genomics and Proteomics | 251516033 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 2 | 2 | 5 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 5 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this course is to learn the genome structure by comparing it in various organisms, to comprehend the subjects of protein-protein interaction, protein-genome interaction, post- translational proteomics. |
| **Short Course Content** | Genome definition, whole genome sequencing, conserved genes in various species, DNA isolation and cloning, DNA sequence analysis, amino acids, proteins, Protein identification |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Have detailed information about the genome, | 1, 2 | 1, 5, 6 | A, I |
| **2** | Comprehends the methods used in genomic applications and genomic application areas, | 3, 5, 8 | 1, 5, 6 | A, I |
| **3** | Learns the 3D structure of proteins, | 1, 5, 8 | 1, 5, 6 | A, I |
| **4** | Defines proteomics approaches and applications | 1, 5, 8 | 1, 5, 6 | A, I |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| **Main Textbook** | Moleküler Biyoloji (Temel Bilgiler), Atilla Eriş ve Hatice Gülen, Uludağ Üniversitesi  Ziraat Fakültesi Ders Notları, No:98, Bursa, 2004.  Moleküler Biyoloji, Mehmet Karataş, Nobel Yayıncılık Eğitim Danışmanlık Tic. Ltd. Şti., Ankara, 2014. |
| **Supporting References** | Moleküler Biyolojide Kullanılan Yöntemler, Güler Temizkan ve Nazlı Arda, Nobel Tıp Kitabevi Ltd, İstanbul, 1999. |
| **Necessary Course Material** | Computer, projector, santrifuge, incubator, PCR machine |

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| **Course Schedule** | |
| **1** | Introduction to prokaryotic and eukaryotic genomes and comparative genomics |
| **2** | Whole genome sequencing |
| **3** | Conserved genes in various species |
| **4** | Techniques and experimental strategies used in functional and genomic applications |
| **5** | Techniques and experimental strategies used in functional and genomic applications |
| **6** | DNA, DNA determination and isolation methods |
| **7** | RNA, RNA types and their functions |
| **8** | Mid-Term Exam |
| **9** | Identification of proteins |
| **10** | Basic structure and properties of proteins |
| **11** | Basic concepts of proteomics |
| **12** | Proteomics fields of study |
| **13** | Protein isolation methods |
| **14** | Protein quantification methods |
| **15** | Protein purification |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework | 1 | 10 | 10 |
| Laboratory | 14 | 2 | 28 |
| Practical Exam | 1 | 2 | 2 |
| Studying for Practical Exam | 1 | 14 | 14 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **142** |
| **Total workload / 30** | | **4,7** |
| **Course ECTS Credit** | | **5** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Homework | 10 |
| Experimental Skill | 20 |
| Bir öğe seçin. |  |
| **Final Exam** | 40 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Entrepreneurship in Agricultural Biotechnology | 251516034 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 2 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | - |
| **Objectives of the Course** | The aim is to develop a culture and infrastructure of entrepreneurship among students and encourage them to engage in entrepreneurial activities. |
| **Short Course Content** | The course content focuses on understanding the principles of entrepreneurship. Topics include the importance of entrepreneurship, risks, finding investment, and examples of successful ventures. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Explain the importance of entrepreneurial concepts | 2, 3, 8 | 1, 8, 10 | A |
| **2** | Classify different types of entrepreneurship | 2, 3, 8 | 1, 8, 10 | A |
| **3** | Describe entrepreneurial practices | 2, 3, 8 | 1, 8, 10, 13 | A, D |
| **4** | Prepare a business plan as an aspiring entrepreneur | 2, 3, 8 | 1, 8, 10, 13 | A, D |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Semra Arıkan, Girişimcilik: Temel Kavramlar ve Bazı Güncel Konular, Siyasal Kitabevi, Ankara, 2008 |
| **Supporting References** | Sadi Özdemir, Cesur Girişimciler, Hayat Yayınları, 2005 |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Entrepreneurship Concepts |
| **2** | The Development of Entrepreneurship Worldwide and in Turkey |
| **3** | Types of Entrepreneurship |
| **4** | Innovation and Creativity in Entrepreneurship |
| **5** | Idea Generation in Entrepreneurship |
| **6** | Funding for Entrepreneurship and Entrepreneurial Risks |
| **7** | Entrepreneurial Support and Starting a Business; Technology Parks |
| **8** | Mid-Term Exam |
| **9** | Business Plan Development |
| **10** | Market Research |
| **11** | Entrepreneurial Presentations |
| **12** | Analysis of Successful Entrepreneurial Examples |
| **13** | Analysis of Successful Entrepreneurial Examples (continued) |
| **14** | Agricultural Entrepreneurship Practices in Turkey |
| **15** | International Entrepreneurship |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 12 | 12 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 16 | 16 |
|  | **Total workload** | | **86** |
| **Total workload / 30** | | **2,87** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Synthetic Biology | 251516035 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To provide students with a comprehensive understanding of the principles, techniques, and applications of synthetic biology. The course seeks to equip students with the knowledge and skills necessary to design and engineer new biological systems, understand the ethical and societal implications of this emerging field, and stay abreast of the latest advancements  and future trends in synthetic biology. |
| **Short Course Content** | The course content includes the fundamental principles and applications of synthetic biology. Topics include synthetic biology, systems biology, cellular factories, and current and future applications. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understand the principles and foundations of synthetic  biology | 4, 8 | 1 | A |
| **2** | Understand the diverse applications of synthetic biology in  agriculture, industry, and environmental science | 4, 8 | 1, 8 | A |
| **3** | Explore the ethical, legal, and social implications of synthetic  biology research and applications | 4, 8, 11 | 1, 8 | A |
| **4** | Stay informed about the latest advancements and future  trends in synthetic biology and related technologies | 4, 8 | 1, 8 | A |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Synthetic Biology, a Primer (2012) ISBN-13: 978-1848168633 |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | **Definition and History of Synthetic Biology** |
| **2** | **The Future of Synthetic Biology** |
| **3** | **Biobanking** |
| **4** | **Discovery of Genetic Resources** |
| **5** | **Synthetic and Systems Biology, Ethics** |
| **6** | **Creation of Cell Factories** |
| **7** | **Creation of Cell Factories (continued)** |
| **8** | Mid-Term Exam |
| **9** | **Macromolecule Synthesis Methods** |
| **10** | **Biological Factories** |
| **11** | **Complex Systems** |
| **12** | **Processes in Cell Factories** |
| **13** | **Biotechnological Drugs** |
| **14** | **Antibodies and Peptides** |
| **15** | **Vaccines** |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 12 | 12 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 16 | 16 |
|  | **Total workload** | | **86** |
| **Total workload / 30** | | **2,87** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Seed and Seed Material Biotechnology | 251516036 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To evaluate the basic principles of seed production, threshing, extraction and cleaning methods as well as storage and conditioning of seeds for marketing. To teach students the principles of seed physiology, and to transfer knowledge about the technological applications used in the industry |
| **Short Course Content** | In this course information about the production, adaptation, improvement and breeding of seed and all other production materials will be given and biotechnological methods that can be used to solve the problems encountered in agricultural production will be discussed. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To describe the basic structure and physiology of the seed and seed material | 1 | 1, 2, 5 | A |
| **2** | To understand the concept of dormancy and dormancy types | 1, 2 | 1, 2 | A |
| **3** | To interpret the effects of various technological applications used in the industry with regard to the physiological bases of seeds | 3, 4, 11 | 1, 5 | A |
| **4** | To evaluate environmental, technical, technological and economic aspects during the solution of the problems encountered in an organization that operates on seed  production. | 8, 9 | 1, 5 | A |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Tohumluk ve Tohumculuk, Temel İlkeler ve Teknoloji, Celal Er, Dilek Başalma, Nobel Yayınları, Ankara, 2014. |
| **Supporting References** | Tohumluk ve Teknolojisi, Sezen Şehirali, Ankara Üniversitesi Ziraat Fakültesi Yayınları,  Ankara, 2002.  Successful Seed Programs: A Planning and Management Guide, ). (Ed.) J.E. Douglas, 1980. |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Concept of seed and seed material |
| **2** | Seed industry in Turkey |
| **3** | The structure and parts of the flower |
| **4** | Reproduction in plants |
| **5** | Fertilization and seed formation |
| **6** | Morphology of the seeds |
| **7** | Physiology of the seeds |
| **8** | Mid-Term Exam |
| **9** | Ecological principles of seed production |
| **10** | Agricultural principles of seed production |
| **11** | Seed technology |
| **12** | Storage of the seeds |
| **13** | Laws on seed growing |
| **14** | Procurement and distribution of seeds |
| **15** | Vitality and vigor tests in seeds, Certification system in seeds |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **80** |
| **Total workload / 30** | | **2,66** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Genetically Modified Organisms | 251516037 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To give information about of transgenic plants and animal productions and Genetical modified organism (GMO) analysis |
| **Short Course Content** | Gene transfer techniques, productions of transgenic plants and animals, GMO analysis methods |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understand recombinant DNA technology and basic  methods for obtaining recombinant DNA. | 1, 2, 3, 4, 5, 9 | 1, 2, 5 | A, D, F, |
| **2** | Evaluate the importance of genetically modified plants in terms of plant production and follow their development  processes. | 1, 3 | 1, 2, 5 | A, D, F |
| **3** | Gains information about the use of genetically modified  organisms in health. | 1, 9, 10 | 1, 2, 5 | A, D, F |
| **4** | Interpret the effects of genetically modified organisms on the  environment and biodiversity. | 10, 11 | 1, 2, 5 | A, D, F |
| **5** | Gains the ability to interpret the socio-economic effects of  genetically modified organisms. | 10, 11 | 1, 2, 5 | A, K |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Bitki Biyoteknolojisi I ve II, Özcan, S., Gürel, E., ve Babaoğlu, M |
| **Supporting References** | Law of Biosecurity |
| **Necessary Course**  **Material** | Computer, projection |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Genetically Modified Organism and Agricultural productions |
| **2** | Recombinant DNA technology |
| **3** | Recombinant DNA production |
| **4** | Gene transfer techniques |
| **5** | Gene transfer techniques |
| **6** | Genetically modified plants |
| **7** | Antisense RNA technologies and Terminator Technologies |
| **8** | Mid-Term Exam Moleculer structure of GMO and gene expession |
| **9** | Genetically modified animals |
| **10** | Genetically modified microorganisms |
| **11** | Genetically modified microorganisms |
| **12** | Uses of genetically modified organisms in health |
| **13** | Effects of genetically modified organisms on the environment and biodiversity |
| **14** | Socio-economic effects of genetically modified organisms |
| **15** | GMO analyses |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **90** |
| **Total workload / 30** | | **3** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Biotechnological Methods in Plant Pest Control | 251516038 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 2 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

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| --- | --- |
| **Prerequisite(s) if any** | To have successfully completed the Plant Protection Course |
| **Objectives of the Course** | The course "Biotechnological Methods in Pest Management" focuses on the application of advanced biotechnological techniques for the control of agricultural pests. Topics covered include molecular diagnostic methods for plant pests and beneficial organisms, the functions of resistance genes against pathogens, and the use of microbial symbionts. Additionally, the entomotoxic effects of Cry genes derived from *Bacillus thuringiensis*, gene silencing techniques such as RNA interference (RNAi), the use of genetically modified natural enemies, and transgenic insects are discussed. The biotechnological potential of entomopathogens, the role of antimicrobial peptides, and the determination of insecticide resistance through molecular methods are also addressed. This course aims to equip students with the skills to develop innovative and sustainable pest management strategies using biotechnological tools, and to critically evaluate the ethical, environmental, and economic dimensions of these methods. |
| **Short Course Content** | Biotechnological Methods in Pest Management" encompasses the use of advanced biotechnological techniques in the control of agricultural pests. Topics include molecular diagnostic methods, resistance genes, microbial symbionts, Cry genes, RNA interference (RNAi), genetically modified natural enemies, transgenic insects, entomopathogens, antimicrobial peptides, and the determination of insecticide resistance. This course aims to equip students with the ability to develop innovative and sustainable pest management strategies and to critically evaluate the ethical, environmental, and economic dimensions of these methods. The content is compiled from international academic sources. |

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| **Learning Outcomes of the Course** | | **Contributed**  **PO(s)** | **Teaching**  **Methods \*** | **Measuring**  **Methods \*\*** |
| **1** | Acquiring knowledge about molecular diagnostic methods for plant pests and beneficial organisms. | 2, 3, 6, 8, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **2** | Gaining in-depth understanding of the functions and mechanisms of resistance genes against pathogens. | 1, 2, 3, 6, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **3** | Understanding the role and application of microbial symbionts in plant pest control. | 1, 6, 8, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **4** | Learning about the entomotoxic effects of Cry genes derived from Bacillus thuringiensis and their applications in agricultural pest control. | 1, 2, 6, 8, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **5** | Understanding the mechanisms of gene silencing techniques such as RNA interference (RNAi) and their effects on pest control. | 1, 2, 3, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **6** | Acquiring knowledge about the development and application processes of genetically modified natural enemies used against pests. | 1, 2, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **7** | Understanding the use of transgenic insects in agricultural pest control and the biotechnological and ethical dimensions of this application. | 3, 6, 8, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **8** | Gaining insights into the biotechnological potential and roles of entomopathogens in pest management. | 1, 2, 3, | 1, 2, 5, 8, 11, 13 | A, K |
| **9** | Learning about the effects and applications of antimicrobial peptides in pest control. | 1, 2, 3, 6, 8, 9 | 1, 2, 5, 8, 11, 13 | A, K |
| **10** | Acquiring knowledge on the determination and management of insecticide resistance in plant pests using molecular methods. | 1, 3, 6, 8, 9 | 1, 2, 5, 8, 11, 13 | A, K |

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| **Main Textbook** | Hoy, M. A. (2013). "Insect Molecular Genetics: An Introduction to Principles and  Applications" (3rd Edition). Academic Press. |
| **Supporting References** | Goldsmith, M. R., & Marec, F. (Eds.). (2010). "Molecular Biology and Genetics of the  Lepidoptera". CRC Press. |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction and General Concepts |
| **2** | Molecular Diagnostic Methods |
| **3** | Resilience Genes |
| **4** | Microbial Symbionts |
| **5** | Cry Genes and Biotechnological Applications |
| **6** | Gene Silencing Techniques (RNAi) |
| **7** | Genetically Modified Natural Enemies and Transgenic Insects |
| **8** | Mid-Term Exam |
| **9** | Entomopathogens |
| **10** | Antimicrobial Peptides |
| **11** | Insecticide Resistance |
| **12** | Transgenic Plants and Biosafety |
| **13** | Bioinformatics and Data Analysis |
| **14** | Field Practices and Case Studies |
| **15** | Current Research and Case Studies |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 8 | 2 | 16 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 12 | 3 | 36 |
|  | **Total workload** | | **97** |
| **Total workload / 30** | | **3,23** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz |  |
| Homework |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Sectoral Applications in Agricultural Biotechnology | 251516039 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 2 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | This course aims to examine the sectoral applications of agricultural biotechnology and the role of these technologies in the agricultural industry. Students learn about genetic engineering, biotechnological product development, plant and animal biotechnology. They also evaluate the impact of agricultural biotechnology on sustainable agriculture and  environmental protection. |
| **Short Course Content** | This course covers the basic principles and applications of agricultural biotechnology. Genetic engineering, recombinant DNA technology, plant and animal biotechnology, biotechnological product development, molecular markers and bioinformatics are covered. In addition, economic, ethical and environmental aspects of biotechnological applications  are discussed. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understanding the basic concepts and applications of agricultural biotechnology | 1, 2, 5, 6, 8, 10 | 1, 2, 5, 13 | A, K |
| **2** | Developing biotechnological products using genetic  engineering and recombinant DNA technology | 1, 2, 5, 6, 8, 10 | 1, 2, 5, 13 | A, K |
| **3** | To have knowledge about plant and animal biotechnology | 1, 2, 5, 6, 8, 10 | 1, 2, 5, 13 | A, K |
| **4** | Evaluating the economic, ethical and environmental impacts  of biotechnological applications | 1, 2, 5, 6, 8, 10 | 1, 2, 5, 13 | A, K |
| **5** | To be able to perform genetic analysis using bioinformatics  and molecular markers | 1, 2, 5, 6, 8, 10 | 1, 2, 5, 13 | A, K |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | "Biotechnology: Academic Cell Update Edition" by David P. Clark and Nanette J.  Pazdernik |
| **Supporting References** | "Principles of Plant Biotechnology" by S. H. Mantell, J. A. Matthews, and R. A. McKee |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Definition and importance of agricultural biotechnology |
| **2** | Principles of genetic engineering |
| **3** | Plant genetics and biotechnological interventions |
| **4** | Animal genetics and biotechnological interventions |
| **5** | Use of molecular markers |
| **6** | Bioinformatics tools and data analysis |
| **7** | Definition and importance of agricultural biotechnology |
| **8** | Mid-Term Exam |
| **9** | Biyoteknolojik ürünlerin tasarımı ve geliştirilmesi |
| **10** | Biyoteknolojinin sürdürülebilir tarıma katkıları |
| **11** | Biyoteknolojik uygulamalarda etik konular |
| **12** | Yeni biyoteknolojik gelişmeler |
| **13** | Laboratuvar uygulamaları ve proje çalışmaları |
| **14** | Biyoteknolojik uygulamaların sektörel örnekleri |
| **15** | Güncel biyoteknoloji tartışmaları |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework | 1 | 1 | 1 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 3 | 2 | 6 |
| Studying for Mid-Term Exam | 1 | 2 | 2 |
| Final Exam | 6 | 3 | 18 |
| Studying for Final Exam | 1 | 1 | 1 |
|  | **Total workload** | | 83 |
| **Total workload / 30** | | 2,77 |
| **Course ECTS Credit** | | 3 |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Medicinal and Aromatic Plants | 251516005 |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 3 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The general objectives are to understand the importance of Medicinal and Aromatic Plants that are of economic importance at the world and in Türkiye, to reveal their place in the trade, to introduce the plants, to teach general cultivation techniques. |
| **Short Course Content** | It contains information about the history, importance, ecological requirements, general cultivation, drying and preservation principles, usage areas, effective substances and diversity of Medicinal and Aromatic Plants. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To understand the importance of Medicinal and Aromatic Plants at the world and Türkiye. | 3, 6, 7 | 1, 2, 6, 11, 15 | A, D, K |
| **2** | To gain ability to learn sustainable agriculture of MAPs. | 3, 6, 7 | 1, 2, 6, 11, 15 | A, D, K |
| **3** | To obtain information about the general characteristics and usage areas of MAPs. | 3, 6, 7 | 1, 2, 6, 11, 15 | A, D, K |
| **4** | To gain information about drying and preserving of MAPs. | 3, 6, 7 | 1, 2, 6, 11, 15 | A, D, K |
| **5** | To obtain information about the essential oil production of  MAPs and their value-added products. | 3, 6, 7 | 1, 2, 6, 11, 15 | A, D, K |
| **6** | To introduce new MAPs into the regional production pattern | 3, 6, 7 | 1, 2, 6, 11, 15 | A, D, K |
| **7** | Gaining experiences in the cultivation of important endemic  species of MAPs | 3, 6, 7 | 1, 2, 6, 11, 15 | A, D, K |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Baydar, H. 2005. Tıbbi Aromatik ve Keyf Bitkileri, SDÜ Zir. Fak. Yayınları, 51, Isparta |
| **Supporting References** | Ceylan, A. 1995. Tıbbi Bitkiler, Ege Üni. Zir. Fak. Yayınları, 312, İzmir  Ceylan,A. Tıbbi Bitkiler II (Uçucu Yağ İçerenler). E.Ü. Ziraat Fakültesi yayınları no.481, 188s, Bornova-İzmir |
| **Necessary Course Material** |  |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction, History of MAPs., their importance, production at the World and in Turkiye, basic concepts  and classifications |
| **2** | Plant metabolites (primary metabolites, secondary metabolites: alkaloids, glycosides, essential oils, etc.) |
| **3** | Importance and uses of secondary metabolites (Traditional Drug Preparation and Usage Methods |
| **4** | Variability in MAPs (Morphogenetic, ontogenetic, diurnal variability and ecological factors) |
| **5** | Student Presentations and Cultivation Practices |
| **6** | Student Presentations and Cultivation Practices |
| **7** | Student Presentations and Cultivation Practices |
| **8** | Mid-Term Exam |
| **9** | Oregano (*Origanum* vulgare L.) |
| **10** | Laurel (*Laurus nobilis* L.) |
| **11** | Oil Rose (*Rosa damascena* Mill.) |
| **12** | Lavender (*Lavandula angustifolia* Mill*.*) |
| **13** | Black cumin (*Nigella sativa* L.) |
| **14** | Saffron (*Crocus sativus* L.) |
| **15** | Cumin (*Cuminum cyminum* L.) |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) |  |  |  |
| Homework | 1 | 5 | 5 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 20 | 20 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 30 | 30 |
|  | **Total workload** | | **104** |
| **Total workload / 30** | | **3,3** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 25 |
| Homework | 25 |
|  |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Entomology | 251516022 |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 3 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Objective of this course, important pest animal groups in agricultural, morhology and anatomy of insects, development and metamophosis in insects, diapose in insects, classification of insects, the management methods of agricultural pests, important plant pests in Turkey, collecting and preserving of insects are teach. |
| **Short Course Content** | Important pest animal groups in agricultural, morhology and anatomy of insects, development and metamophosis in insects, diapose in insects, classification of insects, the management methods of agricultural pests, important plant pests in Turkey, collecting and preserving of insects. |

|  |  |  |  |  |
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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Acquire of knowledge about pest animals except for insect, | 1, 4, 5 | 1, 5, 7 | A |
| **2** | Acquire of knowledge about insect anatomy, | 1, 4, 8 | 1, 5, 7 | A |
| **3** | Acquire of knowledge about insect biology, | 1, 8, 9 | 1, 5, 7 | A |
| **4** | Acquire of knowledge about insect classification and general  features of insect orders, | 1, 4, 5 | 1, 5, 7 | A |
| **5** | Acquire of knowledge about collecting insect, make  collection and preparation, | 1, 4, 8 | 1, 5, 7 | A |
| **6** | Acquire of knowledge about general principles of insect  control. | 1, 8, 9 | 1, 5, 7 | A |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| **Main Textbook** | Yıldırım E., 2012. Genel Entomoloji. Atatürk Üniversitesi Ziraat Fakültesi Ofset Tesisi,  Erzurum. 229 s. |
| **Supporting References** | Kansu, İ. A., 1991. Genel Entomoloji. Kıvanç Basımevi, Ankara. 425 s. |
| **Necessary Course Material** | Computer, Projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Important Pest Animal Groups in Agricultural |
| **2** | External Anatomy of Insects |
| **3** | External Anatomy of Insects |
| **4** | Internal Anatomy of Insects |
| **5** | Internal Anatomy of Insects |
| **6** | Development and Diapause of Insects |
| **7** | Development and Diapause of Insects |
| **8** | Mid-term Exam |
| **9** | Classification of Insects and Nomenclature |
| **10** | General Features of Insect Orders |
| **11** | General Features of Insect Orders |
| **12** | The Management Methods of Agricultural Pests |
| **13** | The Management Methods of Agricultural Pests |
| **14** | Important Plant Pests in Turkey |
| **15** | Important Plant Pests in Turkey |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **78** |
| **Total workload / 30** | | **2,6** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
|  |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Organic Animal Breeding | 251516007 |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 3 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | None |
| **Objectives of the Course** | It is aimed to teach the methods and rules of organic farming, which is an alternative production system that produces quality food, takes animal welfare into consideration and protects the environment, within the framework of the relevant legislation, by revealing the similarities and differences between organic and conventional livestock farming and the  advantages and disadvantages of organic livestock farming. |
| **Short Course Content** | Organic livestock farming, differences between conventional and organic livestock farming, why organic livestock farming, how organic livestock farming is done, organic animal breeding and production principles, legal regulations, problems of organic livestock farming and solutions. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Knowing the differences between organic and traditional  animal husbandry | 3, 8 | 1, 2, 5 | A, D |
| **2** | Knowing how to carry out organic production in  accordance with the relevant legislation | 3, 8, 11 | 1, 2, 5 | A, D |
| **3** | Knowing the difference among organic animal products | 3, 8 | 1, 2, 5 | A, D |
| **4** | Knowing the positive effects of organic practices on animal  welfare | 3, 8 | 1, 2, 5 | A, D |
| **5** | Knowing the positive effects of organic practices on the  environment | 3, 8, 11 | 1, 2, 5 | A, D |
| **6** | To create awareness of production that is harmless to the environment and humans for a healthy generation and a clean world, and to raise the idea of leaving a more livable  world to future generations. | 3, 8, 11 | 1, 2, 5 | A, D |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Presentation notes |
| **Supporting References** | Organik Tarımın Esasları ve Uygulanmasına İlişkin Yönetmelik (2010) Yayımlandığı  Resmi Gazetenin Tarihi: 18 Ağustos, Sayı: 27676. [www.tarim.gov.tr](http://www.tarim.gov.tr/) Organik Hayvancılık Kongresi Bildiriler Kitabı  Scientific articlesakaleler |
| **Necessary Course Material** | None |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Definition of organic animal production, its situation and future in Turkey and in the world |
| **2** | Why organic farming (problems in conventional agriculture) |
| **3** | Organic animal production in the world and in our country |
| **4** | Establishment and principles of organic animal production enterprises (animal selection and transition processes) |
| **5** | Principles of organic animal husbandry (breeding, housing, care, transportation and slaughter) |
| **6** | Principles of organic animal nutrition |
| **7** | Maintenance and management in organic milk production |
| **8** | Mid-Term Exam |
| **9** | Organic red meat production and animal slaughter |
| **10** | Organic egg and chicken production |
| **11** | Organic beekeeping |
| **12** | Organic aquaculture production |
| **13** | Economics of organic production |
| **14** | Differences of organic products from conventional products |
| **15** | Regulation in our country regarding the implementation of organic animal production |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) |  |  |  |
| Homework | 1 | 14 | 14 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 15 | 15 |
|  | **Total workload** | | **84** |
| **Total workload / 30** | | **2.8** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 25 |
| Homework | 25 |
|  |  |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Grafting and Pruning Technique | 251516010 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To gain experiences and get information about grafting and pruning fruit trees. |
| **Short Course Content** | In this course, grafting, and pruning techniques are discussed as theoretical and practical |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Have knowledge about the morphology of fruit trees. | 1, 2, 3, 4 | 1 | A, D |
| **2** | Have knowledge about grafting techniques applied in fruit trees. | 1, 2, 3, 4 | 1 | A, D |
| **3** | Have knowledge about pruning techniques applied in fruit trees. | 1, 2, 3, 4 | 1 | A, D |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Yılmaz, M. 1994. Bahçe Bitkileri Yetiştirme Tekniği. Çukurova Üniversitesi Basımevi,  Adana.  Yılmaz, M. 1990. Meyve Ağaçlarında Budama. Çukurova Üniversitesi Basımevi, Adana. |
| **Supporting References** | Meyve Ağaçlarında Budama ve Aşılama ( Arif Soylu). |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to grafting |
| **2** | Rootstocks |
| **3** | Definition and training of budding |
| **4** | Definition and training of budding |
| **5** | Definition and training of grafting |
| **6** | Definition and training of grafting |
| **7** | Definition and training of grafting |
| **8** | Mid-Term Exam |
| **9** | Definition and objectives of pruning |
| **10** | Various organs of fruit trees and their functions |
| **11** | Physiological principles of pruning |
| **12** | Training systems in fruit trees |
| **13** | Training systems in fruit trees |
| **14** | Training systems in fruit trees |
| **15** | Modern training systems |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework | 1 | 10 | 10 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 10 | 10 |
|  | **Total workload** | | **90** |
| **Total workload / 30** | | **3** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
| Homework | 10 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Agricultural Appraisal and Expertise | 251516011 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Creating employment opportunities by enabling students to make calculations and gain knowledge on issues such as expropriation, privatization, compensation cases, consolidation, learning and applying valuation criteria and methods, and gaining experience in writing reports on expert witness principles and practices. |
| **Short Course Content** | General concepts related to agricultural valuation, valuation criteria and methods, valuation of a land according to the synthetic method, valuation of a farm according to the analytical method (owner), valuation of a farm according to the analytical method (tenant/partner), financial accounts related to valuation, valuation of orchards, fruitless trees, lands and structures, expertise, the legal legislation on which it is based and expert selection,  expropriation, damage assessment and writing of expert report. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understanding the concepts related to agricultural valuation and the qualifications that agricultural engineers who will  perform valuation should have. | 9 | 1, 5 | A, K |
| **2** | Assessing the value of agricultural enterprises, agricultural  lands, rights related to them and other agricultural goods using agricultural valuation methods | 6, 9 | 1, 5, 8, 11 | A, K |
| **3** | Writing expert reports regarding agricultural valuation | 6, 9, 10 | 1, 5, 11, 15 | A, K |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Rehber, E. (2008). Tarımsal Kıymet Takdiri (Değerleme) ve Bilirkişilik. Ekin Basım Yayın  Dağıtım, ISBN:978-9944-141-59-8  Mülayim, Z. G. (2008). Tarımsal Değer Biçme ve Bilirkişilik, Yetkin Yayınları (3. Baskı) |
| **Supporting References** | W.L.Jr Ventolo & M.R.Williams, Fundamentals of Real Estate Appraisal, 8th Edition, Dearborn |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | General concepts related to agricultural valuation |
| **2** | Valuation criteria |
| **3** | Valuation methods |
| **4** | Valuation of land according to the synthetic method |
| **5** | Valuation of a farm according to the analytical method (owner) |
| **6** | Valuation of a farm according to the analytical method (lease/partner) |
| **7** | Financial accounts related to valuation |
| **8** | Mid-Term Exam |
| **9** | Valuation of orchards |
| **10** | Valuation of fruitless trees |
| **11** | Valuation of land and buildings |
| **12** | Definition of expert witness, legal regulations and expert selection |
| **13** | Expert witness regarding expropriation, damage and loss assessment |
| **14** | Writing of expert report |
| **15** | Writing of expert report |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 4 | 2 | 8 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 10 | 1 | 10 |
|  | **Total workload** | | **90** |
| **Total workload / 30** | | **3** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Homework |  |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Landscape Architecture | 251516023 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 3 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To enable the students of the Faculty of Agriculture to understand the working areas of Landscape Architecture and its relations with agriculture and to provide them with a basic education in this direction. |
| **Short Course Content** | Landscape Concept, Landscape Architecture Profession and Historical Development, Working Subjects, History of Landscape Art, Plants and Their Functions, Grouping of Plant Material, Use of Plant Material in Landscape Architecture, Landscape Design, Landscape Planning, Landscape Plants, Cover Plants, Landscape Construction, Urban Recreation  Areas, Landscape applications within the scope of adaptation to climate change will be explained. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To have general knowledge about landscape architecture and its stud area | 1, 6, 8, 10 | 1,2,5 | A, K |
| **2** | To have general knowledge about plant material and its use | 1, 6, 8, 10 | 1,2,5 | A, K |
| **3** | To understand Landscape design and projects | 1, 6, 8, 10 | 1,2,5 | A, K |
| **4** | To be aware of the importance of cooperation between Landscape Architects and Agriculture Engineers and to gain  ability on teamwork | 1, 6, 8, 10 | 1,2,5 | A, K |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Korkut, A., Şişman, E.E., Özyavuz, M., (2010). Peyzaj Mimarlığı, Verda Yayıncılık ve  Danışmanlık Hizmetleri, İstanbul.  Hatipoğlu, A., Gülgün, B. (1999) Tek ve Çok Yıllık Mevsimlik Çiçekler, Kent Matbaası, Yenişehir-İzmir, 205s.  Güney, A., Erdem Ü., Zafer, B., Hepcan, Ş. (1996) Peyzaj Konstrüksiyonu (Donatı Elemanları), Ege Üniversitesi Ziraat Fakültesi Yayınları No: 514, Bornova İzmir, 149s. Uzun, G. (1996) Peyzaj Mimarlığında Çim ve Spor Alanları Yapımı, Çukurova  Üniversitesi Ziraat Fakültesi Yardımcı Ders Kitabı No:20, Adana, 170 s. |
| **Supporting**  **References** | Ceylan, G., (2004). Dış Mekan Süs Bitkileri ve Peyzajda Kullanımları, Flora Yayınları,  İstanbul. |
| **Necessary Course**  **Material** | Projection |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Landscape Concept, Landscape Architecture Profession and Historical Development, Working Subjects |
| **2** | History of Landscape Art |
| **3** | Plants and their functions, Grouping of plant material |
| **4** | Use of Plant Material in Landscape Architecture and Principles of Use |
| **5** | Landscape Design |
| **6** | Landscape Planning |
| **7** | Gymnospermae Plants |
| **8** | Mid-Term Exam |
| **9** | Angiospermae Plants |
| **10** | Bedding Flowers |
| **11** | Cover Plants |
| **12** | Landscape Construction |
| **13** | Urban Recreation Areas |
| **14** | Arid Landscaping Practices |
| **15** | Landscape Practices in the Scope of Climate Change |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 7 | 2 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 3 | 5 | 15 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 4 | 5 | 20 |
|  | **Total workload** | | **93** |
| **Total workload / 30** | | **3,1** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz |  |
| Homework |  |
|  |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Soilless Culture | 251516006 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To aim is to let students to plan and manage soilless cultivation at commercial level, to solve problems facing in soilless plant production |
| **Short Course Content** | Soilless culture methods, plant nutrition in soilless culture, advantages and disadvantages in soilless culture. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To learn the soilless culture systems | 1, 3, 4 | 1, 5 | A, B, E, K |
| **2** | Cultivate the plants in the soilless culture | 3, 4 | 1, 5 | A, B, E, K |
| **3** | To plan and to manage soilless cultivation at commercial  level | 3, 4, 6 | 1, 5, 14 | A, B, E, K |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Gül, A. 2008. Topraksız Tarım. Hasad yayıncılık, 144 s. |
| **Supporting References** | Savvas, D. and Passam H. 2002. Hydroponic Production of Vegetables and Ormamentals. Embryo Publishing, Greece, 463p.  Douglas, J. S. 1985. Advanced Guide to Hydroponics.BAS Printers Lmt, GB.368 p. |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to horticultural plant physiology |
| **2** | Classification of soilless culture |
| **3** | Water culture |
| **4** | NFT, Aerophonics |
| **5** | Substrate culture and substrates |
| **6** | Plant nutrition in soilless culture |
| **7** | Macro elements |
| **8** | Mid-Term Exam |
| **9** | Micro elements |
| **10** | Nutrient solution preparation |
| **11** | Nutrient solution preparation |
| **12** | Recipes of the Sample Nutrient Solution |
| **13** | Advantages and disadvantages of soilless culture |
| **14** | Environmental impact of soilless culture |
| **15** | Future of soilless culture |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam | 1 | 1 | 1 |
| Studying for Quiz Exam | 1 | 1 | 1 |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) | 1 | 2 | 2 |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 3 | 2 | 6 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 8 | 1 | 8 |
|  | **Total workload** | | **90** |
| **Total workload / 30** | | **3** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Quiz | 10 |
| Report | 20 |
| Bir öğe seçin. |  |
| **Final Exam** | 40 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Food Safety | 251516025 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VI | 3 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To provide students with information about food safety risks and precautions that can be taken at critical control points against these risks, and to provide them with information on quality, basic concepts, principles and methods of food quality control, control cards, total quality management, quality management systems, food quality and safety management systems (ISO-9001, ISO-22000) that will enable them to work as quality managers in the  food sector. |
| **Short Course Content** | Potential harmful effects of toxic/harmful substances on human health or infections originating from processed / raw foods and methods of preservation, foodborne health risks. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To be able to understand the physical and chemical properties of foodborne toxic substances and the reasons for their  contamination and formation; | 1, 2, 8 | 1, 2, 5 | A |
| **2** | To be able to apply methods of protection from foodborne pests; | 1, 2, 8 | 1, 2, 5 | A |
| **3** | To determine potential risks during the production of a foodstuff and to perform risk analyses; | 8, 9, 11 | 1, 2, 5 | A |
| **4** | To be able to understand the basic concepts of quality, total quality, food quality and safety management systems and to prepare a control card; | 8, 9, 11 | 1, 2, 5 | A |
| **5** | Development of Food Assurance and Quality Programs; To  be able to define and compare HACCP, ISO 22000:2005 Food Safety Systems; | 8, 9, 11 | 1, 2, 5 | A |
| **6** | To have knowledge about ISO 9001:2000 (Quality Management System), GHP (Good Hygiene Practices), GMP (Good Manufacturing Practices) and other standards and to  be able to apply them; | 8, 9, 11 | 1, 2, 5 | A |
| **7** | |  |  |  |
| **8** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Julie, M.J. Food Safety, CRS Press, 2004.Topal, Ş. Food Safety and Quality Management  Systems, TUBITAK, 1996.  Topal, Ş. Risk Management System in Food Industry: HACCP and Applications, Taç Ofset, İstanbul, 2001.  Altuğ, T., Ova, G., Demirağ, K., Kurtcan, Ü. Food Quality Control, Ege University Faculty of Engineering Publications, No:29, İzmir, 1994.  TSE, TS EN ISO 9000:2001, TS EN ISO 9001:2000, TS EN ISO 9004:2001 Standards. |
| **Supporting**  **References** |  |
| **Necessary Course**  **Material** | PC Data Projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | The importance of food safety Food safety in Turkey and the world |
| **2** | Food safety laws, food law |
| **3** | Food contaminants and spoilage agents |
| **4** | Food-borne health risks (risks from bacteria and molds) |
| **5** | Food-borne health risks (risks from bacteria, parasites, natural food contaminants and chemical  contaminants) |
| **6** | Food protection techniques and product safety |
| **7** | Basic protection and processing techniques applied to food |
| **8** | Midterm exam |
| **9** | Food additives |
| **10** | Hygiene and sanitation in industrial food safety |
| **11** | Quality safety in food, product and production control |
| **12** | GMP (Good Manufacturing Practices), GHP (Good Hygiene Practices) safety programs |
| **13** | HACCP system and its development in the food industry |
| **14** | ISO 22000 Food safety management system standard |
| **15** | The importance of food safety Food safety in Turkey and the world |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 4 | 3 | 12 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 4 | 6 | 24 |
|  | **Total workload** | | **78** |
| **Total workload / 30** | | **2,6** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
|  |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Graduation Thesis | 251517032 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VII | 0 | 2 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | Project Preparation |
| **Objectives of the Course** | Students will be able to conduct research and practice in any subject related to Agricultural Biotechnology, evaluate the results by creating a project, and transfer them successfully |
| **Short Course Content** | Research, project preparation and presentation in the faculty member selected within the scope of the related course, on the subjects within the department of the faculty member |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Dersin Öğrenim Çıktıları** | | **Katkı Sağladığı PÇ/PÇ’ler** | **Öğretim Yöntemleri \*** | **Ölçme Yöntemleri \*\*** |
| **1** | Students will be provided with the ability to conduct research  and practice on any subject related to Agricultural Biotechnology. | 1, 2, 5, 6, 8, 10 | 1, 2, 5, 13, 14 | A, D, G, J, K |
| **2** | The ability to create a project on any professional subject  and successfully convey the results will be gained. | 1, 2, 5, 6, 8, 10 | 1, 2, 5, 13, 14 | A, D, G, J, K |
| **3** | |  |  |  |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Related documents and internet resources |
| **Supporting References** | Related documents and Internet resources |
| **Necessary Course**  **Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Preparing a project with the faculty member selected within the scope of the related course, on the subjects  within the faculty member's department |
| **2** | Preparing a project with the faculty member selected within the scope of the related course, on the subjects  within the faculty member's department |
| **3** | Preparing a project with the faculty member selected within the scope of the related course, on the subjects  within the faculty member's department |
| **4** | Preparing a project with the faculty member selected within the scope of the related course, on the subjects  within the faculty member's department |
| **5** | Preparing a project with the faculty member selected within the scope of the related course, on the subjects within the faculty member's department |
| **6** | Preparing a project with the faculty member selected within the scope of the related course, on the subjects  within the faculty member's department |
| **7** | Preparing a project with the faculty member selected within the scope of the related course, on the subjects  within the faculty member's department |
| **8** | Mid-Term Exam |
| **9** | Preparing a project with the faculty member selected within the scope of the related course, on the subjects  within the faculty member's department |
| **10** | Presentation of the project |
| **11** | Presentation of the project |
| **12** | Presentation of the project |
| **13** | Presentation of the project |
| **14** | Presentation of the project |
| **15** | Presentation of the project |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) | 5 | 2 | 10 |
|  |  |  |  |
| Mid-Term Exam |  |  |  |
| Studying for Mid-Term Exam |  |  |  |
| Final Exam | 4 | 2 | 8 |
| Studying for Final Exam | 10 | 3 | 30 |
|  | **Total workload** | | **90** |
| **Total workload / 30** | | **3** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Presentation | 40 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Design in Engineering | 251517033 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VII | 2 | 2 | 5 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 5 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | Thermodynamics |
| **Objectives of the Course** | To ensure the application of various theoretical principles learned in previous courses and to provide students with design experience in their field through the projects they prepare. To encourage interdisciplinary teamwork and help students acquire this skill. |
| **Short Course Content** | The course content includes the design of important design steps used in biotechnology. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Designs some molecules used in biotechnological processes  and selects the appropriate one. | 1, 2, 3, 6, 7 | 1, 6, 12, 14 | A, D, J |
| **2** | Uses suitable software in design. | 1, 2, 3, 6, 7 | 1, 6, 12, 14 | A, D, J |
| **3** | Understands biotechnological steps and uses them in project  development. | 1, 2, 3, 6, 7 | 1, 6, 12, 14 | A, D, J |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** |  |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Course Objectives and Content Overview; Introduction to Design |
| **2** | Biotechnological Molecule Design |
| **3** | Biotechnological Molecule Design |
| **4** | Biotechnological Molecule Design |
| **5** | Biotechnological Molecule Design |
| **6** | Biotechnological Molecule Design |
| **7** | Biotechnological Molecule Design |
| **8** | Mid-Term Exam |
| **9** | Biotechnological Molecule Design |
| **10** | Biotechnological Molecule Design |
| **11** | Biotechnological Molecule Design |
| **12** | Biotechnological Molecule Design |
| **13** | Biotechnological Molecule Design |
| **14** | Biotechnological Molecule Design |
| **15** | Project presentation |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 4 | 56 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 10 | 3 | 30 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) | 1 | 40 | 40 |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 14 | 14 |
|  | **Total workload** | | **152** |
| **Total workload / 30** | | **5,06** |
| **Course ECTS Credit** | | **5** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Project Observation | 50 |
| Project Observation | 50 |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** |  |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Artificial Intelligence in Biotechnology | 251517034 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VII | 2 | 0 | 2 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 2 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | By teaching the role and applications of artificial intelligence in biotechnology, ensure that students can follow the latest AI approaches and technologies in biotechnology. Discuss the ethical aspects of using artificial intelligence in biotechnology and raise awareness on this topic. |
| **Short Course Content** | The course content includes the role of artificial intelligence in biotechnology, its applications in various fields, ethical issues, and current examples. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understands the role of artificial intelligence in  biotechnology. | 1, 8 | 1 | A |
| **2** | Explains the applications of artificial intelligence in  genomics, systems biology, and structural biology. | 1, 8 | 1 | A |
| **3** | Can analyze current and future applications of artificial intelligence in the field of biotechnology and develop new  ideas. | 1, 2, 4, 8, 9 | 1, 8 | A |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Artificial Intelligence in Biotechnology (2020) ISBN 9781774079881 |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to Artificial Intelligence in Biotechnology |
| **2** | Artificial Intelligence in Life Sciences |
| **3** | Artificial Intelligence in Agricultural Biotechnology |
| **4** | Programming Languages |
| **5** | Artificial Intelligence and Genomics |
| **6** | Artificial Intelligence and Genomics (continued) |
| **7** | Artificial Intelligence and Genomics (continued) |
| **8** | Mid-Term Exam |
| **9** | Artificial Intelligence and Systems Biology |
| **10** | Artificial Intelligence and Systems Biology (continued) |
| **11** | Artificial Intelligence and Omics |
| **12** | Artificial Intelligence and Structural Biology (DNA) |
| **13** | Artificial Intelligence and Structural Biology (Protein) |
| **14** | Artificial Intelligence and Ethics |
| **15** | Artificial Intelligence and Emerging Biotechnological Approaches |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 2 | 14 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 1 | 12 | 12 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 8 | 8 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 14 | 14 |
|  | **Total workload** | | **64** |
| **Total workload / 30** | | **2,13** |
| **Course ECTS Credit** | | **2** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Bir öğe seçin. |  |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Plant Breeding and Biotechnology | 251517035 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VII | 3 | 0 | 4 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 4 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To explain classical plant breeding methods and to understand the contribution of biotechnological methods such as tissue culture, molecular markers, gene transfer and gene editing to plant breeding. |
| **Short Course Content** | The purpose of plant breeding, evolution of cultivated plants, Mendelian genetics rules, mutations, interspecific hybridization, autoploidy, alloploidy, differences between cultivated plants and wild forms, cell division and chromosomes, inheritance mechanism, classical plant breeding methods, inheritance of qualitative and quantitative characters,  heterosis, incompatibility, plant tissue cultures, molecular markers, genetic transformations and gene editing, contributions of biotechnological issues to plant breeding. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Explain the contribution of biotechnological methods to plant  breeding. | 3, 4, 8 | 1, 2, 5 | A |
| **2** | Comprehend the principles of Mendel inheritance. | 1 | 1, 2, 5 | A |
| **3** | Comprehend the general characteristics of qualitative and quantitative characters. | 8 | 1, 2, 5 | A |
| **4** | Comprehend the general rules of hybridization breeding. | 8 | 1, 2, 5 | A |
| **5** | Explain the types of mutations and their importance in breeding. | 4, 8 | 1, 2, 5 | A |
| **6** | Get information about the contributions of tissue culture studies to the breeding process. | 3, 4, 8 | 1, 2, 5 | A, G |
| **7** | Explain the use of molecular markers in classical plant breeding. | 3, 4, 8 | 1, 2, 5 | A, G |
| **8** | Explain the importance of gene editing and gene transfer methods in plant breeding. | 3, 4, 8 | 1, 2, 5 | A, G |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Özcan, S. Gürel, E. Babaoğlu, M. (2001) Bitki biyoteknolojisi, S.Ü. Vakfı yayınları Konya  Hüseyin Avni Öktem, Meral Yücel (2016) Bitki biyoteknolojisi ve Genetik Wiley- Interscience  **Hasan Baydar (2020). Bitki Genetiği ve Islahı, Nobel Akademik Yayıncılık**  [Prof. Dr. Yelda Özden Çiftçi,](https://www.palmeyayinevi.com/profdr-yelda-ozden-cIftcI) [Prof. Dr. Ahu Altınkut Uncuoğlu](https://www.palmeyayinevi.com/profdr-ahu-altinkut-uncuoglu) (2020) Bitki Biyoteknolojisinde Güncel Yaklaşımlar, Palme Yayınevi |
| **Supporting References** |  |
| **Necessary Course Material** | Projection, computer |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | The aims of plant breeding, differences between cultivated and wild plants. |
| **2** | Chromosome and gene structures, Mendelian inheritance, Qualitative and Quantitative Inheritance |
| **3** | Plant breeding method (Introduction and selection) |
| **4** | Plant bBreeding method (Crossing) |
| **5** | Plant breeding method (Crossing) |
| **6** | Plant breeding method (Hybrid plant production) |
| **7** | Plant breeding method (Mutations) |
| **8** | Mid-Term Exam |
| **9** | Importance of tissue culture in plant breeding |
| **10** | Molecular markers and their use in breeding |
| **11** | Molecular markers and their use in breeding |
| **12** | Genetic transformations |
| **13** | Genetic transformations |
| **14** | Genome editing |
| **15** | Genome editing |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 3 | 42 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) | 1 | 4 | 4 |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 8 | 2 | 16 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 12 | 1 | 12 |
|  | **Total workload** | | **118** |
| **Total workload / 30** | | **3,93** |
| **Course ECTS Credit** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Presentation | 10 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Animal Breeding and Biotechnology | 251517036 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VII | 3 | 0 | 4 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 4 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | It aims to understand the emergence of cultivated race and variety to learn how to benefit from this diversity in the direction of needs. It is aimed to explain the classical breeding and molecular breeding methods applied in animal husbandry. It is also aimed to explain the biotechnological methods used in animal breeding. |
| **Short Course Content** | Gene frequency variation, phenotypic variance, variance components, interaction of genotype and environment, heritability, selection and effects of selection, genetic progress, selection types, inbreeding and crossbreeding, breeding plans and developments. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learning basic concepts in animal breeding. | 1,3,4 | 1, 5 | A,B, K |
| **2** | Understanding DNA and RNA combinatorial technologies. | 1,3,4 | 1, 5 | A,B, K |
| **3** | Learning classical breeding methods. | 5,6,8 | 1, 5 | A,B, K |
| **4** | To learn gene transfer Methods and their use in agriculture. | 5,6,8 | 1, 5 | A,B, K |
| **5** | Animal biotechnology to be equipped with the necessary  information on | 5,6,8 | 1, 5 | A,B, K |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Düzgüneş, O.; Eliçin, A.; Akman, Numan. 1991. Hayvan Islahı. Ankara Üniversitesi Ziraat Fakültesi Yayınları: 1212, Ders Kitabı: 349, Ankara |
| **Supporting References** | Falconer, D.S. 1989. Introduction to Quantitative Genetics. Longman Scientific &  Technical, England  Bourdon, R. M. 1997 Understanding Animal Breeding. Prentice-Hall, Inc., London. Kumlu, S. 1999 Hayvan Islahı. Türkiye Damızlık Sığır Yetiştiricileri Merkez Birliği Yayınları No: 1. Ankara |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to Animal Breeding |
| **2** | Animal production systems |
| **3** | Phenotype, Genotype, Genotypeand Environment relations |
| **4** | Heritability degree |
| **5** | Genetic improvement and other parameters |
| **6** | Heritability degree |
| **7** | Breeding value and estimate |
| **8** | Mid-Term Exam |
| **9** | Selection |
| **10** | Selection types |
| **11** | Crossing |
| **12** | Crossing types |
| **13** | Biotechnologic applications in animal breeding |
| **14** | Biotechnologic applications in animal breeding |
| **15** | Biotechnologic applications in animal breeding |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total**  **Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 3 | 42 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework |  |  |  |
| Quiz Exam | 2 | 1 | 2 |
| Studying for Quiz Exam | 2 | 4 | 8 |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 20 | 20 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **122** |
| **Total workload / 30** | | **4,066** |
| **Course ECTS Credit** | | **4** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Quiz | 10 |
| Quiz | 10 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Industrial Biotechnology | 251517037 |

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| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VII | 2 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | Learning about industrial biotransformation and bioprocesses and gaining knowledge about the products that can be obtained through these processes. |
| **Short Course Content** | The course content includes microorganisms, genetic and protein engineering, bioprocess processes, and the industrial products resulting from these processes. |

|  |  |  |  |  |
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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Comprehend the basic steps of a biotechnological process | 1, 8 | 1, 5 | A |
| **2** | Learns microorganisms and fermentation technology | 1, 4 | 1, 5 | A |
| **3** | Have knowledge about bioreactors and their design | 1, 4, 8 | 1, 5 | A |
| **4** | Gain and present knowledge about the products produced  with industrial biotechnology | 1, 8, 9 | 1, 11, 15 | A, G |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Endüstriyel Mikrobiyolojiye Giriş (2018) ISBN: 9786053553120 |
| **Supporting References** | Industrial Biotechnology: Products and Processes (Advanced Biotechnology) ISBN 9783527341818 |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | History of Industrial Biotechnology |
| **2** | Microbial Metabolism |
| **3** | Genetic Engineering of Microorganisms |
| **4** | Protein Engineering |
| **5** | Fermentation |
| **6** | Upstream Processes |
| **7** | Downstream Processes |
| **8** | Mid-Term Exam |
| **9** | Bioreactors |
| **10** | Types of Bioreactors |
| **11** | Industrial Enzymes |
| **12** | Applications of Industrial Biotechnology in Agriculture |
| **13** | Student Presentations |
| **14** | Student Presentations (continued) |
| **15** | Student Presentations (continued) |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 1 | 14 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) | 1 | 6 | 6 |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 16 | 16 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 22 | 22 |
|  | **Total workload** | | **88** |
| **Total workload / 30** | | **2,93** |
| **Course ECTS Credit** | | **3** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Presentation | 30 |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** | 40 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Biotechnological Methods in Animal Feeding | 251517038 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VII | 2 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

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| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this course is to provide students with knowledge about biotechnological studies that can be applied in animal nutrition to increase animal yield, yield potential and health level. |
| **Short Course Content** | The importance of animal nutrition, classification of nutrients in feeds, animal digestive systems and physiology, the use of recombinant enzymes and biotechnological products in animal nutrition, legal regulations. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Have knowledge about biotechnological studies in the field  of feeds and animal nutrition. | 2, 3, 4, 5, 8, 11 | 1, 2, 5, 9, 11, 12 | A, B, F |
| **2** | Learn biotechnological studies that can be applied to  increase animal productivity and quality. | 2, 3, 4, 5, 8, 11 | 1, 2, 5, 9, 11, 12 | A, B, F |
| **3** | Learn new technologies in feeding practices to obtain  economic efficiency from farm animals. | 2, 3, 4, 5, 8, 11 | 1, 2, 5, 9, 11, 12 | A, B, F |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |

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| **Main Textbook** | Çiftlik Hayvanlarının Yemleri Ve Beslenmesi - Livestock Feeds And Feeding Richard O.  Kellems, D. C. Church Editör: Müjdat Alp, Neşe Kocabağlı Çeviri:Ahmet Gökhan Önol, Ahmet Yavuz Pekel, Bekir Hakan Köksal, Gülcan Demirel, Müjdat Alp, Neşe Kocabağlı, Onur Tatlı, Ömer Sevim, Özcan Cengiz |
| **Supporting References** | Wallace, R. J.; Chesson, A. ’Biotechnology in animal feeds and animal feeding’. VCH- Verlag, Weinheim, ISBN 3-527-30065-1, (1995) |
| **Necessary Course Material** | Computer, projection. |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Importance and principles of animal nutrition |
| **2** | Classification of nutrients in feeds, |
| **3** | Classification of nutrients in feeds, |
| **4** | Ruminant digestive system and physiology |
| **5** | Ruminant digestive system and physiology |
| **6** | Poultry digestive system and physiology |
| **7** | Forage and green feeds |
| **8** | Mid-Term Exam Moleculer structure of GMO and gene expession |
| **9** | Concentrate and grain feeds |
| **10** | Use of prebiotics, probiotics and yeasts in feeds |
| **11** | Use of recombinant enzymes in animal nutrition |
| **12** | Biotechnological products in ruminant nutrition |
| **13** | Biotechnological products in poultry nutrition |
| **14** | Use of biotechnological products affecting feed utilization rate in animal nutrition |
| **15** | Legal regulations regarding biotechnology in the feed industry |
| **16,17** | Final Exam |

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| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
|  |  |  |  |
| Quiz | 3 | 1 | 3 |
| Studying for Quiz | 3 | 2 | 6 |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **83** |
| **Total workload / 30** | | **2,7** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Quiz | 10 |
|  |  |
|  |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Plant Genetic Resources | 251517039 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VII | 2 | 0 | 3 |

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| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this lecture is that the student understands the evolution, importance, current uses, and preservation of genetic resources important for agricultural production. Information will be given on; genetic variety, selection criteria of races which will be conserved, breeding methods, global studies, data banks and conservation policies. |
| **Short Course Content** | Importance of plant biodiversity, genetic resources and centers of origins of cultivated plants, situation of Turkey’s in terms of plant genetic resources, usage and protection of plant genetic resources, principles of plant gene banks. |

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| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understanding the quality and magnitude of plant genetic  diversity | 1, 4 | 1, 2 | A, D |
| **2** | Understanding and using important plant genetic resources | 3, 4 | 1, 2 | A |
| **3** | Understanding the evolution of genetic resources | 1 | 1, 2 | A |
| **4** | Understanding the importance of genetic resources | 9, 10, 11 | 1, 2, 7, 11 | A, D |
| **5** | Understanding the importance of preservation of genetic  resources |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Şehirali, S. ve M. Özgen, 1987. “Bitkisel Gen Kaynakları” Ders Kitabı, A.Ü. Ziraat Fakültesi Yayınları, Anakara Üniversitesi Matbaası, Ankara. |
| **Supporting References** |  |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Ecosystem and importance of genetic variety |
| **2** | Importance of genetic sources |
| **3** | Introduction to plant genetic resources and biodiversity |
| **4** | Status of plant genetic resources in Turkey |
| **5** | Status of plant genetic resources in Turkey |
| **6** | Conservation possibilities of plant genetic resources |
| **7** | Seed gene banks and their tasks |
| **8** | Mid-Term Exam |
| **9** | Preservation methods of plant genetic resources |
| **10** | New approaches in the conservation and use of plant genetic resources, storage with slow growth technique |
| **11** | New approaches in the conservation and use of plant genetic resources, freeze storage |
| **12** | Problems that would be encountered in the use of transgenic varieties in terms of plant genetic resources |
| **13** | Cultivation of plants and physiological changes of cultivated plants according to wild types |
| **14** | Nomenclature in botany |
| **15** | Herbarium techniques |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
| Homework | 1 | 10 | 10 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 5 | 5 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 5 | 5 |
|  | **Total workload** | | **80** |
| **Total workload / 30** | | **2,66** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
| Homework | 10 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Animal Genetic Resources | 251517040 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VII | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this lecture is that the student understands the evolution, importance, current uses, and preservation of genetic resources important for agricultural production. Information will be given on; genetic variety, selection criteria of races which will be conserved, breeding methods, global studies, data banks and conservation policies. |
| **Short Course Content** | The importance of animal genetic diversity, the situation of Turkey in terms of animal genetic resources, protection of animal genetic resources, selection of breeds to be protected, protection methods, global protection strategies, conservation studies in our country and in the world. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | To understand the nature and extent of animal genetic diversity existing today. | 1,2,3 | 1,4 | A,K |
| **2** | To be able to recognize indigenous genetic resources that are important in agricultural terms and to understand the  purposes of their use. | 1,2,3 | 1,4 | A,K |
| **3** | To understand the process of formation and domestication of  genetic resources. | 1,2 | 1,4 | A,K |
| **4** | Realizing the importance of genetic resources. | 5,8 | 1,4 | A,K |
| **5** | Current status of farm animal genetic diversity. | 5,8 | 1,4 | A,K |
| **6** | Explanation of current protection methods. | 9,10 | 1,4 | A,K |
| **7** | Providing information about protection policies. | 9,10 | 1,4 | A,K |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Ruane, J. (1999). Selecting breeds for conservation. Genebanks and the conservation of  farm animal genetic resources. Chapter 4. Ed, J.K. 59-73. dlu Inst., for Anim. Sci. And Health. Netherlands. |
| **Supporting References** | Thomas, S (1990). National models for endangered breeds conservation, programmes  genetic conservation of domestic livestocks. Chapter 11. ed, L. Anderson, CAB International. 115-119. |
| **Necessary Course Material** | Soysal,M.İ., Özkan Ü.E., Gürcan E.K., 2020. Çiftlik Hayvan Genetik Kaynaklarının Koruma ve Sürdürülebilir Kullanımı. |

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| **Course Schedule** | |
| **1** | Basic Concepts |
| **2** | What is an ecosystem? The importance of genetic diversity |
| **3** | Description of genetic sources |
| **4** | Importance of genetic resources |
| **5** | The domestication process and its importance in terms of genetic resources |
| **6** | Utilizing genetic resources |
| **7** | Importance of protecting genetic resources |
| **8** | Mid-Term Exam |
| **9** | Methods of protection of genetic resources |
| **10** | Native animal genetic resources and legal regulations in Türkiye |
| **11** | Introduction of Türkiye's cattle breeds genetic resources |
| **12** | Description of domestic small animals breeds in Türkiye |
| **13** | Description of domestic poultry breeds in Türkiye |
| **14** | Description of domestic horse breeds in Türkiye |
| **15** | Studies in Türkiye |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 16 | 16 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 18 | 18 |
|  | **Total workload** | | **78** |
| **Total workload / 30** | | **2,6** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 50 |
| Quiz | - |
| Homework | - |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Occupational English | 251517041 |

|  |  |  |  |
| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VII | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of this course is providing basic understanding, reading and speaking skills in English for business life. |
| **Short Course Content** | To teach basic business English understanding and speaking, professional correspondence techniques and communication (oral, written, visual). |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Ability of practicing and recognising verbal, grammatical items related to bussiness English. | 7 | 1 | A, K |
| **2** | Writing texts, letter of intent/cover letter, e-mail, reports that presenting information and evidence based on data in bussiness English. | 1, 5 | 1, 5, 11 | A, K |
| **3** | Gaining ability of understanding and interpreting academic or non-academic texts. | 7, 8 | 1, 2, 5, 11 | A, F, K |
| **4** | Preparing detailed CV. | 6 | 1, 11 | A, D, K |
| **5** | Evaluating subjects about bussiness, giving informative presantations and improving dialog abilities related with  social situations. | 6, 7, 8 | 1, 5, 15 | A, G, K |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Academic Purposes 1. ODTÜ Geliştirme Vakfı Yayıncılık . 179 s.  Bağcı, A.D., Music, E., Sığınan, Ö., Tarakçıoğlu, B., Tarhan Ş. 2006. English For Academic Purposes 2. ODTÜ Geliştirme Vakfı Yayıncılık . 178 s. Bozatlı, İ., Mengi, E., Reinart, Ü., Sığınan, Ö., 2005. Academic Oral Presentation Skills. ODTÜ Geliştirme Vakfı Yayıncılık . 78 s. |
| **Supporting References** | Akar, N.Z., Özkan, Y., Tarhan, Ş. 2005. Language and Communication Skills After Graduation. ODTÜ Geliştirme Vakfı Yayıncılık . 161 s. |
| **Necessary Course Material** | Computer, projection, dictionary |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Word study; technical terms (Business English) |
| **2** | Word study; reading study |
| **3** | CV preparation |
| **4** | Writing a cover letter |
| **5** | Writing a letter of intent /statement of purpose |
| **6** | Employment interview, example of employment interview, phone conversation and relevant listening  comprehension |
| **7** | Introduction to writing report |
| **8** | Mid-Term Exam |
| **9** | Oral presentation techniques, listening to professional presentation-listening comprehension |
| **10** | Presentation of short seminar by students |
| **11** | Presentation of short seminar by students |
| **12** | Presentation of short seminar by students |
| **13** | Presentation of short seminar by students |
| **14** | Presentation of short seminar by students |
| **15** | Presentation of short seminar by students |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 1 | 14 |
| Homework | 1 | 8 | 8 |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) | 1 | 11 | 11 |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **93** |
| **Total workload / 30** | | **3,1** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Homework | 10 |
| Presentation | 20 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 40 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Reproductive Physiology and Applications | 251517042 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VII | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The objective of the course is to understand the importance of reproduction in farm animals, recognition of the organs of the reproductive system, organ function, acquisition of basic knowledge about reproductive physiology. |
| **Short Course Content** | The importance of reproduction in animal production, morphology and physiology of the reproductive systems in farm animals (mammals and birds), reproductive characteristics in species, endocrine mechanisms and functions in reproduction, estrus cycle, mating,  conception, physiology of pregnancy, birth, endocrinology of birth, reproductive related defects, infertility |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understanding the importance of reproduction in farm  animals, | 1, 2, 3, 4, 5, 8 | 1, 2, 5, 8, 9, 10 | A, B, E, F, K |
| **2** | To know the reproductive systems and endocrinology, | 1, 2, 3, 4, 5, 8 | 1, 2, 5, 8, 9, 10 | A, B, E, F, K |
| **3** | To know the applications in reproduction of farm animals | 1, 2, 3, 4, 5, 8 | 1, 2, 5, 8, 9, 10 | A, B, E, F, K |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Reproduction in Farm Animals 7th Edition, 2000. By E. S. E. Hafez, B. Hafez Published by Wiley-Blackwell |
| **Supporting References** | Kaymakçı, M., 2002. Üreme Biyolojisi. Ege Üniversitesi, Ziraat Fakültesi Yayınları No:50  Alaçam, E. 1990. (Editör) Theriogenoloji. Evcil Hayvanlarda Reprodüksiyon, Suni Tohumlama, Obstetrik ve İnfertilite |
| **Necessary Course Material** | Computer, projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Importance of reproduction in animal production and history |
| **2** | Functional anatomy of female and functions |
| **3** | Functional anatomy of male and functions |
| **4** | Reproductive organs and functions of farm animals (poultry) |
| **5** | Oogenesis, |
| **6** | Spermatogenesis |
| **7** | Reproductive hormones and their functions |
| **8** | Mid-Term Exam |
| **9** | Hypothalamic-Pituitary Axis |
| **10** | Estrus cycle |
| **11** | Mating, fertilization |
| **12** | Embryogenesis, Physiology of pregnancy |
| **13** | Birth and endocrinology of birth |
| **14** | Assisted reproductive technologies |
| **15** | Assisted reproductive technologies |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload (Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 2 | 28 |
|  |  |  |  |
| Quiz | 1 | 3 | 3 |
|  |  |  |  |
| Mid-Term Exam | 1 | 2 | 2 |
| Studying for Mid-Term Exam | 1 | 10 | 10 |
| Final Exam | 1 | 2 | 2 |
| Studying for Final Exam | 1 | 20 | 20 |
|  | **Total workload** | | **93** |
| **Total workload / 30** | | **3,1** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 35 |
| Quiz | 10 |
|  |  |
|  |  |
| **Final Exam** | 55 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Biofuels and Energy Crops | 251517031 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VII | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

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| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | To teach the technologies used in the use of products obtained by agricultural biomass |
| **Short Course Content** | Information about energy crops that can be used in the production of biofuels such as bioethanol and biodiesel and examples from current applications will be taught. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Learns the concepts of biofuels | 1, 5 | 1 | A |
| **2** | Gains knowledge about energy crops that can be used for biofuels | 1, 5 | 1 | A |
| **3** | Evaluate the relevant applications and apply them when necessary | 1, 2, 5, 7, 8 | 1, 11, 15 | A, G |
| **4** | Becomes competent in different types of energy crops and  potential industrial uses | 1, 2, 4, 5, 7, 8 | 1, 11, 15 | A, G |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Handbook of Bioenergy Crop. ISBN 1439816859, 9781439816851 |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to biofuels |
| **2** | Introduction to energy crops |
| **3** | Economic contribution of energy crops and their production in the world |
| **4** | Types of energy crops |
| **5** | Utilization of energy crops |
| **6** | Harvest and storage of energy crops |
| **7** | Biofuels and energy crops |
| **8** | Mid-Term Exam |
| **9** | Energy crop examples-maize |
| **10** | Energy crop examples-poplar |
| **11** | Energy crop examples-sugarcane |
| **12** | Energy crop examples-sorghum |
| **13** | Energy crop examples-switchgrass |
| **14** | Student presentations-I |
| **15** | Student presentations-II |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 1 | 14 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) | 1 | 6 | 6 |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 16 | 16 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 22 | 22 |
|  | **Total workload** | | **88** |
| **Total workload / 30** | | **2,93** |
| **Course ECTS Credit** | | **3** |

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| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 30 |
| Presentation | 30 |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** | 40 |
| **Total** | 100 |

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**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

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| --- | --- |
| **Course Name** | **Course Code** |
| Fermented Products Technology | 251517043 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VII | 2 | 0 | 3 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  |  |  | 3 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Elective |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | No |
| **Objectives of the Course** | The aim of the course is to teach fermentation processes and the industrial products produced through these processes. |
| **Short Course Content** | The course content covers the fundamentals of fermentation and topics related to different fermented product technologies. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Understand fermentation technology and the  microorganisms used in these processes. | 1, 2, 8 | 1 | A |
| **2** | Learn about different types of fermentation and the industrial  products produced. | 1, 2, 8 | 1 | A |
| **3** | Recognize the applications of fermentation technology in  food, pharmaceuticals, biofuels, and other industrial fields. | 1, 2, 8, 9 | 1, 8 | A |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

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| --- | --- |
| **Main Textbook** | Fermente Ürünler Teknolojisi ve Mikrobiyolojisi (2020) ISBN 978-625-406-665-8 |
| **Supporting References** |  |
| **Necessary Course Material** | Computer and projector |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Introduction to Fermentation Technology |
| **2** | Fermentation Microorganisms |
| **3** | Types of Fermentation |
| **4** | Technical Principles of Fermentation |
| **5** | Fermenters |
| **6** | Pickle Production Technology |
| **7** | Olive Production Technology |
| **8** | Mid-Term Exam |
| **9** | Vinegar Production Technology |
| **10** | Alcoholic Beverage Production Technology |
| **11** | Boza Production Technology |
| **12** | Tarhana Production Technology |
| **13** | Şalgam Production Technology |
| **14** | Production of Organic Acids, Enzymes, Amino Acids, and Vitamins |
| **15** | Production of Organic Acids, Enzymes, Amino Acids, and Vitamins (continued) |
| **16,17** | Final Exam |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 2 | 28 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 1 | 14 | 14 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) |  |  |  |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) |  |  |  |
|  |  |  |  |
| Mid-Term Exam | 1 | 1 | 1 |
| Studying for Mid-Term Exam | 1 | 18 | 18 |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 24 | 24 |
|  | **Total workload** | | **86** |
| **Total workload / 30** | | **2,87** |
| **Course ECTS Credit** | | **3** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Mid-term | 40 |
|  |  |
| Bir öğe seçin. |  |
| **Final Exam** | 60 |
| **Total** | 100 |

**ESOGU AGRICULTURAL BIOTECHNOLOGY DEPARTMENT COURSE INFORMATION FORM**

|  |  |
| --- | --- |
| **Course Name** | **Course Code** |
| Vocational Training Course (Workplace Training) | 251518031 |

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| --- | --- | --- | --- |
| **Semester** | **Number of Course Hours per Week** | | **ECTS** |
| **Theory** | **Practice** |
| VIII | 5 | 25 | 30 |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Course Category (Credit)** | | | | |
| **Basic Sciences** | **Engineering Sciences** | **Design** | **General Education** | **Social** |
|  | 25 | 25 | 50 |  |

|  |  |  |
| --- | --- | --- |
| **Course Language** | **Course Level** | **Course Type** |
| Turkish | Undergraduate | Compulsory |

|  |  |
| --- | --- |
| **Prerequisite(s) if any** | All 7 semester courses must be successfully completed and the grade point average must  be 2 or above. |
| **Objectives of the Course** | To provide students with practical experience for the courses they take in agricultural biotechnology degree programme. |
| **Short Course Content** | Carrying out training in the workplace 5 working days a week during the semester. |

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| **Learning Outcomes of the Course** | | **Contributed PO(s)** | **Teaching Methods \*** | **Measuring Methods \*\*** |
| **1** | Gains experience in the workplace for the theoretical and practical courses taken during undergraduate education. | 1, 2, 3, 4, 5, 7,  11 | 1, 6, 7, 11, 12,  15 | A, E, G, K, L |
| **2** | Fulfils responsibilities in the workplace by preparing daily, weekly and monthly work plan. | 6, 7, 8, 9, 10 | 1, 6, 7, 11, 12,  15 | A, E, G, K, L |
| **3** | Gains work ethics and discipline. | 9 | 6, 7, 11, 12 | A, E, G, K, L |
| **4** | |  |  |  |
| **5** | |  |  |  |
| **6** | |  |  |  |
| **7** | |  |  |  |
| **8** | |  |  |  |
| **9** | |  |  |  |
| **10** | |  |  |  |

|  |  |
| --- | --- |
| **Main Textbook** | Workplace training protocol |
| **Supporting References** | - |
| **Necessary Course Material** | - |

|  |  |
| --- | --- |
| **Course Schedule** | |
| **1** | Vocational training at the workplace |
| **2** | Vocational training at the workplace |
| **3** | Vocational training at the workplace |
| **4** | Vocational training at the workplace |
| **5** | Vocational training at the workplace |
| **6** | Vocational training at the workplace |
| **7** | Vocational training at the workplace |
| **8** | Vocational training in the workplace - Report Presentation |
| **9** | Vocational training at the workplace |
| **10** | Vocational training at the workplace |
| **11** | Vocational training at the workplace |
| **12** | Vocational training at the workplace |
| **13** | Vocational training at the workplace |
| **14** | Vocational training at the workplace |
| **15** | Vocational training in the workplace - Report Presentation |
| **16,17** | Final exams |

|  |  |  |  |
| --- | --- | --- | --- |
| **Calculation of Course Workload** | | | |
| **Activities** | **Number** | **Time (Hour)** | **Total Workload**  **(Hour)** |
| Course Time (number of course hours per week) | 14 | 40 | 560 |
| Classroom Studying Time (review, reinforcing, prestudy,….) | 14 | 10 | 140 |
| Homework |  |  |  |
| Quiz Exam |  |  |  |
| Studying for Quiz Exam |  |  |  |
| Oral exam |  |  |  |
| Studying for Oral Exam |  |  |  |
| Report (Preparation and presentation time included) | 2 | 35 | 70 |
| Project (Preparation and presentation time included) |  |  |  |
| Presentation (Preparation time included) | 2 | 35 | 70 |
|  |  |  |  |
| Mid-Term Exam |  |  |  |
| Studying for Mid-Term Exam |  |  |  |
| Final Exam | 1 | 1 | 1 |
| Studying for Final Exam | 1 | 60 | 60 |
|  | **Total workload** | | **901** |
| **Total workload / 30** | | **30,03** |
| **Course ECTS Credit** | | **30** |

|  |  |
| --- | --- |
| **Evaluation** | |
| **Activity Type** | **%** |
| Report | 25 |
| Presentation | 25 |
| Bir öğe seçin. |  |
| Bir öğe seçin. |  |
| **Final Exam** | 50 |
| **Total** | 100 |