	1ST SEMESTER							
	Course Code	**Course Name**	**Z/S**	**D**	**U**	**L**	**K**	**ECTS**
1	**0000000**	**ATATURK'S PRINCIPLES AND HISTORY - I**	**Z**	**2**	**0**	**0**	**2**	**2**
Course Objectives	This course first observes the foundations of the history of the Turkish Revolution with regard to its reputation, the Renaissance, the Reformation period, the Industrial Revolution and modernization. First World The causes and evaluations of the war. National liberation struggle and Mustafa Kemal Atatürk's preparatory phase in this process.							
Course Content	Definition of history and relations to other sciences, Concept Information, the nature of the revolution and the parts of the revolution, the characteristic of the Turkish Revolution, the revolution according to Atatürk, the French Revolution, the structure and geopolitical situation of the Ottoman Empire, The reasons for the decline and collapse of the Ottoman Empire, an overview of the reasons for the decline, Innovation Movements in the Ottoman Empire, Reforms made before the Tanzimat, Tanzimat Period Reforms, Reforms made after the proclamation of the Tanzimat, Reform Edict, I. Constitutional Monarchy, Constitutional Monarchy II, Tripoli War, Balkan Wars, World War I, General Causes of War, Reasons for the Ottoman State to Enter the War, The Start and Development of the War, 1.Fronts in the World War, Secret Sharing Projects during the First World War and Treaties Ending the War, Mondoros Armistice and Occupations, Wilson Principles, Harmful and Useful Societies, Birth of the National Struggle Movement and National Organizations, Mustafa Kemal Atatürk's life and personality,Mustafa Kemal Pasha's Activities in Istanbul, the Sultan and the Ottoman Empire's view of the situation, the period of the National Struggle, Mustafa Kemal Pasha's Exit to Samsuna, Mustafa Kemal Pasha's Activities in the Basin, Amasya Circular, Erzurum Congress, Sivas Congress, Ali Rıza Pasha Cabinet and Amasya Meeting, Last Opening of the Ottoman Parliament and the Declaration of the Misak-ı Millinin, the importance of the Misak-ı Millinin, the Occupation of Istanbul, the arrival of the Representation Committee to Ankara, the opening of the Grand National Assembly, Features, National Struggle Uprisings							
Course Subjects	1. Basic Concepts of the Turkish Revolution [Basic Concepts of the History of the Turkish Revolution, the Model of the Turkish Revolution and the Concept of Kemalism] 2. The Rise of Western Civilization [The Rise of the Western Way, Geographical Discoveries and the Renaissance of the West, Reformation and the Secularization of the West, Enlightenment: Towards a Nation-Based Civilization, The French Revolution: Towards a Liberal West, the Industrial Revolution: Democratization of the West] 3. Disintegration Process in the Ottoman Empire [Deterioration of Land and Economic Structure, Deterioration of Political and Military Structure, Western Influence] 4. The Search for Solutions in the Ottoman Empire [The Search for Structural Reforms in the Face of Disintegration, Tanzimat Edict, Islahat Edict, First Constitutional Monarchy, Young Turk Movement and Second Constitutional Monarchy, The Search for Ideological Reforms in the Face of Disintegration: Ottomanism, Islam, Turkism, Westernism] 5. The Collapse of the Ottoman Empire [Tripoli W a r (1911-1912), Balkan Wars (1912-1913), World War I, Causes and General Characteristics of the War, Ottoman Empire's Entry into the War] 6. The End of the First World War and the Occupation of Anatolia /MIDTERM [US Intervention and the End of the War, The End of the Ottoman Empire] 7. The Beginning of the National Resistance [The General Situation in Anatolia and the Formulas of Liberation Discussed, The Occupation of Izmir and the Beginning of the Congress Process, The Organizations Established Before the War, Mustafa Kemal Pasha's Departure to Anatolia] 8. Congress Period and the Congress of National Resistance, Sivas Congress, Amasya Protocol and the Last Ottoman Empire, Occupation of Istanbul] 9. Opening of the Grand National Assembly of Turkey [Opening of the Grand National Assembly of Turkey, Structure and Nature of the National Assembly, National Assembly Reactions: Treaty of Sèvres and Internal Uprisings, Treaty of Sèvres, Internal Uprisings] 10. The War of Independence Begins [Establishment of the Independence Courts, Transition to Regular Armies, Armenian Question and Closure of the Eastern Front, Eastern Front Diplomacy: Treaty of Gyumri (December 3, 1920), Treaty of Moscow (March 16, 1920), Treaty of Kars (October 13, 1921))] 11. Glory on the Southern and Western Fronts [Glory on the Southern Front, the uprising of Circassian Ethem and its suppression, the defeat of the Greek army at Inönü, the result of glorious successes: 1921 Constitution and the transition to National Sovereignty] 12. Towards the End on the Western Front [London Conference, Second Inonu Utkusu, Army in Kütahya and Eskişehir, Battle of Sakarya and its Results] 13. The Great Victory and the Preparations for an Honorable Peace [Battle of the Commander-in-Chief, Mudanya Armistice, Abolition of the Sultanate] 14. Lausanne Conference and Peace / Final Exam [Lausanne Conference and Negotiated Problems: Borders, Capitulations, Straits, Ottoman Debts, Minorities, Other Issues Evaluation of the Lausanne Peace]							

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Learning Outcomes	1. The transition from empire to nation state 2. Drawing attention to the role of Mustafa Kemal Atatürk in organizing the national struggle; 3. ustafa Kemal Atatürk's political and military motivations and decision-making; 4. In the progress of the "national thesis"; 5. To be able to observe the continuities and ruptures between the Empire and the Republic; 6. Unifying the foundations of Turkish modernization; 7. Investigate the research of the Great War; 8 The War of Independence, to take advantage of international politics;

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2	PHYSICS	Z	3	0	0	3	4
Course Objectives	To gain the analysis of the basic fundamental problem and the correct planning for the analysis of physics.						
Course Content	Physics and vectors, kinematics, Newton's laws, motion, work and energy, potential energy and conservation of energy, linear momentum and conservation.						
Course Subjects	1. Physics, criteria of physics problems, standards and here, the same criteria and acres and important steps, estimates and consideration of importance, vectors and vectorial sum, the purpose of vectors, measure vector, product of vectors 2. Displacement, time and average speed, instantaneous speed. 3. average motion acceleration, constant acceleration, falling bodies, velocity and motion by integration 4. Position and velocity vectors, acceleration vector, 5. Oblique stroke movement, movement, limit speed. 6. Force and interactions, Newton's first law, Newton's second law. 7. mass and weight, Newton's sample bodies. 8. 1st Midterm, Applications of Newton's first law (applications of the law of equilibrium), Applications of Newton's second law (dynamics of particles). 9. Friction force, dynamics of rotational motion, fundamentals in nature. 10. Work, kinetic energy and work-energy theorem. 11. Work and energy with variable forces, power. 12. Gravitational potential, potential salary. 13. Conservative and non-conservative forces, force and potential energy, energy diagrams. 14. Momentum and repulsion, conservation of momentum. Conservation of momentum and collapses, collisions, center of mass.						
Learning Outcomes	1) In physics, the model refers to the model and classical model; it is discussed that the net tens and net force on an object is zero; the author; it is discussed as the weights of two objects similar to each other. 2) Calculates the work preference and work of a force on an object; Expresses the kinetic energy as a seven and its value; Discusses how to change the kinetic energy of this object to be done on an object and solves mechanical solutions based on this principle; The connection of the relations in the kinetic energy with the total work done is not constant in use or the curved path of the cimin packet services; Solves the power which is the speed of work. 3) Appropriately focalize the quantities of mechanics and their measurements; Orientations in calculations; List the differences between vectors and scalars; Add and subtract vectors graphically; Calculate the author of a vector and vectorial calculations; Investing in projects with unit investment and aid; Two different methods of multiplying vectors. 4) Students will learn the concepts of linear motion, average and instantaneous velocity, average and estimated velocity and its target; Interpret position-time, velocity-time, and velocity-time graphs in linear motion; Solve problems in linear motion with constant acceleration including free fall; Discuss the non-constant acceleration in linear motion. 5) Expresses the representation of an object using two or (5); Calculates the vectorial velocity and vectorial acceleration using the timing of an object's rotan; Expresses the general concepts of the path of an object's rotan; Expresses information about the observed velocities of two observations in the motion of an object. 6) Expresses the plan of the moment of clarity of a particle, which constitutes the momentum of the force of an occurrence; Orders what is necessary for the total momentum of the particle system to be conserved; Solves problems involving two colliding masses; Differentiates between elastic, inelastic, and inelastically varying variables; Examines the target and center of mass of a balanced center of mass; Analyzes from a point of view such as the ejection of an object with motion. 7) Sorts the object or sorts required for a use in use; Relates the center of mass of an object to the object; Solves equilibrium problems involving solids; Talks about how to talk about a retraction, relaxation, compression or shearing. 8) Solves using Newton's first in equilibrium at the place where the body acts on it; Solves using Newton's second, which involves an analysis from the point of view of the accelerating body; Examines the nature of various properties such as static quality, kinetic structure, uncoupling integrity and essence, and solves problems consisting of these properties; Distinguishes the class of tariffs according to the reference systems in which the centripetal and the centripetal apply and which reference systems apply to rotational dynamics problems; Solves the problem of an interaction moving on a circular trajectory; The four fundamental structures found in nature are within. 9) Gravitational force energy concept; Approach to problems related to motion; Potential energy of elasticity in problems related to bodies attached to springs; Conservation and expresses the relationship between the non-conservative weights and solves involving the motion of bodies within these two forces; increases the conservative force from the function of potential energy related to the conservative force; enables students to develop energy plans to improve the single-conservative motion of a body that is under one.						

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3	**CAREER PLANNING**	**Z**	**2**	**0**	**0**	**2**	**2**
Course Objectives	The aim of the course is to provide contemporary career planning that is compatible with real life problems in the rapidly changing economic, social, cultural, ethical and legal conditions of the business world. methods and give students the ability to adapt them to their own lives. Career Planning is a combination of the values and needs of employees and their work experiences and						
	It is a problem-solving and decision-making process that aims to establish the most appropriate relationship between opportunities. It enables employees to be happier and more productive in their work. It creates highly motivated, dedicated employees who can predict their future, know what awaits them, set their goals accordingly. Individual is a course to be practiced. It provides a strategic approach to career planning and job search.						
Course Content	1. What is career definition, career planning and management? 2. Career Planning and Career Development, models. 3. Career stages Knowing your personal preferences 4. Career trends around the world 5. Career theories (J.Holland- Ann Roe, E. Schein) 6. Methods of preparing CV, cover letter and thank you letter 7. Expectations of the business world from new graduates (midterm exam) 8. How to conduct an impressive job interview? Information on interview techniques 9. Learning how to fill out a resume. To learn how to apply for a job via the Internet and how to fill out job application forms on company websites. 10. Ensuring the participation of a professional visitor from the business world in the course and transferring business meetings 11. Career management of job placement and organizational career planning in terms of individual and organization, 12. The place of career planning in human resources management, the roles of employees, managers and HR specialists in career management 13. Career planning issues, special cases: older workers, families where both parents work, career plateau, skills obsolescence, unlimited careers. 14. Establishing home and work-life balance						
Learning Outcomes	1 At the end of the course, they learn individual career planning; 2 How to make personality and education; 3 stages of career development?; 4 What is the relationship between career stages and life stages? 5 What should I pay attention to when it comes to work?; 6 practices to be considered in a job interview; 7 What is the relationship between personality and occupational and job choices? 8 What career traits can be used for features on the outlook of the business? 9 What programs can be used in the career program? 10 Fully equipped with the necessary knowledge and skills to become a full-fledged user and to make their own planning scheduling;						
4	**CHEMISTRY**	**Z**	**3**	**0**	**0**	**3**	**4**
Course Objectives	Adopting the basic design of chemistry, teaching the basic concepts of chemistry, comprehending the education of chemistry, gaining the right to solve the problem and solving the problems of producing without thinking correctly.						
Course Content	Chemistry atoms, molecules and ions, stoichiometry, aqueous reactions, chemical reactions, electron structure of atoms, gases, Chemical Bonding I: Covalent Bonding Chemical Bonding II: Mole Geometry and atomic orbital hybridization.						

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Course Subjects	1. Introduction to Chemistry 2. Atoms, Molecules and Ions 3. Stoichiometry 4. Aqueous SolutionChemicals 5. Gases 6. Solutions to Problems Related to Topics 7. Midterm Exam 8. Energy in Chemical Reactions 9. Electron Structure of Atoms 10. Periodic Table 11. Chemical Bonding I: Covalent Bonding 12. Chemical Bonding II: Molecular Geometry and Hybridization of Atomic Orbitals							
	13. Solutions to Problems Related to Topics 14. General Evaluation							
Learning Outcomes	1) Can write and interpret chemical reactions. 2) It can be used for molecules. 3) Can classify, suitable for chemicals. 4) Interpret the bonds of chemical bonds. 5) Can formulate the data. 6) Apply the basic principles of chemistry.							
5	**MATHEMATICS - I**	**Z**	**3**	**0**	**0**	**3**	**3**	
Course Objectives	The aim of the course is to provide a foundation in engineering mathematics, to complete the solutions of species and differential, integration and integration solutions, to be able to make applications in their courses. and to gain the ability to develop.							
Course Content	Real number, inequalities, absolute number, complex number, polar applications of detail, functions, limit and continuity, popularity, derivative and its applications							
Course Subjects	1. Real number, inequalities, extreme value 2. Complex number 3. Polar representation of the complex and its applications 4. Functions, definition, graph drawing 5. Functions, definition, graph drawing 6. Limit and continuity 7. Limit and continuity 8. Limit and continuity 9. Midterm exam 10. Uncertainty 11. Uncertainty 12. Derivative and derivative applications 13. Daily use with the L Hospital app 14. Review before the final (Real number, inequalities, real, functions, limit, continuity, derivative and its applications, graphical drawings, visual states) 15. Final Exam Week 1 16. Final Exam Week 2							

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Learning Outcomes	1 Ability to write and write effectively in the field, to prepare design design, to do it effectively and to take and give estimates 2 Biyosistem Mühendisliğinin tamamlanmasıyla ilgili problemlerin veya disipline özgü konularının incelenmesi için tasarım geliştirme, test yapma, alan çalışması, veri ability to collect, analyze and interpret 3 Biosystems Engineering programming language, formulation and usability, selecting and implementing appropriate and appropriate teaching for this purpose 4 To design a complex system, process, device or production related to the field of Biosystems Engineering in such a way that it is designed for a specific end state under the given conditions and circumstances. design and the ability to apply modern design design for this purpose 5 Knowledge about workplace practices related to the field of Biosystems Engineering, such as project management, risk management and assistance treatment; knowledge about entrepreneurship, care; knowledge about sustainable development 6 Developing and selecting modern tools necessary for the analysis and solutions of complex problems in the application of biosystems applications, and using information technologies effectively in engineering 7 legal knowledge of global system applications and engineering solutions on health, environment and safety in the field of life and on contemporary engineering knowledge issues 8 Ability to work technically in disciplinary and multidisciplinary teams; ability to work skillfully 9 Information about ethical behavior, professions and ethics, and standards used in engineering practice 10 Mathematics, Natural Sciences, and Biosystems Engineering uniquely specific original knowledge, Science; theoretical and applied knowledge in these fields, masters dealing with engineering problems 11 On the necessity of lifelong learning; the ability to access, follow publications in science and technology and self-renewal						
6	**BIOSYSTEMS ENGINEERING. INTRODUCTION**	**Z**	**2**	**1**	**0**	**2**	**4**
Course Objectives	To provide students with information about Biosystems Engineering study areas and study subjects						
Course Content	To be able to comprehend the importance of land and water resources, Agricultural Energy Systems, Agricultural Machinery Systems and the working areas and working subjects of the departments						
Course Subjects	1. Introduction to Biosystems Engineering 2. Biosystems Engineering Application Areas 3. Biosystems Engineering Study Topics 4. Land and Water Resources USA study topics 5. Introduction to Agricultural Energy Systems 6. Energy Concept 7. Classification of Energy Sources 8. Agricultural Energy Systems 9. Introduction to Agricultural Machinery Systems 10. Pre-Harvest Agricultural Mechanization 11. Post-Harvest Agricultural Mechanization 12. Rural Settlements and Settlement Elements, Settlement Types in Turkey 13. Structures and facilities needed in agricultural enterprises 14. Planning of Stables, Poultry Houses and Corrals						
Learning Outcomes	1. To have knowledge about the developments in biosystems engineering in the world 2. To learn the function and working areas of biosystems engineering 3. To have knowledge about biosystems engineering						
7	**TURKISH LANGUAGE - I**	**Z**	**2**	**0**	**0**	**2**	**2**
Course Objectives	Considering that mother tongue education covers the whole future, the correct and good use of language will be understood in the field. In order to realize the aim of university education to make use of mother tongues in oral and written form; 1. Students will be taken to Turkish Language classes. 2. Oral education will be reinforced with practices 3. It will be determined to correct the ones in use. 4. Lessons will be targeted with data to be realized with the visuals of the books. 5. Language awareness will be gained.						

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Course Content	Language and languages; Language, culture, communication, peoples, societies; Language types, anciently, in terms of languages; The ability to use the mother tongue; good comments; Observation, listening, reading, thinking and reviewing without thinking and reviewing; The stages of the stages of achievements in expression; Correct, regular, Turkish grammar and writing writing an appropriate planned writing; The way of written expression; Functions used in everyday language; Explanatory, demonstrative, descriptive, narrative, conversational expression; Written narratives; Form / document writings; Didactic teacher genres; Literary genres.						
Course Subjects	1. Language and languages 2. The relationship between language, culture, communication, thought, society 3. The diversity between languages in terms of language types, form, origin 4. The importance of the ability to use the mother tongue 5. Qualities of successful narration 6. Observation, resting, reading, thinking, comprehension and their importance and application in terms of written expression 7. Implementation of the stages of success in expression 8. The rules of writing a planned article in accordance with the rules of correct, regular, Turkish grammar and spelling 9. Midterm exam (to be written according to the academic calendar) 10. Written expression methods; expression disorders used in daily language 11. Explanatory, demonstrative, descriptive, narrative, conversational narrative types 12. Types of written expression 13. Form/document writings 14. Didactic instructive genres; Literary genres						
Learning Outcomes	1) To comprehend didactic didactic types 2) To understand the expression disorders used in daily language 3) To have knowledge about language and languages						
	4) Understanding language types and the diversity among languages in terms of form and origin 5) To understand the importance of the ability to use the mother tongue 6) To comprehend the qualities of successful expression 7) To understand the relationship between language, culture, communication, thought, society 8) To understand the importance of observation, rest, reading, thinking, comprehension and their importance in writing and to gain the ability to apply them 9) To comprehend literary genres 10) To comprehend the stages of being successful in expression in practice 11) To learn and comprehend the methods of written expression 12) Understanding form/document writings 13) To comprehend the rules of writing a planned article in accordance with the rules of correct, regular, Turkish grammar and spelling 14) To comprehend the types of written expression 15) To comprehend explanatory, demonstrative, descriptive, narrative, conversational narrative methods						
8	**FOREIGN LANGUAGE - I**	**Z**	**2**	**0**	**0**	**2**	**2**
Course Objectives	To be able to gain listening-comprehension and reading-comprehension skills in English as well as the ability to speak effectively in an appropriate environment. Also, the structures taught To be able to gain the ability to write correctly and purposefully in a foreign language by using words and vocabulary.						
Course Content	Introducing yourself and friends; saying hello and good-bye; for names and phone numbersPresent Simple (To Be) / Subject Pronouns / Possessive Adjectives PronounsTalking about geographical locations; asking and giving information about places of originAsking about and describing clothing using Present Continuous affirmative and negative statementsTalking about the weather Can (to express ability and permission)Adjectives / adverbsSaying what people do and don't do using Present Simple tense, 3rd person singularSaying what you eat and drink; describing dishes; asking for things in restaurantsTelling the time; Days of the week; Months of the year; Seasons Making comparisons and describing outstanding features using comparative adjectives and superlative adjectives Ordinal numbers/ Prepositions of location/ Time expressionsTalking and asking about quantity; asking for things using adverbs of quantity (any, some, only a little, only a few, alot of...), countable-uncountable nouns / How many - How muchExpressing needs and wants using too / enough / very Asking for and telling prices ; "How much is it? "Talking about past experiences using regular verbs in Simple Past Tense						

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Course Subjects	1. Greetings; Introducing yourself; Exchanging personal information 2. Decscribing Personal Belongings; Asking and Giving The Time; Giving Directions 3. Describing a room; Talking about your hometown; Asking about personal belongings 4. Asking for and giving personal details; Talking about routines and habits; Likes & Dislikes 5. Consolidation and Review 6. Expressing ability or lack of ability; Making accepting and refusing; Invitations or Suggestions; Making a request 7. Giving information about everyday activities; Talking about what people are doing at the moment and in general 8. Mid-term exam (to be written according to the academic calendar) 9. Describing people; Making comparisons; Using the telephone 10. Identifying and describing accommodations; Describing simple objects; Giving reasons; Following directions 11. Consolidation and Review 12. Talking about meals; Following and giving simple instructions; Asking for and giving permission 13. Expressing needs and wants; Asking for and telling prices; Describing present and past situations 14. Talking about past experiences 15. Final Exam Week 1 16. Final Exam Week 2						
Learning Outcomes	1) To develop the ability to speak effectively by paying attention to intonation and emphasis 2) To be able to gain correct pronunciation by using the structures taught 3) To ensure that they can understand what they listen to about the subjects they have learned in their fields 4) To gain the ability to write correctly and appropriately in a foreign language using the structures and vocabulary taught 5) To be able to gain the ability to read and understand what they read in a foreign language 6) To be able to gain the functions specified in the sections related to weekly topics						
	7) To teach targeted grammatical structures and vocabulary						
09	**BOTANICS**	**Z**	**3**	**0**	**0**	**3**	**4**
Course Objectives	The aim of the course is to provide students with the basic concepts of botany science and to enable them to recognize the plant.						
Course Content	Definition and classification of botany; Plant cytology, cell structure and functions, cell organelles and their functions; Plant tissues, meristem, epidermis, parenchyma, collenchyma, sclerenchyma, conduction tissue, secretory system						
Course Subjects	1 Classification and nomenclature of plantsMicroscope introduction and use 2 Organic and inorganic substances in the cell - carbohydratesMicroscope introduction and use 3 Proteins, fats, nucleic acids, enzymes and vitaminsFree cell 4 Cell organelles - endoplasmic reticulum, ribosome, golgi complex, lysosome, mitochondria, plastidsFree cell 5 Nucleus, Chromosomes, Cell division (amitosis, mitosis, meiosis) Cell in tissue 6 Cell wall (formation, layers, chemical structure, chemical differentiation), gates, plasmodesmaCell as tissue 7 Histology Plant Tissues; Meristematic tissue, Basic tissue (Parenchyma) Plastids 8 Histology Plant Tissues; Protective tissue, Support tissue Plastids 9 Histology Plant Tissues; Transmission tissue, Secretory tissueStarches 10 Organography: Vegetative organs; Root (morphology, anatomy, metamorphosis) Starches 11 Organography: Vegetative organs; Stem (morphology, anatomy, metamorphosis) Crystals 12 Organography: Vegetative organs; Leaf (morphology, anatomy, metamorphosis) Crystals 13 Organography: Generative organs; Flower (formula, diagram, flower states, pollen and embryo sac formation) Feathers and supporting tissue 14 Pollination and fertilization, Fruit and seed formation Feathers and supporting tissue						

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Learning Outcomes	1 To be able to comprehend the plant kingdom and plant nomenclature; 2 To be able to compare plant and animal cells; 3 To be able to recognize the cell; 4 To be able to comprehend the roles of organic and inorganic structures in the cell; 5 To be able to comprehend the structure and functions of cell organelles; 6 To be able to comprehend the grouping of plant tissues and their functions; 7 To be able to comprehend vegetative and generative organs and their functions in plants; 8 To be able to recognize the plant;						
10	**ZOOLOGY**	**Z**	**3**	**0**	**0**	**3**	**4**
Course Objectives	To teach cell structure and cellular events which are the basic unit of living systems, to explain the functions of tissue and organ systems, metabolism events and to teach the types of reproduction in living things.						
Course Content	Will have information about the general characteristics of zoology.						
Course Subjects	1. General introduction, introduction of the aim and content of the course, explanation of the course and source books, general characteristics of living things, physical and chemical structures 2. Protein synthesis in the cell, carbohydrate, lipid structure explanation 3. Introduction to the macromolecules that make up the cell. Introduction to cell science, structural properties of cell membrane, cytoplasm and organelles in it 4. Cell division 5. Molecular causes of cell senescence, programmed cell death, (Apotosis) and its importance for the cell. 6. Development in living things, epithelial tissue, connective and support tissue, muscle tissue, nerve tissue, blood tissue 7. Enzymes, factors affecting enzyme activity and introduction to metabolism, vitamins. 8. Digestive system, respiratory system, circulatory system 9. Excretory System, Sensory Organs 10. Nervous system 11. Endocrine system 12. Reproductive system 13. Genetics						
	14. Mutation						
Learning Outcomes	1. Learns the structures that make up the cell and their functions; 2. Learns cell division, protein synthesis; 3. Learns the genetic structure of living things and mutation; 4. Learns tissue functions; 5. Learns organ systems and their functions in animals; 6. Learns the types of reproduction in living things; 7. Learns the scientific classification of animals; 8. Learns the general characters of animals; 9. Learns how development is in living things; 10. Learns basic information about zoology;						
TOTAL			25	1	0	25	31

2ND SEMESTER							
Course Code	**Course Name**	**Z/S**	**D**	**U**	**L**	**K**	**ECTS**
1	**ATATURK PRINCIPLES AND HISTORY - II**	**Z**	**2**	**0**	**0**	**2**	**2**

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Course Objectives	This course examines the revolutions in the political, social and cultural fields following the national struggle. It also analyzes the foreign policy practices of the Atatürk period. In addition, the basic dynamics of the Turkish revolution and the role of Atatürk's principles in nation-state building are also evaluated.						
Course Content	This course examines the revolutions in the political, social and cultural fields following the national struggle. It also analyzes the foreign policy practices of the Atatürk period. In addition, the basic dynamics of the Turkish revolution and the role of Atatürk's principles in nation-state building are also evaluated.						
Course Subjects	1 Transition to Republican Turkey [Establishment of the People's Party, Governmental Crisis and Attempts to Push Mustafa Kemal Pasha Out of Politics, Constitutional Amendment Formula and the Proclamation of the Republic] 2 Revolution in the Political Field [Abolition of the Caliphate, Abolition of the Erkan-ı Harbiye Umumiye Vekalet, Abolition of the Ministry of Sharia and Evkaf, First Constitution of the Republic, 1928 Constitutional Amendment and Secularization] 3 Legal Revolution and the Regulation of Social Life [The concept of law and the necessity of legal revolution, Innovations in the field of law: Adoption of the Civil Code, Constitutionalization of Atatürk's Principles, Other Innovations and a General Evaluation, Innovations Regulating Social Life: Modernization of Clothing and Dress, Closure of Dervish Lodges, Zawiyahs and Tombs, Modernization of Time and Measurement Units, Surname Law] 4 Education and Cultural Revolution [Evaluation of the Education System from the Ottoman Empire, Ensuring the Unity of Education and Training, Abolition of Madrasas, Writing Revolution, Opening of National Schools, Opening of People's Houses, Establishment of Turkish Historical Society and Turkish Language Society, University Reform, Opening of Village Institutes, General Evaluation of the Education Revolution] 5 Economic Revolution [Economic Structure Remaining from the Ottoman Empire, Effects and Results of Izmir Economic Congress, World Economic Depression and Transition to Mixed Economy, Regulations and Developments in Economic Sectors: Agricultural Sector, Industrial Sector, Banking and Finance Sector, Transportation Sector, World War II and the Implementation of War Economy, A General Evaluation of the Economic Revolution] 6 Foreign Policy Developments [Atatürk's Foreign Policy Goals and Principles, Solving the Problems Remaining from Lausanne: Mosul Problem, Turkish-Greek Population Exchange Problem, Straits Problem, Turkey's Becoming a Member of the League of Nations, Balkan Treaty, Sadabat Pact, Hatay's Joining the Motherland, Turkish-British-French Alliance, World War II and Turkey's War Policy] 7 Opposition Reactions against the Revolution / MIDTERM EXAM [Establishment of the Progressive Republican Party, Sheikh Sait Uprising and Takrir-i Sükûn Law, Assassination Attempt on Mustafa Kemal Pasha, Mustafa Kemal Pasha's Reading of the Great Speech, Free Republican Party Experience, Menemen Incident, Bursa Incident, A New Assassination Attempt on Mustafa Kemal Pasha, Dersim events] 8 The Transition to the Multi-Party Regime [Atatürk's Last Years, the Second World War Years and the Formation of the Opposition, the Establishment of the Democratic Party and the 1950 elections] 9 Atatürk's Principles Republicanism [Basic concepts of the principle of republicanism, Atatürk's understanding of republicanism] 10 Atatürk's Principles Nationalism [Basic Concepts of the principle of nationalism, Atatürk's understanding of nationalism]						
	11 Atatürk's Principles: Secularism [Basic Concepts of the Principle of Secularism, Atatürk's Understanding of Secularism] 12 Atatürk's Principles Populism [Basic Concepts of Populism Principle, Atatürk's understanding of populism] 13 Atatürk's Principles: Statism and Revolutionism [Basic Concepts of the Principle of Statism, Atatürk's Understanding of Statism, Atatürk's Understanding of Revolutionism] 14 Evaluation of the Criticisms on Kemalism [Overview of the Evaluations on Kemalism, Evaluation of the Theses Against Atatürk]						
Learning Outcomes	1 Understanding the transition from empire to nation state; 2 To recognize the principles and methods that guided Atatürk's decisions; 3 To be able to evaluate how the institutions of the Republic were established and developed; 4 To be able to distinguish the differences and similarities between the institutions of the Republic and the Empire; 5 To be able to compare the Turkish Revolution with other revolutions; 6 To comprehend the development process of the concept of secularism; 7 To develop an analytical approach that brings together national and universal values; 8 To evaluate the process of transition to multi-party life;						
2	**TURKISH LANGUAGE - II**	**Z**	**2**	**0**	**0**	**2**	**2**

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Course Objectives	In accordance with the ever-advancing conditions of the age, it is important for our young people studying in different fields to be able to write down their opinions on a subject and to write about special days. To be able to prepare texts in activities, to improve their ability to speak well, to eliminate their deficiencies in language and expression, to provide them with knowledge about the forms of expression.							
Course Content	In accordance with the ever-advancing conditions of the age, it is important for our young people studying in different fields to be able to write down their opinions on a subject and to write about special days. To be able to prepare texts in activities, to improve their ability to speak well, to eliminate their deficiencies in language and expression, to provide them with knowledge about the forms of expression.							
Course Subjects	1 Aims and objectives of the course, content, resources to be utilized and introduction of the semester course plan 2 Spelling rules and practice 3 Punctuation and its application 4 What is narration? Features of narration 5 Types, forms and application of narration 6 General expression disorders in Turkish and their correction 7 General information about composition 8 Midterm Exam and Course Evaluation 9 The plan to be used in composition writing and its application 10 Types of written composition (Emotion-weighted writings, event-weighted writings) 11 Types of written composition (Thought-weighted writings, review writings, other types of written expression) 12 Types of oral composition (Types of oral expression based on discussion) 13 Types of oral composition (Types of oral expression based on interview 14 Developing the student's ability to speak and write correctly and beautifully by using sample texts selected from Turkish and world literatures in the history of thought and related applications							
Learning Outcomes	1 To be able to express their feelings, thoughts, knowledge, expectations, experiences verbally and in writing; 2 To be able to use Turkish equivalents of professional and scientific terms; 3 Development of vocabulary; 4 To be able to apply writing types; 5 Applying oral and written texts; 6 To be able to read and understand Turkish science, art and culture publications; 7 To be able to compare selected sample texts from Turkish world literature and history of thought; 8 To be able to produce Turkish texts in the fields of science, art and culture;							
3	**FOREIGN LANGUAGE - II**	**Z**	**2**	**0**	**0**	**2**	**2**	
Course Objectives	To provide students with basic communication skills in the target foreign language (English). For this purpose, the relevant grammar structures, reading-comprehension, writing and listening techniques to teach with the help of lectures and exercises.							
Course Content	To provide students with basic communication skills in the target foreign language (English). For this purpose, the relevant grammar structures, reading-comprehension, writing and listening techniques to teach with the help of lectures and exercises.							

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Course Subjects	1 Introduction Informing about the course content and evaluation principles. General review of 1st semester topics 2 Past tense (verb to be), past tense (regular verbs) 3 Past tense (irregular verbs), expressing past events 4 Past tense (irregular verbs), expressing past events 5 Past Tense (regular/irregular verbs)- affirmative-negative-question sentences 6 Past Tense (regular/irregular verbs)- affirmative-negative-question sentences 7 Text analysis, listening, writing and grammar activities related to the topics covered 8 Text analysis, listening, writing and grammar activities related to the topics covered and mutual conversation 9 Text analysis, listening, writing and grammar activities and presentations related to the topics covered 10 Future tense (planned), preparing invitation cards for special occasions, making phone calls 11 Future tense (planned), preparing invitation cards for special occasions, making phone calls 12 Future tense (instant decision), asking and expressing an opinion about something 13 Future tense (planned, spontaneous decision and prediction), asking and expressing opinion on a topic, 14 Text analysis, listening, writing and grammar activities related to the topics covered, general review and short video show						
Learning Outcomes	1 Develop a positive attitude towards the target foreign language; 2 It builds the necessary skills for communication goals in the targeted language and the necessary infrastructure for academic studies; 3 Provides a basic level of grammar acquisition; 4 Understands and explains basic level texts read in the target language; 5 Gains the ability to write at a basic level in the target language. In this direction, he/she acquires the ability to write short paragraphs, e-mails, information notes, etc; 6 Gain competence in listening comprehension at a basic level; 7 Expresses himself/herself through oral expression, answers questions; 8 Learn and actively use basic vocabulary; 9 Acquires the ability to use expressions encountered in daily life; 10 Develops general cultural knowledge of the target language;						
4	**MATHEMATICS - II**	**Z**	**3**	**0**	**0**	**3**	**3**
Course Objectives	To create an undergraduate level of knowledge in students by defining and examining existing concepts in mathematics, to teach them integration, integration techniques, certain to teach concepts such as integral applications, sequences, series						
Course Content	To create an undergraduate level of knowledge in students by defining and examining existing concepts in mathematics, to teach them integration, integration techniques, certain to teach concepts such as integral applications, sequences and series						
Course Subjects	1 Indefinite integral and continuous functionsQuestion solutions. 2 Sub and supersums and fundamental theoremsSolution of problems. 3 Definite integral and Riemann sumQuestion solutions. 4 Inequalities and improper integralsQuestion solutions. 5 Variable substitution method, partial integration method and simple fractionation methodQuestion solutions. 6 Trigonometric integrals, binomial integrals, integrals of exponential transformations. Question solutions. 7 Curve length calculation and volume calculationQuestion solutions. 8 Midterm + Lesson Review Question solutions. 9 Area and volume calculations of rotational surfaces. Question solutions. 10 Area and arc length calculation in polar coordinatesQuestion solutions. 11 Sequences and convergence of sequencesQuestion solutions. 12 Series, positive term series, ratio test, alternating series, power series, integral test and taylor series. 13 Multiple integralsQuestion solutions. 14 Applications of multiple integrals						

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Learning Outcomes	1 To be able to identify, evaluate and use data in appropriate places; 2 To be able to take integral, to learn what integral means and its application areas; 3 To be able to put forward a problem, to reach the desired by starting from the given and to gain the formation of solving the problem;							
5	**MEASUREMENT KNOWLEDGE**	**Z**	**2**	**2**	**0**	**3**	**4**	
Course Objectives	Principles and fundamentals of measurement, measurement techniques for different quantities and measurement methods used in agricultural mechanization.							
Course Content	Introduction to measurement, definition of measurement, Measurement errors and unit systems, Length measurement, micrometers, Caliper and caliper types, Mass and measurement, Time measurement, Heat energy and temperature measurement, Measurement of light intensity, Measurement of electrical quantities, Measurement of electrical quantities and instruments, Pressure, flow and speed measurement in fluids, Measurement of power, fuel consumption and noise in thermal engines, Measurement of operating values of agricultural tools and machinery.							
Course Subjects	1. Introduction to measurement, definition of measurement 2. Measurement errors and unit systems 3. Length measurement, micrometers 4. Caliper and caliper types 5. Mass and its measurement 6. Time measurement 7. Heat energy and temperature measurement 8. Measurement of light intensity 9. Midterm Exam 10. Measurement of electrical quantities 11. Measurement instruments of electrical quantities 12. Pressure, flow and velocity measurement in fluids 13. Power, fuel consumption and noise measurement in thermal engines 14. Measurement of operating values of agricultural tools and machinery							
Learning Outcomes	1) To be able to measure the operating values of agricultural tools and machinery 2) To be able to measure power, fuel consumption and noise in thermal engines 3) To be able to measure pressure, flow rate and velocity in fluids 4) To know the measurement of electrical quantities and instruments 5) To know the definition and principles of measurement 6) To know measurement errors 7) To be able to measure with micrometers and calipers 8) To know and be able to do mass and measurement methods 9) Time Heat energy and temperature Measurement of light intensity							
6	**CLIMATE KNOWLEDGE**	**Z**	**2**	**0**	**0**	**2**	**3**	
Course Objectives	To give information to students about the definitions of climate elements and meteorological events, how they occur and their relationship with agriculture.							
Course Content	The purpose and scope of agricultural meteorology, agricultural meteorology, climatology and agriculture Meteorological observations Climate elements (temperature, air humidity, cloudiness, air pressure, Evaporation and precipitation Clouds and fogs The formation of air mass movements and air masses affecting Turkey							

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Course Subjects	1. The importance of meteorological values in agriculture 2. Agriculture and climate, sun, earth 3. Atmosphere 4. Air temperature 5. Measuring temperature 6. Frost and its types 7. Trip to the Provincial Directorate of State Meteorological Affairs 8. Midterm Exam 9. Atmospheric precipitation and rainfall 10. Clouds, mists						
	11. Precipitation 12. Atmospheric pressure and wind 13. Causes of pollution and ayresols 14. Evaluation						
Learning Outcomes	1) To learn the relationship between climate elements and meteorological events and agriculture 2) To learn climate elements and meteorological events						
7	**MATERIAL INFORMATION**	**Z**	**3**	**0**	**0**	**3**	**3**
Course Objectives	Understanding the materials used in engineering and the properties of these materials and giving them to the students, Giving the student the processes to be done to improve the mechanical properties of the materials, Students will be able to control these properties, Giving the student the choice of materials for design, International steel To teach the standards to the student and to provide the student with the ability to make material selection.						
Course Content	The internal structure of matter, the effect of internal structure on material classes, bonds between atoms, crystal structures, phase transformations and phase diagrams, physical and mechanical properties of materials, classification of iron carbon alloys and steels, steel standards, plastic materials, corrosion and corrosion protection methods. covers.						
Course Subjects	1. Atomic structure and interatomic bond forces 2. Bond energy and interatomic distance and influencing factors 3. Classification of materials and types of materials 4. Crystal structures and crystal structure defects 5. Solid melts 6. Internal structure formation 7. Material properties and physical properties 8. Mid-term exam (according to the academic calendar) 9. Mechanical properties 10. Examination of tensile test 11. Iron carbon alloys 12. Steel standards 13. Plastics 14. Corrosion and corrosion protection methods						
Learning Outcomes	1) To be able to produce solutions for corrosion protection of materials 2) To have knowledge about steel and steel standards 3) To have knowledge about the general properties of materials 4) To have the knowledge to be able to do some material inspection methods						
8	**ENERGY SOURCES**	**Z**	**3**	**0**	**0**	**3**	**3**

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Course Objectives	The aim of the course is to learn the subject and basic information about energy resources. The students taking this course are provided to gain a perspective on energy resources, which is one of the subjects of economic geography, from the perspective of geography. In addition, students are expected to comprehend the importance of energy resources and their place in human life. To have knowledge about world energy markets, energy production and consumption of countries, energy trade, the importance and future of renewable energy resources. among its objectives.						
Course Content	The demand for energy resources c o n t i n u e s to grow every year due to the increasing world population and economic developments. Within the scope of this course resources and their development processes are discussed.						
Course Subjects	1. What is Energy - Kinetic Energy, Potential Energy, Classification of Energy Sources 2. Mineral Coal - Coal Formation Theories, Classification of Coals 3. World Coal Reserves, Production and Trade 4. Oil 5. Oil and Derivatives Oil Refineries, Pipelines, Trade in Turkey						
	6. Natural Gas 7. Nuclear Energy 8. Hydraulic Energy 9. Biomass Energy 10. Solar Energy 11. Wind Energy 12. Geothermal Energy 13. Hydrogen Energy 14. Marine Sourced Energy						
Learning Outcomes	1- To be informed about various issues related to fossil fuels and to be able to use this knowledge for specific analysis and design. 2- By being informed about the problems of the age, the economic, political, social and environmental impacts of the production, transportation and use of fossil fuels at national and global level to be able to comprehend. 3- To develop the ability to collect and interpret data on fossil fuels for the evaluation and research of problems and solutions. 4- Develop written and verbal communication skills in English on a variety of fossil fuels issues through active participation in multi-disciplinary teamwork.						
9	**DIGITAL LITERACY**	**Z**	**3**	**0**	**0**	**3**	**3**
Course Objectives	The aim of this course is to enable the student to use digital tools and digital media effectively, to gain skills in accessing, analyzing and researching digital content, and to develop their own to be able to produce digital content at a basic level.						
Course Content	The content of the course consists of themes related to being a conscious user and producer in the digital age and digital culture. These themes include digital technologies and digital conceptual framework, use, key strategies, risks and benefits, information access, sharing, control and production of platforms.						

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Course Subjects	1 The concept and scope of digital literacy 2 Digital culture, generations and identities 3 Digital technologies and digital-based platforms 4 Access to information and research in the digital age 5 Algorithms and how they work 6 Privacy, security and confidentiality in the digital age 7 Piracy and hacking culture 8 Midterm Exam 9 Digital citizenship 10 Information on the digital platform: sharing, quality and accuracy 11 Digital verification tools and platforms 12 Digital content: Reading and analyzing genres 13 Basic level content production on digital platforms I 14 Basic level content production on digital platforms II 15 Digital shopping and consumer culture 16 Final Exam						
Learning Outcomes	1. Knows the concepts and terms related to digital culture, platforms and technologies. 2. Gains the ability to use digital platforms and digital media effectively and consciously. 3. Can produce basic content on digital platforms. 4. Gain the ability to distinguish the risks and benefits of content on digital platforms.						
10	**INTRODUCTION TO AGRICULTURAL MACHINERY**	**Z**	**2**	**2**	**0**	**3**	**5**
Course Objectives	Ensuring that students reach the necessary level of knowledge about agricultural machinery in accordance with the content of the course.						
Course Content	Basic concepts related to agricultural machinery such as force and work machine, work efficiency; energy conversion, classification of energy sources; structural structure of thermal engines characteristics and operating principles, equipment, engine operating characteristics; electric motors; classification and types of agricultural tractors, operating principles, power analysis in tractors, structural units of tractors; ear and disc plows, cultivators, soil mills, harrows, rollers, field plows, grain seeders, precision seeders,						
	cotton planting machines, potato planting machines, seedling and sapling planting machines, soil augers, organic and chemical fertilizer spreading machines, spraying machines, hoes, thinning machines, mulching machines, frost protection machines, pumps, harvesting and harvesting tools and machines, similar information about agricultural machinery, such as intended use, parts and tasks, settings, etc.						

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Course Subjects	1 Definition of engineering, Basic concepts 2 Historical development of Agricultural Machinery and Engineering, Content of Engineering education 3 Approach to Agricultural Machinery and Technology Engineering 4 Dimensions in engineering, calculator usage, SI unit systems, unit conversions 5 Data acquisition and processing in engineering 6 Innovative approaches in engineering 7 Powertrain and motion transmission organs 8 Midterm Exam 9 Material Information 10 Introduction of Basic Subjects of Agricultural Machinery and Technology Engineering 11 Introduction of Basic Subjects of Agricultural Machinery and Technology Engineering 12 Tractors and power units 13 Tillage, sowing, planting, fertilizing, spraying, harvesting and post-harvest machinery and technologies 14 Tillage, sowing, planting, fertilizing, spraying, harvesting and post-harvest machinery and technologies 15 Renewable energy sources and their applications in agriculture						
Learning Outcomes	1) Students will gain the ability to analyze and synthesize 2) Students will gain creative entrepreneurship and inquiry skills 3) Students will learn to be individuals who are prone to teamwork 4) Recognize and update the basic concepts of basic science, engineering, general agriculture and agricultural machinery in order to form the basis of agricultural machinery education. will acquire knowledge 5) To reveal the differences between the field of agricultural machinery and other branches of engineering 6) Gains the ability to measure and convert units in engineering						
TOTAL			24	4	0	26	30

3RD SEMESTER							
Course Code	**Course Name**	**Z/S**	**D**	**U**	**L**	**K**	**ECTS**
1	**STATIC**	**Z**	**2**	**0**	**0**	**2**	**3**
Lesson Objective	It aims to analyze the forces acting on engineering systems and the effects of these forces on the equilibrium of the systems.						
Lesson Contents	Basic principles of statics, force, moment, force systems, balance of force systems, truss systems, plane frames, cables, friction, weight and geometric center, inertia moment						
Course Subjects	1. Basic principles of statics 2. Force systems 3. Equilibrium of force systems 4. Equilibrium of force systems (continued) 5. Equilibrium of force systems (continued) 6. Lattice systems 7. Truss systems (continued) 8. Midterm Exam 9. Plane frames						

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	10. Cables 11. Friction 12. Center of gravity and geometric center 13. Center of gravity and geometric center (Continued) 14. Moment of inertia 15. Final Exam Week 1 16. Final Exam Week 2						
Learn me Outputs	1) To have knowledge about the forces acting on engineering systems 2) To be able to analyze the equilibrium state of systems						
2	**PLANT PROTECTION MACHINES**	**Z**	**1**	**2**	**0**	**2**	**3**
Lesson Objectiv e	Introduction of the machines used in the application of chemical pesticides (pesticides) to protect crops against diseases, pests and weeds, technical Explanation of the features and working principles, correct selection and calibration of the machines.						
Lesson Content s	Classification of plant protection machinery, pulverization technique and basic characteristics, factors affecting the adhesion of drug droplets on target surfaces and drug drift, main structural elements of sprayers, types and operating principles of sprayers, types and operating principles of foggers, pollinators and microgranule applicators types, main structural elements and working principles, machines used in fumigation and soil sterilization, preparation and calibration of plant protection machines.						
Course Subject s	1 Agricultural warfare methods 2 Decision-making criteria for agricultural 3 warfare Drop formation 4 types of chemical medicines 5 Types and classification of plant protection machinery 6 Hydraulic field sprayers powered by pressure energy Garden 7 sprayers with auxiliary air flow 8 Ridge sprayers 9 Airflow pneumatic sprayers 10 Fogging machines 11 Parts of sprayers - pumps Determination of 12 pump capacity Sprayer nozzles 13 Preparation and adjustment of pulverizers for work 14						
Learni ng Outco mes	1 Defines the basic concepts related to Plant Protection, gains professional ethical responsibility 2 Reaches the theoretical knowledge about plant protection by using information technologies and makes written and oral presentations in his/her own 3 language 4 To solve the problem related to diseases, pests or weeds, collects the necessary data, selects and applies the appropriate control method 5 Decides the necessity of using chemical methods in the fight against plant protection problems and determines the pesticides that can be applied and 6 writes prescriptions. Knows which methods should be used in agricultural warfare for the protection and sustainable use of natural resources. 7 Uses initiative in recognizing, deciding and solving problems in professional issues Understands the 8 local, national and international importance of his/her profession and develops an attitude appropriate to his/her position Gains the ability to work individually and in a team on issues related to his/her profession						

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3	**FLUID MECHANICS**	**Z**	**3**	**0**	**0**	**3**	**3**
Lesson Objective	To give the basic concepts of fluid mechanics, To examine the hydrostatic state of stagnant fluids, To give the conservation equations, To examine creeping fluids, Open To examine the flow in channels, to give measurement methods of fluids.						
Lesson Contents	General properties of fluids, statics of fluids, kinematics of fluids, dynamics of fluids, dimensionless quantities in hydrodynamics						
Course Subjects	1 Introduction, Stagnant 2 Fluids Stagnant Fluids 3 Stagnant Fluids Stagnant 4 Fluids Conservation 5 Equations Frictional Flow 6 Sample 7 Solution Lesson 8 Review 9 Frictional Flow 10 Frictional Flow 11 Frictional Flow 12 Frictional Flow 13 Sample 14 Solution Sample Solution Sample Solution Flow Example Solution in Open Channels						
Learning Outcomes	1 To learn the basic concepts of fluid mechanics; To 2 perceive the hydrostatic state of stagnant fluids; To learn 3 the conservation equations; 4 To be able to comprehend the continuity equation; 5 To be able to comprehend the general energy equation;						
4	**SOIL KNOWLEDGE**	**Z**	**2**	**2**	**0**	**3**	**4**
Lesson Objective	To introduce the soil, which is an indispensable element of agriculture, to comprehend soil formation processes, to recognize the physical, chemical and biological properties of soil and for sustainable agriculture To teach the basic knowledge of soil management and soil conservation issues.						
Lesson Contents	Historical development of soil science, soil parent material, formation of soils, classification of soils, physical, chemical and biological properties of soil, soil organic matter and soil conservation. Definition of soil-mineral and organic composition of soil-soil formation-horizons in soil profile-physical, chemical and biological properties of soil-soil organic matter-salinization and alkalization of soil and quality of irrigation water, soil classification, soil erosion and conservation						

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Course Subjects	1 Soil concept from past to present, importance, functions and duties of soil 2 Soil parent material and bedrock, components of soil, fragmentation and decomposition in soil formation 3 Factors that make soil 4 Soil formation processes (processes causing horizonization), Changes in soil system 5 Soil profile Soil main horizons and subdivisions 6 Soil classification and intensively used classification systems 7 Physical properties of soils 8 Chemical properties of soils, clay minerals 9 Biological properties of soils and soil organic matter 10 Plant nutrition and function of nutrients in plants, nutrient deficiency symptoms in plants 11 Organic and chemical fertilizers, Chemical fertilizers used extensively in the market and their contents, Factors to be considered in fertilization, Fertilizer application methods and differences in fields and gardens 12 Soil, plant, water sampling methods and importance for laboratory analysis 13 Soil ability classes and sub-classes, Turkey soil resources and soil problems 14 Soil management and soil health						
Learnme Outputs	1 Learns basic theoretical knowledge about Soil and Plant Nutrition and combines them with personal skills 2 Gains the ability to access, understand and use information about Soil and Plant Nutrition 3 Gains the ability to use information technologies 4 Gains the ability to do individual and team work						
	5 Understands the local, national and international importance of his/her profession and develops an attitude appropriate to his/her position 6 Takes initiative in recognizing, deciding and solving problems in professional matters 7 To have knowledge about the recognition, planning, conservation and sustainable use of soil and other natural resources 8 Gains knowledge about soil fertility and fertilization.						
5	**TECHNICAL DRAWING**	**Z**	**2**	**2**	**0**	**3**	**4**
Lesson Objective	In this course, the basis of engineering education, the basis of technical drawing and drawing examples and technique with applications are taught.						
Lesson Contents	Technical drawing tools and materials, Writing and line work, Geometric shape drawings, Projection, Perspective view, Scales, 3rd common view, Incomplete views, Sectioning, Dimensioning, Perspective drawing						
Course Subjects	1. Technical drawing tools and equipment 2. Writing and line work 3. Geometric shape drawings 4. Projection 5. Scales Making an appearance 6. Scales Making an appearance 7. Appearance extraction - 3rd common appearance 8. Making an appearance - incomplete given appearance 9. Perspective view extraction - Sample drawings 10. Midterm Exam 11. Sectioning 12. Dimensioning 13. Perspective drawing 14. Perspective drawing 15. Final Exam 16. Final Exam						

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Learning Outcomes	1) To be able to make three-dimensional drawing of machines 2) To be able to make perspective drawing 3) To be able to make sectioning and dimensioning 4) To be able to make geometric drawings 5) To be able to use drawing tools used in technical drawing effectively 6) To be able to make three appearances						
6	**STATISTICS**	**Z**	**3**	**0**	**0**	**3**	**4**
Lesson Objective	It is aimed that the students taking the course will learn basic statistical concepts and use these concepts widely in the fields related to their field.						
Lesson Contents	Definition of statistics, basic concepts used, data types and collection methods, data organization, measures of central tendency, measures of dispersion, estimation theory, correlation analysis and regression analysis is aimed to teach						
Course Subjects	1. Introduction to statistics, population and sample concept, system of moments, 2. Descriptive statistics, frequency tables, center measures, measures of variability, figures and graphs 3. Normal distribution 4. Hypothesis checks 5. Hypothesis checking sample solutions 6. Chi-squared distribution 7. Midterm exam 8. Chi-squared distribution example solutions 9. Binomial distribution						
	10. Binomial distribution example solutions 11. Poison distribution 12. Correlation analysis 13. Regression analysis 14. Correlation and regression analysis sample solutions 15. Final exam week 16. Final exam week						
Learning Outcomes	1) Basic statistical concepts and their widespread use in areas related to their field of study 2) To have the ability to design experiments, conduct experiments, conduct field studies, collect data, analyze and interpret results in order to investigate complex problems or discipline-specific research topics encountered in the field of Biosystems Engineering 3) Ability to identify, formulate and solve problems in the field of Biosystems Engineering; ability to select and apply appropriate analysis and modeling methods for this purpose to have 4) To assist in the development, selection and use of modern tools necessary for the analysis and solution of complex problems encountered in Biosystems Engineering applications and the ability to use information technologies effectively						
7	**AGRICULTURAL STRUCTURES AND IRRIGATION**	**Z**	**2**	**2**	**0**	**3**	**4**
Lesson Objective	To provide information on the main topics of agricultural structures and irrigation and the aim of optimum utilization of soil and water resources in agricultural enterprises.						
Lesson Contents	General topics and contents of agricultural structures and irrigation department, Development of soil and water resources, Management structures, Protection and storage structures, Soil and water resources in Turkey development of water resources.						

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Course Subjects	1 Makes engineering design and application of irrigation systems; tests the materials to be used in these systems and prepares reports. 2 Develops and implements strategies for the reuse of non-traditional waters such as wastewater, drainage waters, surface runoff waters, treated wastewater without adversely affecting the environment, conducts laboratory analyzes and prepares reports on the suitability of waters for irrigation and reclamation of saline alkaline soils. 3 Prepares the projects of soil water structures, animal shelters, storage structures and crop production structures. Static analyzes in terms of strength. Determines the material properties to be used in construction, makes tests related to materials. 4 Designs crop production structures, supervises and operates environmental conditions; selects, tests and prepares reports on the materials to be used. 5 Designs ponds and small dams and develops projects. Prepares and implements drought and flood action plans within the scope of integrated basin management. 6 Develop and implement water management strategies for sustainable agricultural production and conservation of water resources 7 To be able to develop and implement irrigation programs using soil-plant-water relations and engineering properties of soil. 8 Prepares and implements land consolidation projects. Realizes in-field development services. Prepares and implements rural development projects. 9 Identifies problems in soil and water conservation (erosion) and water harvesting, prepares and implements projects. 10 Makes drainage surveys in agricultural areas; plans drainage systems, prepares and implements their projects; selects and tests the materials to be used and prepares reports 11 Plans activities related to the operation, maintenance and repair of irrigation networks; develops project formulations for monitoring and evaluation, and operates irrigation networks. 12 Can Work Independently and Take Responsibility 13 Ability to design and implement analytical, modeling and experimental based research; ability to analyze and interpret complex situations encountered in this process 14 Produces practical, effective solutions for sustainable agricultural production. 15 Access to resources related to the field, to benefit from these resources and continuous self-renewal 16 Develops projects for the protection of natural resources such as soil and water by using basic engineering, basic agricultural engineering and agricultural structures and irrigation engineering knowledge and presents them for the benefit of society 17 Have the ability to recognize, decide and analyze problems in professional issues.						
Learnme Printouts	1) At the end of this course, the student gains a general knowledge about agricultural structures and irrigation department. 2) Students gain knowledge about the general courses taught in the department of agricultural structures and irrigation and their contents. 3) Students will be prepared for the lessons they will take in the following classes and will gain more confidence by preparing themselves for more planned and programmed work.						
rı	4) Learns the methods of developing joint projects by using the knowledge of agricultural engineering and agricultural structures and irrigation engineering. 5) Learns to produce projects for sustainable agricultural production.						
8	**DYNAMIC**	**Z**	**2**	**0**	**0**	**2**	**3**
Lesson Objective	Using the principles established by Newton and Euler, introduce students to the concept of moving bodies and their applications						
Lesson Contents	Fundamentals of dynamics/vectors, vector operations, Newton's laws, unit systems, kinematics of a point of matter/choice of coordinate systems, position-velocity-acceleration relations, linear motion, curvilinear motion, Cartesian curvilinear motion, examination of natural and polar coordinates, circular motion, relative motion, Newton's II. Law and force, mass and acceleration, linear motion, curvilinear motion, work and energy, kinetic and potential energy, power, impulse and momentum (linear and angular), conservation of energy and momentum, efficiency. Rigid kinematics of bodies / absolute and relative motion, translation, angular motion relations						

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Course Subjects	1 Kinematics of Particles 2 Kinematics of Particles 3 Kinetics of Particles Newton's Second Law 4 Kinetics of Particles Newton's Second Law 5 Kinetics of Particles Energy and Momentum Methods 6 Kinetics of Particles Energy and Momentum Methods 7 Particle Systems 8 Particle Systems 9 Kinematics of Rigid Bodies 10 Kinematics of Rigid Bodies 11 Plane Motion of Rigid Bodies: Forces and Impulses 12 Plane Motion of Rigid Bodies: Forces and Impulses 13 Plane Motion of Rigid Bodies: Energy and Momentum Methods 14 Plane Motion of Rigid Bodies: Energy and Momentum Methods						
Learning Outcomes	1 To be able to define dynamic and kinematic problems by oral and written expression; 2 Ability to model problems in applied kinematics of particles and rigid bodies in engineering dynamics using simple drawing techniques and modern computer technologies; 3 To be able to apply the principles of engineering in dynamics, including problem solving and design solutions to engineering scenarios; 4 To be able to formulate mathematical formulations of problems related to applied kinematics of particles and rigid bodies within the scope of engineering dynamics. 5 To be able to analyze the dynamics of particles - rigid bodies and its applications and interpret the results;						
9	**AGRICULTURAL ECONOMICS**	**Z**	**3**	**0**	**0**	**3**	**4**
Lesson Objective	To assimilate the concepts by acquiring basic knowledge about agricultural economics, to teach the production activities of agricultural enterprises, problems and solutions						
Lesson Contents	The place of agriculture in the Turkish economy (agricultural land, production and yield, agricultural production index, exports, share of agriculture in national income, fixed capital investments), agricultural enterprises characteristics, general problems of Turkish agriculture, agricultural production tools (natural resources, entrepreneur and capital), annual operating results of agricultural enterprises, operating costs, purchase cost and opportunity cost measurement of business success (gross production value gross output gross output pure output pure output agricultural income gross profit pure profit).						
Course Subjects	1 Definition of agriculture, types and characteristics of agricultural production 2 While explaining the importance of agriculture, the contribution of the agricultural sector to nutrition, industry and its place in the economy 3 Basic elements of agricultural structure, population in agriculture and its characteristics, land use and distribution of land to enterprises, enterprise size data 4 Capital use and technology level in agriculture, mechanization in agriculture, input use such as fertilizers, pesticides, seeds, types and amounts of agricultural production in the country, developments over the years, institutional changes 5 Development and establishment of institutions such as ZDK, TSK, ZB, TMO etc. for the agricultural sector, the impact of institutionalization on agricultural development, 6 Examples of the application of the basic principles of economics to agriculture, the law of diminishing returns, the principle of substitution, the principle of marginal revenue, etc. are explained, options to maximize production 7 When determining the cost of agricultural production, fixed and variable cost elements are explained, average cost - unit product cost is calculated 8 Supply and demand characteristics of agricultural products, markets and price formation of agricultural products						
	9 Determination of agricultural business production activities, cost analysis according to year-end partial and full budget method, determining the financial structure of the enterprise 10 Creating and developing financial resources of enterprises, credit conditions, making payment plans 11 The importance of organization in agriculture, types of organization, cooperatives, principles, types, duties, problems and changes in agricultural cooperatives 12 General information about agricultural policy, objectives and tools, implementation results, policy changes 13 General information on Turkey-EU relations						

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	14 Recall their knowledge with general course review						
Learning Outcomes	1 Defining agriculture, diversification, sorting technical and economic characteristics; 2 Understanding, explaining and evaluating the importance of agriculture and its contribution to sectors; 3 To comprehend the basic elements of the agricultural structure, to see the deficiencies and problems created and to develop the ability to think for their solution; 4 To be able to apply the basic principles of economics to agriculture, to learn the methods of reaching maximum income with the most appropriate use of resources, to create options and to choose the best one. to choose the best; 5 Determining the form and method of production of the agricultural enterprise, making production and evaluating the product; 6 Determining product costs and revenues by analyzing the business, realizing continuous production by ensuring profitability; 7 Understanding the market system for production and converting it into income, monitoring market conditions; 8 Finding ways to provide the necessary finance for production, making use of organizational power; 9 Making business decisions taking into account the instruments of agricultural policy; 10 Monitoring international agricultural relations;						
TOPLAM			**20**	**8**	**0**	**23**	**32**

4TH SEMESTER							
Course Code	**Course Name**	**Z/S**	**D**	**U**	**L**	**K**	**ECTS**
1	**COMPUTER AIDED DESIGN**	**Z**	**2**	**2**	**0**	**3**	**4**
Lesson Objective	To teach the technical drawing program that enables design and drawing on the computer and is widely used all over the world. Project making ability						
Lesson Contents	After a quick introduction of the program, module usage and design studies of various agricultural machines						

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Course Subjects	1. Fast entry to the program 2. 2D drawing 3. 3D drawing 4. Application drawings 5. Assembly 6. Technical drawing 7. Midterm exam 8. Modules 9. Modules 10. Application drawings 11. Soil tillage machine design 12. seeder design 13. Spraying machine design 14. Project presentation 15. Project presentation 16. Final						
Learning Outcomes	1) To be able to design using computer 2) Ability to control and analyze designs before prototype stage						
2	**FIELD CROPS**	**Z**	**2**	**2**	**0**	**3**	**4**
Lesson Objective	By explaining the basic principles of field agriculture and the general situation of field agriculture in Turkey, to introduce cereals, edible grain legumes, industrial crops, forage crops and medicinal and aromatic plants in terms of plant characteristics, to give general information about appropriate cultivation techniques, plant breeding and biotechnology is intended.						
Lesson Contents	Information about field agriculture, plant growing techniques, cool climate cereals, warm climate cereals, industrial crops, meadow pasture and forage crops						
Course Subjects	1 Aim, objective, objectives, gains, teaching methods of Field Crops course, General Field Agriculture 2 Warm Climate Cereals; Economic Importance, Adaptation and Morphological Characteristics, Cultivation of Maize, Paddy and Millets 3 Adaptation and Morphological Characteristics of cool climate cereals 4 Cultivation of Wheat, Barley, Oats and Rye 5 Edible Grain Legumes; Importance, Systematics and Adaptation, Culture of Lentils and Chickpeas, Beans, Broad Beans, Peas and Cowpeas 6 Industrial Plants; Definition, Classification and Importance, Cotton, Flax, Hemp, Sunflower Culture 7 Cultivation of Soybeans, Peanuts, Sesame, Poppy, Sugar Beet and Potato 8 Course Review and Midterm Exam 9 Importance, Adaptation and Culture of pleasure, medicine and spice plants 10 Forage Crops and Meadow-Pasture Culture. Recognition and cultivation of legume and wheat forage crops 11 Introduction and cultivation of grass plants 12 The concept and importance of seed production 13 Introduction to plant breeding methods 14 Introduction to biotechnology						

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Learning Outcomes	1 Information to producers about the cultivation of cereals, edible grain legumes, industrial crops, medicinal and aromatic plants and forage crops in field crops can transfer it; 2 Identify the important problems of field agriculture and produce ideas for solving these problems; 3 Learning the problems of field crops in the region and can take part in their projects; 4 They can be environmentally sensitive individuals in field crops applications; 5 To know morphological characteristics of important field crops species; 6 To be able to identify important field plant species; 7 Learning appropriate storage conditions for field crops produced; 8 To be able to recommend field crops suitable for the purpose of producers;						
3	**ANIMAL PRODUCTION**	**Z**	**2**	**2**	**0**	**3**	**4**
Lesson Objective	To give information about breeding, raising and feeding of farm animals.						
Lesson Contents	Basic principles of animal breeding, general principles of cattle, sheep and goat breeding, general principles of chicken breeding, animal body and feed structure, animal nutrition feeds used, general principles of animal nutrition.						
Course Subjects	1 Presentation of the course program, the place of animal husbandry in agricultural production, profitable animal husbandry conditions, 2 Species and breed concept in zootechnics, breed races and classification of breeds 3 Reproduction in farm animals, importance of fertility 4 Animal breeding 5 Importance of cattle breeding, care and management 6 Importance of sheep breeding, care and management 7 Importance of goat breeding, care and management						
	8 The importance of poultry, Turkey and the world situation 9 Egg poultry, meat poultry maintenance and management 10 Course Review and Midterm Exam 11 Nutrient content of animal body and feed 12 Digestive System and Digestion of Feed in Farm Animals 13 Feeds and feed additives 14 Feeding of livestock in different physiological stages						
Learning Outcomes	1 Knows the place and importance of animal husbandry in agricultural production; 2 Knows species, breed concept, breeds and breed races in zootechnics; 3 Know the morphological and physiological characteristics of various farm animals; 4 Learns the basic concepts and information about animal breeding; 5 Learns care, management practices and practical breeding work in farm animals; 6 Learns basic and practical knowledge about feeds and animal nutrition; 7 Knows nutrients and their functions in the animal body; 8 Recognizes the digestive systems of farm animals, knows their general functions;						
4	**OCCUPATIONAL HEALTH AND SAFETY**	**Z**	**3**	**0**	**0**	**3**	**3**
Lesson Objective	With this course, students; To ensure that they have sufficient knowledge about basic occupational health and safety, to recognize the occupational risks they will encounter in working life, to recognize the necessary To be able to take precautions and therefore to support the establishment of a healthy workplace environment and to have sufficient knowledge about the relevant legislation						
Lesson Contents	Historical development of occupational health and safety in the world Concepts related to occupational health and safety Occupational accidents, occupational diseases, workplace risk factors						

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Course Subjects	1. Historical development of occupational health and safety in the world 2. basic concepts of occupational health and safety 3. occupational hygiene 4. definition of work accidents and protective applications 5. risk assessment 6. physical risk factors 7. biological risk factors 8. chemical risk factors 9. midterm exam 10. ergonomic risk factors 11. occupational diseases I 12. Occupational Diseases II 13. Labor Law No. 4857 14. 6331 OHS Law 15. evaluation of the course 16. final exam						
Learning Outcomes	1) have sufficient knowledge about the definitions and practices related to occupational health and safety. 2) can count workplace risk factors 3) develop awareness of occupational accidents and occupational diseases						
5	**GARDEN PLANTS**	**Z**	**2**	**2**	**0**	**3**	**4**
Lesson Objective	The importance of horticultural crops for our country, ecological requirements, biological and physiological principles, production techniques, general cultural practices, maturity, harvesting and preservation theoretical and practical knowledge.						
Lesson Contents	Introduction of plants, their biology, morphology, pollination and fertilization, propagation, cultural processes and conservation.						
Course Subjects	1 Introduction to horticulture 2 Area of horticultural crops in the country and distribution by region 3 Economic importance of horticultural crops 4 Raw material aspect and nutritional value of horticultural crops 5 Climate requirements of horticultural crops 6 Soil requirements of horticultural crops 7 Biological and physiological principles in horticultural plants 8 Generative production in horticulture 9 I. visa 10 Vegetative production in horticulture 11 Tillage and pruning of horticultural crops 12 Fertilization, irrigation and chemical applications in horticultural crops 13 Maturity and harvesting of horticultural crops 14 Conservation in horticulture						

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Learning Outcomes	1 Recognizing horticultural plants morphologically and physiologically; 2 To be able to produce horticultural crops with generative and vegetative methods; 3 To be able to create a garden project in horticulture; 4 To be able to apply pruning and grafting techniques in horticultural crops; 5 To be able to do garden care in garden plants; 6 Physiological and biological principles of horticultural crops are known to be able to identify and solve problems;						
6	**STRENGTH**	**Z**	**3**	**0**	**0**	**3**	**4**
Lesson Objective	To provide basic knowledge in the solution of engineering problems related to the dimensioning and strength of objects						
Lesson Contents	General concepts, force and load, -Stress and strain, Hook's Law -Stress and strain due to axial loads, -Shafts, stress and strain due to torsional loads strain, -stress due to bending loads on beams						
Course Subjects	1. Subject and basic concepts of strength 2. Stress, shape and displacement 3. Mechanical properties of solids 4. Normal force state, stress calculation 5. Heat effect on bodies, rings and thin tubes 6. Stress analysis, uniaxial stress state 7. Biaxial stress state, shear stress-free state 9. Shear stress state 10. Strain analysis 11. Cutting effect 12. Bending effect 13. Torsion 14. Sprain						
Learning Outcomes	1. To be able to comment on the behavior of any object under the influence of an applied force; 2. To be able to evaluate the effects of stress and strain on a structural element; 3. To be able to comprehend safety and reliability issues; 4. To provide an understanding of the equations used in the design of basic elements in biosystems engineering;						
7	**AGRICULTURAL WASTE MANAGEMENT**	**Z**	**3**	**0**	**0**	**3**	**4**
Lesson Objective	Engineering analysis and design of systems for the collection, storage, treatment, transportation and utilization of usable organic waste and wastewater.						
Lesson Contents	What kind of materials are considered as waste in agriculture, purpose, general principles, agricultural wastes, classification of wastes, waste utilization, equipment, laws on waste management, regulations and implemented policies cover composting and construction techniques.						

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Course Subjects	1 What is waste, purpose of waste management and general principles of waste managementAccess to other resources on the subject 2 Planning factorsAccess to other relevant resources 3 Agricultural wastes, water, air and animal resourcesPresentation of visual examples 4 Agricultural wastes, water, air and animal resourcesOperation visit 5 Classification of agricultural wastes Presentation of visual examples 6 Classification of agricultural wastes Presentation of visual examples 7 Geological factors and groundwaterPresentation of visual examples 8 Course repetition and midterm Course repetition and midterm 9 Site selection for agricultural waste management systemsSample solution 10 Agricultural waste management systemsExploration trip 11 Design of components of agricultural waste management systemsSample solution 12 Design of components of agricultural waste management systemsSample solution 13 Waste utilizationExample solution 14 Waste management equipment Laws, Regulations, Policies and Water Quality Criteria						
Learning Outcomes	1-To explain the natural structure of wastes and their effects on the environment; 2-To explain the physical, chemical and biological principles of waste treatment; 3-To explain waste systems and technologies; 4-To prepare waste management plans; 5-To design waste collection, processing, evaluation and utilization systems.						
8	**HYDROLOGY**	**Z**	**3**	**0**	**0**	**3**	**3**
Lesson Objective	To examine the distribution, movement and properties of water. To provide the necessary data for the use and development of water resources.						
Lesson Contents	The importance of hydrology, hydrological cycle, measurement of precipitation, infiltration, evaporation.						
Course Subjects	1.Definition, importance and methods of hydrology 2.Hydrological cycle 3.Occurrence and measurement of precipitation 4.Evaporation and evapotranspiration losses 5.Analyzing rainfall measurements 6.Infiltration 7. Groundwater flow 8. Current measurements and analysis of records 9. Midterm Exam 10. Characteristics of surface runoff and river basins 11. Hydrographs 12. Unit hydrograph theory and transition from precipitation to runoff 13.Translation of hydrograph 14.Applications of statistics in hydrology						
Learning Outcomes	1) Information on water resources will be provided 2) Information on water resources will be provided 3) Information on water resources will be provided						
9	**GEOGRAPHIC INFORMATION SYSTEMS**	**Z**	**3**	**0**	**0**	**3**	**3**
Lesson	Increasing the predisposition of agricultural engineers to the application methods of new technologies in the agricultural field, the ability to utilize remote sensing [illegible]						

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	technologies
Objective	Providing the ability to work with 2 and 3 dimensional maps in digital environments with Geographic Information Systems and expanding the use of Global Positioning System (GPS) is the main objective of this course. is its purpose.
Lesson Contents	Giving basic information about Geographic Information Systems, Remote Sensing and Global Positioning (GPS), how satellite images are used for agricultural purposes Explanation with examples. The use of Global Positioning System (GPS) instruments GRASS TrackMaker ArcGIS and QGIS Imagine software is explained practically.
Course Subjects	1. Week Remote Sensing, definition and satellite systems 2. Week Properties of satellite images used in remote sensing 3. Week Spectral reflectance and reflection properties of objects 4. Week Opportunities to utilize satellite images in agricultural studies 5. Week Techniques for accessing satellite data on the Internet 6. What is free software? What is Free software in Remote Sensing? 7. Using free software in UA (Google Earth, GRASS, Geodata) 8. Week Midterm exam 9. Week Basic features of Geographic Information System 10. WeekRaster and Vector image data properties and usage areas 11. WeekCreating digital maps in computer (ArcGIS, Google Earth, QGIS) environment 12. WeekQGIS software and usage features of the software 13. WeekQGIS software applications (determination of watershed areas, topographic analysis, calculation of areas 14. Week Basic features of GPS-Global Positioning, working principles of GPS instruments, coordinate determination, transfer of GPS data to computer environment (MapSource and TrackMaker software)
Learning Outcomes	1) Determination of the creation and use of image processing techniques (Raster and Vector image) in computer environment. 2) To have knowledge of basic computer software for Remote Sensing, Geographic Information Systems and GPS. 3) To learn spectral reflectance and reflection properties of objects. 4) Creating, analyzing and evaluating the database on digital maps. 5) Making digital data belonging to the same area in different structures ready for use together. 6) Digitization and computerization of printed maps. 7) To learn the working principles of satellites and satellite images.

SUM M			23	8	0	27	33

5TH SEMESTER							
Course Code	**Course Name**	**Z/S**	**D**	**U**	**L**	**K**	**ECTS**
1	**THERMODYNAMICS**	**Z**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To teach the basic principles of classical thermodynamics. To train students to identify, formulate and solve engineering problems related to thermodynamics. To teach the application of methods related to the second law necessary for thermodynamic systems. About steam power and refrigeration cycles to give basic information.						
Course Content	Thermodynamic properties of gases, laws of thermodynamics, power cycles						
Course Subjects	1 Basic Concepts of Thermodynamics 2 Basic Concepts of Thermodynamics 3 Thermodynamic Properties of Gases 4 Changes of State of Ideal Gases 5 Compression of Gases and Compressors 6 Compression of Gases and Compressors 7 Application and Example Solutions Related to Past Topics 8 Midterm 9 Steam and Pressure Processes 10 Steam and Pressure Processes 11 Power Cycles 12 Combustion 13 Refrigeration Cycles 14 Heat Transfer						
Learning Outcome	1) Thermodynamic Properties of Gases 2) 3) Basic Laws of Thermodynamics 4) System and Environment in Thermodynamics						

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2	**BASIC PRINCIPLES OF IRRIGATION**	**Z**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Defining soil-plant-water relations, obtaining the necessary criteria for the design of irrigation system projects and new technologies and models for this purpose use of software						
Course Content	Definition of irrigation, irrigation systems, soil-plant-water relations, irrigation water requirement,						
Course Subjects	1. Week Definition and importance of irrigation 2. Week Irrigation method and irrigation system 3. Week Soil-plant-water relations 4. Week Soil-plant-water relations (continued) 5. Week Measurement of soil moisture 6. Week Movement of water in soil 7. Week Plant water consumption 8. Week Midterm Exam 9. Week Measurement of plant water consumption 10. WeekIrrigation water requirement 11. Week Irrigation water requirement (continued) 12. WeekSample irrigation project 13. WeekCropwat computer program 14. WeekCropwat computer program (continued)						
Learning Outcomes	1) As a result of the course, students will be able to diagnose the current situation and problems of the irrigation area and decide which survey studies should be carried out to solve the problem. will be able to give						
3	**PLANTING MAINTENANCE FERTILIZER MACHINES**	**Z**	**2**	**1**	**0**	**2**	**4**
Course Objectives	Explanation of machines and mechanization models used in sowing, maintenance and fertilization processes						
Course Content	Planting, Maintenance and Fertilization Machines, mechanization models and calculations						
Course Subjects	1 Physico-mechanical properties of fertilizers 2 Principles of applying fertilizers to the soil 3 Barn Fertilizer Spreading Machines 4 Solid fertilizer spreading machines 5 Seed characteristics in terms of sowing 6 Biomechanics of germination 7 Agrotechnical principles of cultivation 8 Midterm exam 9 Planters 10 Planters 11 Burying feet and seed pipes 12 Hoeing technique and machinery 13 Growing and planting seedlings 14 General Review						
Learning Outcome	1) Recognizes Planting, Maintenance and Fertilization Machines 2) Knows mechanization applications in sowing, maintenance and fertilization processes						

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s							
4	**MACHINE ELEMENTS**	Z	3	0	0	3	4
Course Objectives	Introduction of machine elements used in the design of agricultural machinery and teaching of design criteria						
Course Content	Stress, strain and design materials Welding connections Solder and Bonding Connections Rivet Connections Bolt and Screw Connections Shaft-Hub Connections Shafts and Axles Lubrication and Oils Plain Bearings Rolling Bearings Clutches Gear Wheel Mechanisms Belt-Pulley Mechanisms Chain Variators						
Course Subjects	1. Week Introduction to Machine Elements 2. Week Stress, strain and engineering materials 3. Week Source connections						
	4. Week Solder, Bonding and Solder Connections 5. Week Bolt and Screw Connections 6. Week Shaft-Hub Connection, Shafts and Axles 7. Week Lubrication and Oils 8. Week Midterm Exam 9. Week Plain Bearings 10. WeekTumble Beds 11. Week Mechanisms 12. WeekGear Wheel Mechanisms 13. WeekGear Wheel Mechanisms II 14. WeekBelt-Pulley Mechanisms 15. WeekChain Mechanisms 16. Week Variators						
Learning Outcomes	1) Understanding of machine elements such as fasteners, power transmission mechanisms, bearing elements						
5	**THERMAL ENGINES**	**Z**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To introduce thermal engines, which are the power source of other self-propelled agricultural machinery, especially the tractor, which is the main power source of agricultural machinery, in all aspects and to teach operating systems						
Course Content	Introduction to thermal engines, classification of thermal engines, thermal engine introduction curves, fuels used in thermal engines, parts and operation of thermal engines Principles						

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Course Subjects	1 PRELIMINARY DESCRIPTIONS ABOUT THERMIC (INTERNAL COMBUSTION) ENGINES Definition of Thermal Engines, History of Thermal Engines, Classification of Engines, THERMODYNAMICS OF INTERNAL COMBUSTION ENGINES; Thermodynamics of Four-stroke Internal Detonation (Otto) Engines, Thermodynamics of Four-Stroke Internal Combustion (Diesel) Engines Introduction of engine laboratory and engines and solution of problems related to the subject 2 Mixed Cycle (Seilinger Cycle), Two Stroke Internal Explosion (Otto) Engines, Two Stroke Internal Combustion (Diesel) Engines, Rotary Piston Engines (Wankel Engines), Real Pv (Indicator) Diagrams of Four Stroke Otto and Diesel Engines, Valve Timing Diagram. Solution of Problems Related to the Subject Animation Demonstration 3 POWER, ROTARY MOMENT, EFFICIENCY AND ENGINE PRESENTATION CURVES IN ENGINES; Engine powers, Brakes used in measuring effective power, Determination of effective power, mechanical efficiency, average effective pressure, fuel consumption, Experimental methods of thermal engines, Presentation Curves of Thermal Engines. Solution of problems related to the subject Animation show 4 Fuels Used in Thermal Engines, Petroleum Fuels, Distillation method, Cracking method, Polymerization method, Hydrogenation method, Gasoline, Diesel fuel, Alcohols, Vegetable oils and Biodiesel, Biogas, Natural Gas, LPG (liquefied petroleum gas), Lubricating oils used in thermal engines and their classification Solution of problems related to the subject Animation show 5 Combustion, Determination of the amount of oxygen and air required for 1 kg of fuel by going from the chemical composition of the fuel, Finding the combustion reaction and fuel / air ratio by going from the closed formula of the fuel, Incomplete Combustion, Thermal values of fuels, Knock (Detenesyon), Knock in gasoline engines, Knock in diesel engines, Evaporation heat and carburetor icing, Steam plug. Solving Problems Related to the Subject Animation Demonstration 6 MAIN PARTS OF THERMAL ENGINES; Inert parts of thermal engines, cylinder block, cylinder head, combustion chamber shapes in gasoline engines, combustion chamber shapes in diesel engines, crankcase, intake and exhaust manifolds, moving parts of thermal engines, pistons and piston rings, Piston anamil (crank) knematics, Piston rod, Inertia force of piston rod, Inertia force in single cylinder engines, Anamil (crankshaft), Crank effect, Balance in single cylinder engines, Balance in multi-cylinder engines, Anamil bearings, Flywheel (regular wheel), Anamil vibration extinguisher. Complete disassembly and assembly of the gasoline engine and solution of problems related to the subject 7 Control Organs of Thermal Engines, Valves, Valve springs, Valve spring, Valve timing, Valve opening interval, Hydraulic valve tappets, Rocker mechanism, Valve springs and valve tappets, Grinding and lapping of valves, Camshaft (camshaft) and gear Complete disassembly and assembly of the gasoline engine and solution of problems related to the subject 8 FUEL EQUIPMENT; Fuel Tank, Fuel Transmission Pump and Fuel Filter, Fuel Tank, Fuel Transmission Pump, Fuel Filters,.Air Filter Diesel Complete disassembly and assembly of the engine and solution of problems related to the subject
	9 FUEL EQUIPMENT; Fuel Tank, Fuel Transmission Pump and Fuel Filter, Fuel Tank, Fuel Transmission Pump, Fuel Filters,.Air Filter Diesel Complete disassembly and assembly of the engine and solution of problems related to the subject 10 Fuel Equipment of Gasoline Engines, Fuel equipment of carburetor engines, Carburetor types and working principles, Hva fuel flows in the carburetor and finding the air / fuel ratio, Drawbacks of carburetors, Gasoline Spray Systems, Gasoline spraying systems, Gasoline spraying systems, Gasoline spraying systems, Mono-jetronic gasoline spraying system, Motronic gasoline spraying system, LPG (Liquefied petroleum gas) fuel system of engines using. Complete disassembly and assembly of the diesel engine and solution of problems related to the subject 11 Fuel System of Diesel Engines, Fuel (diesel) pump, Pumps with changing stroke, Pumps with overflow valve, Pumps with piston rotating around its axis, common rail system, Regulator, Advance schemes in fuel pumps, Injectors,Mechanical injectors, Hydraulic injectors, Amount of fuel sprayed and spray time in diesel engines, Overfilling (Supercharging), Turbocharging systems, Intercoolers (aftercoolers) Examination of fuel systems on the engine and solution of problems related to the subject 12 Ignition equipment; Accumulator, Charge generator, Charge dynamo, Alternator, Starter motor, Ignition equipment; Battery powered classic type (Delco) ignition equipment. Transistorized (electronic ignition equipment), Transistorized ignition equipment with cutter, Transistorized ignition equipment without cutter, Capacitive dischargeignition equipment, Magneto ignition equipment, Preheating circuits. Examination of ignition equipment on the engine and solution of problems related to the subject 13 COOLING EQUIPMENT; Air cooling method, Water cooling method, Natural circulation water cooling method, Pumped water cooling method, Calculations related to cooling system. Examination of cooling equipment on the engine and solution of problems related to the subject 14 LUBRICATION EQUIPMENT; Lubrication methods used in thermal engines, Lubrication by mixing oil with fuel, Lubrication with fresh oil, Impact lubrication, Pressure lubrication, Oil cooling systems, Calculations related to oil pump Examination of lubrication equipment on the engine and solution of problems related to the subject

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Learning Outcomes	1 Should know the types of thermal motors and their working principles; 2 Recognize engine fuels and lubricants and know what happens if lubrication is neglected; 3 Know the thermodynamics of engines, the meaning of phenomena such as combustion, power calculation and knocking and the ways to prevent them; 4 You must recognize the engine parts; 5 Students should be able to perform calculations related to engines such as piston speed, piston acceleration, piston travel and calculation of dynamic forces; 6 Know the engine equipment, both in terms of its parts and its operating principles; 7 Should be able to make calculations related to engine equipment such as carburetor calculation, oil pump calculation; 8 Recognize and diagnose possible malfunctions that may occur in engines. If the workshop facilities are available, they should be able to eliminate some of them;							
6	**INTRODUCTION TO REMOTE SENSING**	**Z**	**2**	**0**	**0**	**2**	**3**	
Course Objectives	Increasing the predisposition of Biosystems Engineers to the application methods of new technologies in the agricultural field, providing the ability to utilize satellite technologies with remote sensing, working with 2 and 3 dimensional maps in digital environments with Geographic Information Systems and the use of Global Positioning (GPS) dissemination is the aim of this course.							
Course Content	Giving basic information about Geographic Information Systems, Remote Sensing and Global Positioning (GPS), explaining how satellite images are used for agricultural purposes with examples. Use of Global Positioning (GPS) instruments, application of GRASS, TrackMaker, ArcGIS and QGIS Imagine software. is explained as.							
Course Subjects	1. Week Remote Sensing, definition and satellite systems1 . Week presentation notes 2. Week Characteristics of satellite images used in remote sensing2. Week presentation notes 3. Week Spectral reflectance and reflection properties of objects3 . Week presentation notes 4. Week Opportunities to utilize satellite images in agricultural studies Week 4 presentation notes 5. Week Techniques for accessing satellite data on the internet5. Week presentation notes 6. Week What is free software? What are Free software in Remote Sensing? Week 6 presentation notes 7. Week Use of free software in UA (Google Earth, GRASS, Geodata) Week 7 presentation notes 8. Week Midterm exam 9. Week Basic features of Geographic Information System9 . Week presentation notes 10. WeekRaster and Vector image data properties and usage areas10 . Week presentation notes 11. WeekCreating digital maps in computer (ArcGIS, Google Earth, QGIS) environment11 . Week presentation notes 12. WeekQGIS software and features of using the software12 . Week presentation notes 13. WeekQGIS software applications (determination of watershed areas, topographic analysis, calculation of areas Week 13 presentation notes							
	14. WeekGPS-Basic features of Global Positioning, working principles of GPS instruments, coordinate determination, transfer of GPS data to computer environment (MapSource and TrackMaker software) Week 14 presentation notes 15. WeekFinal exams Week 1							
Learning Outcomes	1) Determination of the creation and use of image processing techniques (Raster and Vector image) in computer environment. 2) To have knowledge of basic computer software for Remote Sensing, Geographic Information Systems and GPS. 3) To learn spectral reflectance and reflection properties of objects. 4) Creating, analyzing and evaluating the database on digital maps. 5) Making digital data belonging to the same area in different structures ready for use together. 6) Digitization and computerization of printed maps. 7) To learn the working principles of satellites and satellite images.							
7	*VOCATIONAL ELECTIVE D-1 (COURSE 2)	S			0		3	
8	*VOCATIONAL ELECTIVE D-1 (COURSE 3)	S			0		3	
9	**ELECTIVE COURSE (COURSE 1)	S			0		4	
TOTAL							30	

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6TH SEMESTER							
Course Code	**Course Name**	**Z/S**	**D**	**U**	**L**	**K**	**ECTS**
1 00000000	**AGRICULTURAL TRACTORS**	**Z**	**2**	**1**	**0**	**2**	**4**
Course Objectives	Except for the engine of agricultural tractors, it is the examination of the principle of operation and project design of power transmission organs.						
Course Content	Explaining the design, projecting and working principles of agricultural tractors, learning the use, adjustment and maintenance of the tractor						
Course Subjects	1. Week Definition and classification of tractors Related topic 2. Week Tractor motion transmission organs, clutch related subject 3. Week Gearbox related topic 4. Week DifferentialRelated topic 5. Week Final speed reduction Related topic 6. Week Executive systems related topic 7. Week MidtermAll taught 8. Week Routing systemsRelated topic 9. Week Brakes Related topic 10. WeekHydraulic system Related topic 11. WeekTail shaft, tow hook and pulleyRelated topic 12. WeekPower and efficiency in tractorsRelated topic 13. WeekTractor mechanics Related topic 14. Week Tractor experiments Related topic 15. WeekFinal Exam Week 1						
Learning Outcomes	1) Working principles of the elements of agricultural tractors, project design will be learned						
	MECHANIZATION IN ANIMAL HUSBANDRY	**Z**	**2**	**1**	**0**	**2**	**4**
Course Objectives	Introduction of all equipment and systems in the field of animal husbandry, examination of new technologies						
Course Content	To teach the machinery, equipment and latest technology used for the betterment of animal production enterprises						
Course Subjects	1. Week Recent developments in animal production 2. Week Forage mechanization						
	3. Week Silage mechanization 4. Week Silage mechanization 5. Week Roughage mechanization 6. Week Drying, storage, packaging systems 7. Week Barn equipment 8. Week Fertilizer cleaning systems 9. Week Manure evaluation methods (Compost-biogas) 10. Week Examination 11. WeekMilking machines 12. WeekMilk cooling tanks 13. WeekPoultry mechanization 14. WeekFeeding systems 15. WeekFinal exam						

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Learning Outcomes	1) Teaching all equipment and systems used in livestock farms, examining new technologies						
3	**AGRICULTURAL CONSTRUCTION**	**Z**	**1**	**2**	**0**	**2**	**4**
Course Objectives	To transfer basic construction knowledge as a whole to the people who will work in the planning and projecting of agricultural structures and facilities.						
Course Content	Classification of buildings, building materials, building elements, projecting of wooden building elements, projecting of steel building elements, projecting of roof elements, exploration and quantity surveying						
Course Subjects	1. Week Structure concept 2. Week Construction types in agricultural structures 3. Week Building materials 4. Week Selection of appropriate building materials 5. Week Mechanical, physical and technological properties of building materials 6. Week Building elements 7. Week Soils, foundations, walls 8. Week Midterm exam 9. Week Columns, beams, floors, roofs 10. WeekProjecting wooden structural elements 11. WeekProjecting of steel structural elements 12. WeekProjecting roof systems 13. WeekBuilding Projects 14. WeekRetaining structures 15. WeekDetailing and exploration						
Learning Outcomes	1) Creating material layouts in agricultural construction 2) Dimensioning, section determination and section control of agricultural structural elements 3) To prepare and implement plans and projects related to agricultural construction. 4) To make discovery and bill of quantities related to agricultural construction.						
4	**AGRICULTURAL BUILDING MATERIALS**	**Z**	**2**	**0**	**0**	**2**	**3**
Course Objectives	It is aimed to teach the basic properties of building materials to engineers who will work in agricultural building design.						
Course Content	Agricultural structures and types of agricultural construction, light and heavy materials used for these structures and their properties						
Course Subjects	1 Introduction, course introduction 2 Properties of the building material 3 Physical properties of materials and examples 4 Building materials used in agricultural construction, materials made of metal						
	5 Wood and wood products 6 Stones 7 Clay-derived materials, adobe, brick 8 Clay-derived materials 9 Course repetition 10 Mortar element and mortar types 11 Binding materials, cement 12 Concrete 13 Use of concrete and reinforced concrete material production 14 Protective materials						

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Learning Outcomes	1 Understanding the mechanical, technological and physical properties of building materials; 2 To have building material standard information; 3 Ensuring that the material is used for its intended purpose; 4 Recognizing materials that can be effective in human and environmental health;						
5	**AGRICULTURAL MACHINERY OPERATION TECHNIQUE**	**Z**	**3**	**0**	**0**	**3**	**3**
Course Objectives	To teach the importance and scope of agricultural machinery management, basic concepts of agricultural machinery management, work success, power requirement and cost concepts and their calculation methods and to gain the ability to use these methods. In addition, the concept of machine selection and the main methods used in machine selection. methods, methods of machine acquisition and common machine utilization.						
Course Content	Information about power generating and consuming machines in agricultural machinery, cost factors, factors affecting business success and efficiency.						
Course Subjects	1 Introduction, agricultural machinery management, importance and scope, concept of work success in agricultural machinery, economic work success, technical work success, theoretical work success, real work success 2 Work success calculation methods, factors affecting work success, work width, working speed, field efficiency 3 Other factors affecting the success of the work, field shape, parcel width, setting and maintenance, working and turning patterns in the parcel 4 The concept of power and power requirement in agricultural machinery, basic concepts, force, distance, time, speed, work, torque, power 5 Power concept in tractors, engine fuel power, net engine power, PTO power, axle power, draw power, power calculation methods in tractors 6 Power requirement of agricultural machinery, draw power requirement, PTO power requirement, methods used in the calculation of power requirement of different machines 7 Cost in agricultural machinery, the elements that make up the cost, fixed costs (depreciation, interest, protection, tax, insurance expenses), variable costs (fuel, oil, repair, labor force expenses) 8 Midterm exam 9 Methods used in the calculation of depreciation, interest, protection, tax and insurance expenses 10 Methods used in the calculation of fuel, oil, repair and labor costs 11 Selection of agricultural machinery and factors affecting the selection of machinery, the main methods applied in the selection of agricultural machinery 12 Workability and time available to work in the field 13 Machine renewal 14 Machine acquisition and common machine utilization methods and their applications in the world						
Learning Outcomes	1. To be able to explain the basic concepts of agricultural machinery management; 2. To gain the ability to apply work success calculations related to agricultural machinery; 3. To gain the ability to apply cost calculations related to agricultural machinery;						
6	**PRODUCT PROCESSING AND PRODUCTION MACHINES**	**Z**	**3**	**0**	**0**	**3**	**3**
Course Objectives	The aim of the course is to enable the student to comprehend the processes applied to ensure that agricultural products do not lose their properties after harvesting until they are presented to the consumer, and to understand the processes performed. measure the success of these processes and distinguish the factors affecting the success of these processes.						
Course Content	Transportation and transmission machines, Cleaning and classification machines, Grinding and shredding machines, Pressing machines, Heating Technique, Facilities used in heating agricultural products, Thickening facilities,						
Course Subjects	1 Introduction of the course, post-harvest treatments applied to agricultural products, purpose and objectives of separation and classification, degree of purity. 2 Groups that can be formed as a result of sorting and classification, process success criteria. 3 Physical properties used in sorting and classification, size and size relationships in cereal grains.						
	4 Separation of grains according to their geometric properties, rectangular and round hole sieves. 5 Separation of grains according to their geometric properties, sieve sets, factors affecting the sieving process 6 Separation of grains according to their geometric properties, triors, factors affecting the separation process. 7 Separation of grains according to their aerodynamic properties, air flow separators, factors affecting the separation process. 8 Midterm Exam 9 Separation of grains according to friction force and surface roughness.						

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		10 Separation of grains according to surface roughness, magnetic separators. 11 Separation of grains according to other auxiliary separation characteristics 12 Sorting and classification of fruits and vegetables. 13 Agricultural products-moisture relations, moisture rates, equilibrium moisture, drying stages, types of dryers, factors affecting drying. 14 Crushing of granular products, purposes of crushing, classification of crushed products according to their size, hammer and roller mills						
Learning Outcomes		1 To be able to comprehend the processes carried out to reach the consumer without losing the properties of the harvested agricultural products; 2 To be able to calculate the success of separation and classification processes in agricultural products; 3 To be able to measure the dimensions of granular products, to plan the separation and classification processes according to the 4 relations between the dimensions; To be able to comprehend the basic and auxiliary separation properties of granular products and 5 the schemes designed according to these properties; To be able to comprehend separation and classification methods in fruits and vegetables; 6 To be able to comprehend the moisture relationship of agricultural products, to determine the moisture content and to plan the drying process accordingly; 7 To be able to comprehend the purpose of grinding and crushing of agricultural products, to distinguish the properties of mills;						
7		+VOCATIONAL ELECTIVE D-1 (COURSE 1)	S					3
8		+VOCATIONAL ELECTIVE D-1 (COURSE 2)	S					4
9		***ELECTIVE COURSE (COURSE 1)	S					4

7TH SEMESTER							
Course Code	**Course Name**	**Z/S**	**D**	**U**	**L**	**K**	**ECTS**
1	**HARVEST THRESHING MACHINES**	**Z**	**2**	**1**	**0**	**2**	**4**
Course Objectives	The most important period in agricultural production is harvest and post-harvest. Practices during this time period are usually human labor intensive activities and without the use of technology, large crop losses occur. The aim of this course is to introduce students to new developments in harvest and post-harvest practices and methods of reducing crop losses. to inform the public about						
Course Content	Harvesting principles, harvesting and mowing techniques of green forage crops, meadow mowers, silage and bale machines, grain harvesting machines, combine harvester and operation parameters product losses.						
Course Subjects	1. Week Mowing principles in agricultural mechanization 2. Week Technologies used in grain harvesting 3. Week Harvesters and classification criteria 4. Week Sarsaks and design, 5. Week Cleaning unit and grain storage, 6. Week Moving organs in harvesters, 7. Week Harvester's work capacity and losses, 8. Week Blend forging systems, 9. Week Corn and cotton harvest, 10. WeekBalya machines, 11. WeekMowing principles in agricultural mechanization, 12. WeekFruit harvesting methods. 13. WeekHarvest of potatoes and onions, Soybean and sugar beet harvest, 14. WeekHarvest of potatoes and onions, Soybean and sugar beet harvest,						

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	Week 15Final exam 1 week						
Learning Outcomes	1) Technologies used in grain harvesting, Combine harvesters and classification criteria, Threshing elements and efficiency, Sars and design, Cleaning unit and grain warehouse, 2) Moving organs in harvesters, Harvester work capacity and losses, Threshing systems, Corn and cotton harvesting, Balers, 3) Mowing principles in agricultural mechanization Fruit harvesting methods. Potato and onion harvesting Soybean and sugar beet harvesting						
2	**DRAINAGE AND LAND RECLAMATION**	**Z**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To enable students to design drainage systems to be built on an agricultural land with problems related to surface and subsurface drainage systems. Salinity To ensure that the reclamation of lands with alkalinity and alkalinity problems is also carried out by students						
Course Content	Repetition of general introduction to agricultural drainage issues, types of drainage problems (surface, subsurface, etc.), topographic information in terms of drainage, soil data in terms of drainage (texture, hydraulic conductivity, profile depth, etc.), ground water data and creation of ground water maps, salinity data and creation of maps, variability of data under field conditions and division of land into units according to these data, design of the system (positioning of drain lines, drain spacing and selection of depths), determination of drain diameters and slopes, filtration in drainage, salinity and alkalinity problems and reclamation studies						
Course Subjects	Review of general introduction to agricultural drainage 2 Types of drainage problems (surface, subsurface, etc.) 3 Topographical information in terms of drainage, soil data in terms of drainage (texture, hydraulic conductivity, profile depth, etc.) 4 Topographical information in terms of drainage, soil data in terms of drainage (texture, hydraulic conductivity, profile depth, etc.) (continued) 5 Ground water data and creation of ground water maps, salinity data and creation of maps 6 Variability of data in field conditions and division of the land into units according to these data 7 Design of the system (design of the system)) (continued) 5 Ground water data and creation of ground water maps, salinity data and creation of maps 6 Variability of data under field conditions and division of the land into units according to these data 7 Design of the system (positioning of drain lines, selection of drain intervals and depths) 8 Midterm 9 Determination of drain diameters and slopes 10 Naming of drain lines and control of profiles 11 Filtration in drainage 12 Salinity and alkalinity problems 13 Salinity and alkalinity Comparison of the projects realized by the students with the projects actually built and general evaluation						
Learning Outcomes	1. Using these data, design of an economically efficient, technically feasible system (with lay-out, depth, spacing, slope, cross-section and profile in accordance with the topography of the land and filter 2. Students learn how to identify and obtain the necessary data for the drainage system that will solve the problem 3. Students will be able to diagnose the drainage problem and learn appropriate solutions 4.						
3	**IRRIGATION MACHINES**	**Z**	**1**	**2**	**0**	**2**	**3**
Course Objectives	Defining the methods and components used in the preparation of a good irrigation program for the effective use of water resources at the basin level and giving examples projects are aimed to be developed						
Course Content	Definition of Irrigation Time Planning (ITSP) and the methods used, basic information on ITSP planning, planning stages, ITSP planning with computer programs planning						
Course Subjects	1 Irrigation Time Planning (IWP), definition and methods used 2 Basic information in irrigation planning, plant water consumption and determination methods 3 Determination of plant coefficients 4 Meteorological parameters 5 Soil-Plant-Water relations 6 Water-Yield relation, yield factor (ky) 7 Water saving, planning stages 8 Midterm 9 Planning of IWP with soil water budget, necessary information, methods used 10 Estimated fast planning method 11 Simple calculation method 12 Graphical method 13 Planning of SZP with computer programs 14 Evaluation of an irrigation program at basin scale						
Learning Outcomes	To have knowledge in irrigation programming						
4	**SOIL CULTIVATION SYSTEMS**	**Z**	**1**	**2**	**0**	**2**	**3**
Course Objectives	To gain knowledge and skills about tillage and seed bed preparation techniques in agricultural production and the design, use, repair, adjustment, maintenance and protected tillage methods of tillage machines used in the application of these techniques.						
Course Content	Scientific foundations of tillage, tillage technique, history of tillage, classification of tillage tools, plows, disc plows, garden and vineyard plows, chisel plow and dipkazan, arc plow, pulling force and pulling power in plows, ploughing technique, rotary tillage machines, cultivators, harrows, rollers, field plows, combinations of tools in seed bed preparation, protected tillage and direct sowing.						

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Course Subjects	1. Week Definition and structure of soil, physical properties of mineral soils and methods of determination of physical parameters that can be measured, 2. Week History of tillage, The purposes of tillage, tillage methods in dry and irrigated agricultural regions, 3. Week Tillage techniques with soil tillage tools, 4. Week Soil tillage methods, classification of soil tillage tools and machines, 5. Week Eared plows, 6. Week Eared and disk plows, 7. Week Cultivators and harrows							
	8. Week Midterm exam 9. Week Soil milling cutters and other tools, 10. WeekSoil processing systems, 11. WeekMinimized tillage systems, 12. WeekDirect sowing practices, advantages and disadvantages 13. WeekDirect sowing practices, advantages and disadvantages 14. WeekDirect sowing practices, advantages and disadvantages							
Learning Outcomes	1) Student knows tillage and seedbed preparation techniques in different agricultural systems 2) Learns tillage techniques and application methods in different climatic and soil conditions 3) Have knowledge about no-tillage farming technique and conservation tillage							
5		INTERNSHIP	Z	0	5	0	3	5
6		++VOCATIONAL ELECTIVE DRS-1 (COURSE 1)	S			0		4
7		++VOCATIONAL ELECTIVE DRS-1 (COURSE 2)	S			0		4
8		SOCIAL-CULT. COURSE (COURSE 1)	S			0		4
	TOTAL							30

	8TH SEMESTER							
	Course Code	Course Name	Z/S	D	U	L	K	ECTS
		VOCATIONAL EDUCATION IN BUSINESS	S		30			30
OR								
	Course Code	Course Name	Z/S	D	U	L	K	ECTS
1		+++VOCATIONAL ELECTIVE DRS-1 (COURSE 1)	S					30
2		+++VOCATIONAL ELECTIVE DRS-1 (COURSE 2)	S					
3		+++VOCATIONAL ELECTIVE DRS-1 (COURSE 3)	S					
4		+++VOCATIONAL ELECTIVE DRS-1 (COURSE 4)	S					
5		+++VOCATIONAL ELECTIVE DRS-1 (COURSE 5)	S					
6		+++VOCATIONAL ELECTIVE DRS-1 (COURSE 6)	S					
7		+++VOCATIONAL ELECTIVE DRS-1 (COURSE 7)	S					
8		+++VOCATIONAL ELECTIVE DRS-1 (COURSE 8)	S					
	TOTAL							30

0700005001 - (5TH SEMESTER - INTRA-DEPARTMENTAL COURSES)							
Course Code	**Course Name**	**Z/S**	**D**	**U**	**L**	**K**	**ECTS**

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1	**VINEYARD GARDEN MACHINERY**	**C**	**2**	**0**	**0**	**2**	**3**
Course Objectives	The aim of this course is tractors used in horticulture, engines, tillage, sowing and planting, fertilization, spraying, irrigation, sick and post-sick mechanization to provide information about						
Course Content	To have knowledge about mechanization applications in vineyard gardens						
Course Subjects	1 Mechanization in Agriculture 2 Tractors 3 Engines 4 Tillage Tools and Machines						
	5 Tillage Tools and Machines 6 Planting Planting Machines 7 Midterm Exam 8 Planting Planting Machines 9 Fertilizer Dispensing Machines 10 Agricultural War Machines 11 Water extraction machines 12 Harvesting Machines 13 Post-harvest processing 14 Costs of agricultural machinery						
Learning Outcomes	1. Have knowledge about the growing conditions of horticultural crops. 2. Have knowledge about new systems and machines used in the cultivation of horticulture.						
2	**LANDSCAPE IRRIGATION**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	About planning, projecting, application and operation of irrigation systems in recreational areas, which are different from agricultural irrigation, to students who have irrigation infrastructure to give the necessary engineering knowledge.						
Course Content	Resource research required for the design of irrigation systems for landscape areas, plant water consumption, amount of irrigation water to be applied in each irrigation and irrigation interval, system capacity effective rainfall, irrigation time planning, design of sprinkler and drip irrigation systems, exploration and b i l l of quantities, drawings of technical details, Problems encountered during the application of the project to the land and approaches to their solutions, operation of the applied systems.						
Course Subjects	1 Introduction, Soil-Plant-Water relations 2 Irrigation water quality, irrigation water requirement 3 Identification of landscape areas, resource research 4 Sprinkler irrigation method 5 Pre-projecting factors 6 Selection and arrangement of sprinkler heads, formation of operating units and design of lateral pipelines 7 Sprinkler irrigation projecting 8 Midterm exam 9 Sprinkler irrigation project 10 Drip irrigation method 11 Drip irrigation project 12 Project work 13 Project work 14 Project work						
Learning Outcome	1. To have knowledge about irrigation of landscape areas						

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s							
3	**DESIGN OF DRAINAGE SYSTEMS**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To enable students to design drainage systems to be built on an agricultural land with problems related to surface and subsurface drainage systems. Salinity and To ensure that the reclamation of lands with alkalinity problems is also carried out by students						
Course Content	Repetition of general introduction to agricultural drainage issues, types of drainage problems (surface, subsurface, etc.), topographic information in terms of drainage, soil data in terms of drainage (texture, hydraulic conductivity, profile depth, etc.), ground water data and creation of ground water maps, salinity data and creation of maps, variability of data under field conditions and separation of land into units according to these data, design of the system (positioning of drain lines, drain spacing and depth of the drain selection) determination of drain diameters and slopes Filtration in drainage Salinity and alkalinity problems and reclamation works						
Course Subjects	1 Review of general introduction to agricultural drainage issues 2 Types of drainage problems (surface, subsurface, etc.) 3 Topographic information in terms of drainage, soil data in terms of drainage (texture, hydraulic conductivity, profile depth, etc.) 4 Topographic information in terms of drainage, soil data in terms of drainage (texture, hydraulic conductivity, profile depth, etc.) (continued) 5 Ground water data and creation of ground water maps, salinity data and creation of maps 6 Variability of data in field conditions and land according to these data 7 Design of the system (positioning of drain lines, selection of drain intervals and depths) 8 Midterm exam 9 Drain diameters and						
	Determination of slopes 10 Nomenclature of drain lines and control of their profiles 11 Filtration in drainage 12 Salinity and alkalinity problems 13 Salinity and alkalinity breeding studies 14 Comparison of the projects realized by the students with the projects actually built and general evaluation						
Learning Outcomes	1. Using these data, design an economically efficient, technically feasible system (with lay-out, depth, spacing, slope, cross-section and profile in accordance with the topography of the land and filter 2. Students learn how to identify and obtain the necessary data for the drainage system that will solve the problem 3. Students diagnose the problem of wasteland and learn appropriate solutions 4. Students diagnose the problem of drainage						
4	**AGRICULTURAL MACHINERY TEST METHOD.**	**S**	**2**	**1**	**0**	**2**	**4**
Course Objectives	The performance of agricultural machinery, productivity values, production quality, compliance with national and international standards and agricultural techniques, scientific and technical findings teaching.						
Course Content	The test principles in the national and international standards in force regarding agricultural tractors and agricultural machinery will be examined. Test rigs, measurement parameters and evaluation methods of tractor driven and self-propelled agricultural machines will be explained. The course will cover the testing of tractors and agricultural machinery in Turkey. It also includes important information about the institutions and authorities through which it is carried out.						
Course Subjects	1 The importance and purpose of tests on agricultural machinery; principles and methods of testing of agricultural equipment and machinery, examination of TS and ISO standards; 2 Explanation of soil, crop and other test conditions; Explanation and calculation of work quality and work efficiency in different dimensions of agricultural machinery; 3 Determination of the test method, measurement tools and equipment used in agricultural machinery experiments; towing force, power, fuel consumption, etc. measurement methods; 4 Test Methods: Tractor and cabin tests; Tillage tools and machines tests; 5 Experiment Methods: Experiments on sowing, planting, maintenance and fertilizing machines; 6 Test Methods: Experiments on mowers, hay barrel-turners and balers; Experiments on combine harvesters and other harvesting and threshing machines; 7 Experiment Methods: Experiments on spraying machines; 8 Course Review and Midterm Exam 9 Experiment Methods: End of harvest feed crushing, grinding, cleaning, grading, etc. experiments of machines; 10 Experiment Methods: Experiments on product handling and conveying machines, 11 Experiment Methods: Experiments on milking and cooling machines, 12 Test Methods: Test methods for other food, agricultural and livestock equipment 13 Preparation of experiment reports. 14 Preparation of experiment reports.						

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Learning Outcomes	1 Learns the engineering calculations and designs necessary to improve work quality and work efficiency in agricultural machinery; 2 Gains the ability to learn and use measurement tools and equipment used in agricultural machinery experiments; 3 By making the agricultural machine experiment, the type of material in the machine, learns the machine elements used in practice; 4 Examines the ergonomic aspects of occupational safety of machines and learns design, development and production studies;						
5	**PRESSURIZED IRRIGATION SYSTEM DESIGN**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To inform students about the design and project design of individual and collective, drip and sprinkler irrigation systems in closed irrigation systems and to gain the ability to project.						
Course Content	Definition, importance and history of irrigation, soil and water resources potential in Turkey, irrigability status of soils, sources of irrigation water, soil-water and plant relations, inflitration, plant water consumption, planning principles of irrigation systems, planning of open canals, irrigation program and irrigation systems, water distribution forms, quality and classification of irrigation water, irrigation methods drainage.						
Course Subjects	1 Introduction and literature review - 2 Design of sprinkler irrigation systems Determination of water distribution patterns in sprinkler heads: Single head trial method 3 Design of sprinkler irrigation systems Determination of water distribution patterns in sprinkler heads: Single head trial method 4 Design of individual sprinkler irrigation systems Irrigation system design 5 Design of individual sprinkler irrigation systems Irrigation system design 6 Design of mass sprinkler irrigation systemsIrrigation system design 7 Design of mass sprinkler irrigation systemsIrrigation system design 8 Course review and Midterm Exam - 9 Design of individual drip irrigation systemsIrrigation system design 10 Design of individual drip irrigation systemsIrrigation system design						
	11 Design of mass drip irrigation systems Irrigation system design 12 Design of mass drip irrigation systems Irrigation system design 13 Design of micro sprinkler irrigation systems under treesIrrigation system design 14 Visit to agricultural enterprises with installed irrigation systems in the regionTour to agricultural enterprises with installed irrigation systems in the region						
Learning Outcomes	1 To be able to analyze technologies and developments in pressurized irrigation systems; 2 To be able to choose the most appropriate irrigation method for the conditions; 3 To be able to comprehend the project design of irrigation system in a certain flow; 4 To be able to design the irrigation system required by the selected irrigation method and to be able to dimension the system elements;						
6	**INTRODUCTION TO REMOTE SENSING**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Teaching the definition, scope and data structure of Geographic Information System and Remote Sensing, the use of GIS in the identification and solution of problems related to agriculture, General use of ArcGIS software, sample projects related to GIS applications in Biosystems Engineering study areas.						
Course Content	Introduction to Remote Sensing, Electromagnetic Energy and Remote Sensing, Sensors (Passive and Active Systems), Platforms and Properties, Image and Properties, Image Image Analysis (Preprocessing, Image Enhancement), Image Analysis (Visual Interpretation, Image Classification), Image Analysis (Accuracy Determination), Data Transfer to GIS, Remote Sensing Applications (Homework), Applications on Image Analysis.						
Course Subjects	1 Giving Basic Map Information 2 Geographical location and projections 3 Information systems and GIS basic concepts 4 GIS data structure 5 Queries in GIS environment 6 Basic GIS analysis 7 Basic GIS analysis 8 Midterm exam 9 Physical Basics of Remote Sensing 10 Electromagnetic spectrum, Color Theory and Color images 11 Satellites and Sensors 12 Initial Processing of Remote Sensing Data 13 Generating Information from Remote Sensing Data 14 Observation of agriculture and natural resources Remote Sensing						
Learning Outcomes	1. To be able to comprehend the basics of GIS technologies; 2. To be able to analyze with GIS; 3. Definition, basic principles and elements of remote sensing and general and agricultural use To be able to comprehend the issues related to the fields;						
7	**LAND LEVELING MACHINES**	**S**	**2**	**0**	**0**	**2**	**3**

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Course Objectives	The aim of the course is to give basic information about Soil Mechanics in terms of Earthwork and Leveling, Earthwork and Leveling Machines, Land Clearing and Clearing Technique and Machines, Terracing Technique and Machines, Drainage Technique and Machines. The students who take the course will be able to gain knowledge on Land and Leveling Machines and engineering applications related to the subject. level of education is aimed to be achieved.						
Course Content	Soil Mechanics in terms of Earthmoving and Leveling, Earthmoving and Leveling Machines, Land Clearing and Acma Technique and Machines, Terracing Technique and Machinery, Drainage Technique and Machinery						
Course Subjects	Introduction 2 Soil Mechanics in terms of Excavation and Leveling 3 Technical Survey of Soil in terms of Excavation and Leveling 4 Determination of Movement Resistance, Towing Force and Progress Speed of Excavation and Leveling Machines 5 Control Systems in Melioration Machines 6 Classification and Selection of Tools and Machines Used in Melioration 7 Tabantaşı problem, Subsoiler and Ripper 8 Midterm exam 9 Dozer, Skreyper and Skreyper-Float 10 Graders and Excavators 11 Land Clearing and Clearing Techniques and Machines 12 Terracing Technique and Machines 13 Drainage Technique and Machines 14 Cost Calculation in Melioration Machines						
Learning Outcomes	1. To be able to explain the basic concepts related to land leveling machines; 2. To be able to comprehend important soil and soil properties in land leveling; 3. To be able to recognize the basic mechanization tools used in land leveling and explain for what purpose, where and how these tools are used;						
8	**TECHNOLOGY DEVELOPMENT AND R&D PRINCIPLES.**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To give students basic information about science and technology, technology development processes, invention, innovation, R&D, innovation, patent and intellectual property rights. Course Content It is aimed that students will have the knowledge and skills to conduct R&D and manage projects.						
Course Content	Technology and innovation management course, basic concepts related to technology and technology management, Technology management activities (Acquisition, Utilization, Identification, Learning, Protection and Selection) and Technology management tools (Patent Analysis, Portfolio Management, Technology Roadmap, S-Curve, Stage-Gate Method, Value Analysis), Research - Development (R&D) and Innovation Management.						
Course Subjects	1 Introduction 2 Science, technology and development processes 3 Processes related to invention, innovation and creativity 4 Technology transfer and processes 5 Research and development management 6 Project preparation and presentation methods						
	7 Project management 8 Sample project preparation study 9 Course Review and Midterm Exam 10 Innovation processes 11 Types of innovation 12 Intellectual property rights 13 Preparation of a sample patent application 14 General Review						
Learning Outcomes	1 To be able to apply scientific research methods and techniques; 2 To be able to comprehend R&D structuring and management; 3 To be able to comprehend the importance of project concept and to be able to work project-oriented; 4 To be able to comprehend intellectual rights such as patent, utility model and protection methods of these rights;						
9	**AUTOMATION IN AGRICULTURE**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To enable students to learn the methods of measuring the quantities needed for automation in agriculture, as well as to recognize and use the devices used in these methods, automatic control circuits, devices, control variables and components used during the process, control types, measurement and final control, properties and units of the elements used, static and dynamic operating characteristics, in agricultural technology; greenhouse, food technology, animal husbandry Examples of applications such as production, storage, etc. will be examined						

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Course Content	•Evaluation of measurement by the unit in measurement technique •Errors in measurement systems and their causes, evaluation of measurement results, measurement systems and the basis of a dynamic measurement system •Functions and uses of measuring systems (strain gauges, recorders and other data acquisition and evaluation systems) -Sensors, detection range and sensitivity. •Basic converter applications. •Different sensors and applications •(temperature, pressure, size, flow, light, radiation, motion and vibration, torque, power, etc.). •Automatic control concept, control systems and types. •Basic concepts, definitions and application areas and structure of control systems. •The way industrial control systems work and the behavior of the systems. •Examples of automated control applications in agriculture (greenhouses, food technology, animal production, storage, irrigation)						
Course Subjects	1 Theoretical Introduction of the course, explanation of topics, activities, evaluation methods and functioning 2 Theoretical Evaluation of dimensions with units in measurement technique, determination of error rates and establishment of measurement systematics, SI unit systems and applications, 3 Theoretical Errors in measurement systems and their causes, evaluation of measurement results, measurement systems and the basis of dynamic measurement systems 4 Theoretical Graphical curve fitting, basic electrical measurements and sensitive elements 5 Theoretical Functions and use of measuring systems (strain gauge, recorder and other data acquisition evaluation systems) 6 Theoretical Sensors, detection ranges and sensitivity 7 Midterm Exam (Midterm) midterm exam 8 Theoretical Basic applications related to converters 9 Theoretical Different sensors and their applications (pressure, temperature, heat, size, flow, light, radiation, motion and vibration, torque, power, etc.) 10 Theoretical Automatic control concept, control systems and types 11 Theoretical Basic concepts and definitions, structure and usage areas of control systems 12 Theoretical Behavior of systems and operation of industrial control systems 13 Theoretical Examples of automatic control applications in agricultural technology (greenhouse, food technology) 14 Final Exam (Final) Final Exam						
Learning Outcomes	1 To be able to recognize different types of measuring instruments and to be able to select the appropriate measuring instrument for the field of use. 2 Understand the types of mechanical and electrical control systems. 3 Basic applications for converters 4 Different sensors and their applications (pressure, temperature, heat, size, flow, light, radiation, motion and vibration, torque, power, etc.)						
	5 Examples of automatic control applications in agricultural technology (greenhouse, food technology)						
	PLANNING OF WATER RESOURCES	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	The aim of this course is to provide the students with the ability to use mathematical optimization techniques and models in the planning, design and operation of water resources systems and to To gain the knowledge and skills to apply the principles to various water resources problems.						
Course Content	Land and water resources in the world and in our country, calculation of benefits and costs in water resources projects, economic analysis of water resources projects, water planning of water resources, management of water resources, irrigation planning, irrigation organizations.						

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Course Subjects	1. Week Definition, importance and history of drainage 2. Week Drainage studies 3. Week Hydraulic conductivity determination methods 4. Week Soil water flow under saturated and unsaturated conditions 5. Week Introduction to drainage methods 6. Week Surface drainage systems 7. Week Surface drainage systems 8. Week Midterm Exam 9. Week Subsoil drainage systems 10. WeekPlanning of subsoil drainage systems 11. WeekProperties of materials used in subsoil drainage systems 12. WeekMediation of saline and sodic soils 13. WeekMediation of saline and sodic soils 14. WeekSample projects
Learning Outcomes	1. To understand the importance of water and water resources for the world and Turkey, to understand the problems related to water resources; 2. To develop and solve different types of optimization models for water resources planning and management problems; 3. To understand the role of mathematics in solving engineering problems and to establish a relationship between applied mathematics and water resources problems; 4. To apply computer optimization techniques to water resources problems. to be able to utilize software;

0700006001 - (6TH SEMESTER - INTRA-DEPARTMENTAL COURSES)							
Course Code	**Course Name**	**Z/S**	**D**	**U**	**L**	**K**	**ECTS**
1	**HEAT TRANSFER**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Ventilation, heating and cooling are important processes applied for environmental control in agricultural buildings (animal shelters and greenhouses). Heat transfer pathways must be known in the design and operation of these systems. In addition, heat transfer is required in the design and operation of systems to be used in the processing of agricultural products. As a result, the aim of this course is to provide an overview of ventilation, heating and cooling systems used in agricultural buildings and in the processing of agricultural products. to give the basic knowledge necessary for the design and operation of the systems used.						
Course Content	Introduction, conduction heat transfer under one-dimensional steady flow conditions, Fourier's law in conduction heat transfer, single and multilayer plane, cylindrical and spherical heat transfer by conduction in bodies, heat transfer by convection (free and forced convection), heat transfer by radiation.						
Course Subjects	1 Introduction to heat transfer. Obtaining information from recommended sources. 2 Surface-to-surface conduction heat transfer in single and multilayer plane bodies under steady flow conditions. 3 Surface-to-surface conduction heat transfer in single and multilayer cylindrical bodies under steady flow conditions. 4 Surface-to-surface conduction heat transfer in single and multilayer spherical bodies under steady flow conditions. 5 Sample problem solution on heat transfer by conduction. Preparation of sample problems from different sources. 6 Forced convection heat transfer under laminar flow conditions on flat surfaces. 7 Forced convection heat transfer under laminar flow conditions in circular ducts. Obtaining information from recommended sources. 8 Midterm Exam 9 Forced convection heat transfer under laminar flow conditions in circular ducts. Obtaining information from recommended sources. 10 Forced convection heat transfer under turbulent flow conditions in circular cross-section channels.						

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	11 Sample problem solution on forced convection heat transfer. Preparation of sample problems from different sources. 12 Heat transfer by natural convection in horizontal and vertical plane bodies. 13 Heat transfer by natural convection in cylindrical bodies. Obtaining information from recommended sources. 14 Combined heat transfer between two fluids with plane, cylindrical and spherical bodies between them. Obtaining information from recommended sources. 15 Sample problem solution on compound heat transfer.Preparation of sample problems from different sources 16-17Semester Final Exams						
Learning Outcomes	1. Describe the types and mechanism of heat transfer 2. Calculate heat transfer coefficients for various systems. 3. will be able to solve heat transfer problems with condensation in continuous regime. 4. will be able to solve natural and forced convection problems. 5. Will be able to analyze convection heat transfer in pipe internal and external flows. 6. will be able to compare the types of heat exchangers and calculation methods. 7. Solve engineering problems related to heat transfer independently or by working in a team						
2	**DRYING PRINCIPLES**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Drying of products, which is one of the food preservation methods, is one of the most important post-harvest processes. With this course, students will be able to learn about the drying technique of agricultural products. to learn the details of the foundations and to be able to select and design drying systems that are suitable for the product and have the least quality loss and drying It is aimed to gain the ability to solve the problems that may be encountered during the implementation of the processes and the ability to solve these problems.						
Course Content	Introduction to drying technology, development of drying process in Turkey and in the world, definition and importance of drying; structure of agricultural products, properties related to drying, introduction to drying project preparation; moisture measurement methods; movement of water in agricultural products; physical properties of products and drying relationship; factors affecting drying process, important concepts in terms of drying process; introduction of drying methods; drying stages of agricultural products and drying models; sorption isotherms and their determination, examination of sorption models; control of product quality during and after drying process; drying systems project design						
Course Subjects	1. Week Introduction to drying technology 2. Week Development of drying process in Turkey and the world, the definition and importance of drying 3. Week Structure of agricultural products and properties related to drying 4. Week Introduction to drying project preparation; moisture measurement methods 5. Week Movement of water in agricultural products; physical properties of products and drying relationship; factors affecting the drying process 6. Week Important concepts in terms of drying process; introduction of drying methods; drying stages of agricultural products and drying models 7. Week Sorption isotherms and their determination, examination of sorption models 8. Week Midterm 9. Week Pretreatments applied in drying 10. WeekProduct quality during and after the drying process 11. WeekThe use of psychometric diagram in drying 12. WeekThe use of psychometric diagram in drying (examples) 13. WeekThe use of psychometric diagram in drying (examples) 14. WeekSelection criteria and design of drying systems 15. WeekSelection criteria and design of drying systems 16. WeekEND EXAM						

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Learning Outcomes	1) Apply drying principles and drying programs with different techniques 2) Define and explain the drying process 3) Explain the factors affecting the drying period 4) Determination of psychometric properties and equilibrium moisture in agricultural products 5) Will be able to combine different drying methods according to the product. 6) Will be able to design dryer projects 7) Evaluate special drying methods						
	8) Evaluate the success of the drying process						
3	**RURAL SETTLEMENT TECHNIQUE**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	The aim of the course is to introduce the elements that make up rural settlements and to develop rural settlements, to plan rural settlements, to analyze physical planning problems. and to develop solution proposals.						
Course Content	Settlements and settlement factors, physical structure of rural settlements, settlement patterns in rural areas, rural area planning, characteristics of rural settlements in Turkey, village physical planning planning of the agricultural enterprise center.						
Course Subjects	1 Settlement and settlement factors. 2 Physical structure of rural settlements. 3 Settlement types in rural areas. 4 Dispersed settlements 5 Collective settlements 6 Rural area planning 7 Rural settlement and rural development 8 Characteristics of rural settlements in Turkey. 9 Midterm Exam 10 Problems and solutions of rural settlements in Turkey. 11 Village settlement 12 Village physical planning. 13 Planning principles of agricultural business center. 14 Planning of an agricultural business center. 15 Final exam						
Learning Outcomes	1-To be able to synthesize rural area and rural settlement. 2-To be able to research the necessary data for rural settlement planning and to work with different disciplines. 3-Rural settlement To be able to apply planning principles. 4-To be able to analyze rural settlement problems, identify and solve problems						
4	**CONCRETE**	**S**	**1**	**2**	**0**	**2**	**4**
Course Objectives	It is aimed to teach students the principles of projecting reinforced concrete as a building element in agricultural building design.						
Course Content	History of concrete, Reinforced concrete terms, Steel classes used in reinforced concrete, Reinforced concrete molds, Advantages and weaknesses of reinforced concrete, Basic hypotheses used in reinforced concrete, Explanation of standards and regulations, Reinforced concrete calculation theories, Safety stresses, Elements under simple compression, Columns with simple ribs, Fretted Columns, Columns construction principles, Elements in simple tensile effect, Elements in simple bending effect, Rectangular sections, Tabular sections, Trapezoidal sections, Shear force effect Torsion effect						
Course Subjects	1 Introduction, course introduction and informing the student about the method to be followed during the semester 2 Physical and mechanical properties of concrete, concrete steel as a building material 3 Basic principles and methods in the design of reinforced concrete structures 4 Elements under the effect of axial force 5 Bearing capacity and sizing of short columns with stirrups and braces 6 Basic principles and assumptions in determining the flexural strength of reinforced concrete sections 7 Bearing capacity of single reinforced rectangular sections 8 Midterm exam 9 Sizing of single reinforced rectangular sections (Section calculation) 10 Bearing capacity of double reinforced rectangular sections and sizing of sections 11 T-section, triangular and Bearing capacity of trapezoidal beams 12 Calculation of bending reinforcement of reinforced concrete beams 13 Elements under compound bending 14 Elements under shear force						
Learning Outcomes	1. To be able to comprehend the basic principles and methods in the design of reinforced concrete structures 2. To be able to design a reinforced concrete element in a way to provide economic and durability; 3. To be able to recognize the application areas of reinforced concrete in agricultural building elements; 4. To be able to project reinforced concrete structural elements in agricultural building elements;						
5	**SURFACE IRRIGATION SYSTEMS DESIGN**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Planning of irrigation systems according to climatic, vegetative and soil characteristics, as well as the design of different irrigation systems and to determine their relationship with the application in order to provide a better understanding of these issues, to support the design phase with numerical examples						

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Course Content	Students at the undergraduate level about the design of irrigation systems, preparing irrigation projects, applying the projects to the field and operating irrigation systems. educate with theoretical and practical knowledge						
Course Subjects	1. Theoretical Introduction, Source Research 2. Theoretical Drip Irrigation Method 3. Theoretical Design of Drip Irrigation Systems 4. Theoretical Sprinkler Irrigation Method 5. Theoretical Design of Sprinkler Irrigation Systems 6. Theoretical Under-tree Micro Sprinkler Irrigation Method 7. Theoretical Design of Under Tree Micro Sprinkler Irrigation Systems 8. Midterm Exam (Midterm) Midterm 9. Theoretical Preparation of Land for Irrigation 10. Theoretical Water Intake Properties of Soil 11. Theoretical Pan Irrigation Method, Design of Pan Irrigation Systems 12. Theoretical Long Pan Irrigation Method, Design of Long Pan Irrigation Systems 13. Theoretical Furrow Irrigation Method 14. Theoretical Design of Furrow Irrigation System 15. Practice Practice Exam						
	16. Final Examination (Final) Final Examination						
Learning Outcomes	1 Conducting resource research 2 Knowing the water intake properties of soil 3 Design of pressurized irrigation systems 4 Design of Under Tree Micro Sprinkler Irrigation Systems 5 Pan Irrigation Method, Design of Pan Irrigation Systems						
6	**LANDSCAPE MACHINERY**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Landscape mechanization, Energy sources in landscaping, Garden and forestry machinery, Landscape arrangement and maintenance.						
Course Content	The definition and classification of landscape, the subject and working areas of the Landscape Architecture profession and the preparation and maintenance of landscape areas. information about the machines used will be given.						
Course Subjects	1 The concept of mechanization and landscape mechanization will be introduced. 2 Energy sources in landscape will be explained. 3 General occupational and worker health, rules to be considered while working in garden and forest areas will be explained. 4 The issues to be considered in the maintenance, maintenance and use of the machines will be explained. 5 Machines used in horticulture will be explained. 6 Machines used in forestry will be explained. 7 Machines used for landscaping purposes will be explained. 8 Machines used for maintenance purposes will be explained. 9October machines will be announced. 10 Planting machines will be explained. 11 Fertilization machines will be explained. 12 Spraying machines will be explained. 13 Problems encountered in the use of machines and solutions will be explained. 14 Problems encountered in the use of machines and solutions will be explained.						

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Learning Outcomes	1 Teaching the concept of landscape mechanization; 2 To be able to learn energy sources in landscape; 3 To be able to learn garden and forestry machinery;						
7	**WOODEN AND STEEL STRUCTURES**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	It is aimed to have sufficient technical knowledge about wooden structures and steel structures.						
Course Content	General information on timber structures, Joints and joining tools in timber structures, threaded joints, joining tools, studded joints, bolts and wedges, axial tension and Elements carrying pressure force, Single and multi-part pressure bars, Bending elements, Truss beams, timber roof systems, calculation principles of roof elements, Steel building materials and joining tools, Welding and welded joints Tensile rods and tensile rod joints, Pressure rods, Steel roof systems.						
Course Subjects	1. General information on wooden structures 2. Joints and joining tools in wood structure, threaded joints 3. Joining tools, studded joint 4. Bolts and wedges 5. Elements bearing axial tension and compressive forces 6. Single and multi-piece pressure bars 7. Elements trying to bend 8. Midterm Exam 9. Trusses, timber roof systems, calculation principles of roof elements 10. Steel construction materials and joining tools 11. Welding and welded joints 12. Tensile bars and attachments of tensile bars 13. Pressure bars						
	14.Steel roof systems						
Learning Outcomes	- To be able to comprehend joint elements in timber and steel structures - To be able to recognize timber and steel building systems and elements - To be able to design wooden roof elements in an agricultural building - To be able to design column and roof elements in steel structures						
8	**AGRICULTURAL TECHNOLOGIES. ENERGIZE.**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	The aim of the course is to provide students with basic knowledge about energy efficiency and its relationship with agriculture. The students will be able to analyze the energy efficiency of a machine system or a plant. to have the necessary knowledge and skill level to determine the level of the students' knowledge and skills.						
Course Content	Basic concepts related to energy and energy efficiency, Unit systems for the evaluation of energy, Energy efficiency and energy saving, Energy efficiency in lighting, Energy efficiency in cooling machines and air conditioning plants, Energy efficiency in heating, Utilization of waste energies and recovery methods of these energies, Energy use and efficiency in agricultural production, The importance of power factor and compensation in the use of electrical energy and compensation limits and calculations, Energy efficiency in the use of agricultural machinery, The use and efficiency of technologies related to renewable energy sources, Energy in Turkey Losses and leakages and the measures to be taken Energy efficiency law, regulations related to this law and standards related to energy efficiency						

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Course Subjects	1 Basic concepts of energy and energy efficiency 2 Unit systems for energy utilization 3 Energy efficiency and energy saving 4 Energy efficiency in lighting 5 Energy efficiency in refrigeration machines and air conditioning plants 6 Energy efficiency in heating 7 Utilization of waste energies and recovery methods of these energies 8 Course Review and Midterm Exam 9 Energy use and efficiency in agricultural production 10 The importance of power factor and compensation in the use of electrical energy and compensation limits and calculations 11 Energy efficiency in the use of agricultural machinery 12 Use and efficiency of technologies related to renewable energy sources 13 Energy losses and leakages in Turkey and measures to be taken 14 Energy efficiency law, regulations related to this law and standards on energy efficiency							
Learning Outcomes	1. Understand the importance of energy efficiency and energy saving 2. Understand the relationship between energy efficiency and agriculture 3. To be able to apply energy efficiency principles to practical problems 4. To be able to comprehend laws, regulations and standards related to energy efficiency							
9	**AGRICULTURAL ELECTRIFICATION**	**S**	**2**	**0**	**0**	**2**	**3**	
Course Objectives	Electricity to improve the quality and quantity of production in agricultural production areas and to improve the living conditions of those living in these areas Knowing technical information about all kinds of machines and realities utilizing energy.							
Course Content	The importance of electrical energy and the general electrification status of Turkey, methods of producing electrical energy, Types of Internal Installations Used in Agricultural Electrification and Determination of Conductor Cross Section, Electric Motors and Their Use in Agriculture, Electrical Lighting Technique and Ventilation Techniques in Agriculture.							
Course Subjects	1 The importance of electrical energy and the general electrification status of Turkey 2 Content of agricultural electrification and application areas in Turkey 3 Methods of production of electrical energy 4 Safety precautions in working with electricity 5 Types of Internal Installations Used in Agricultural Electrification and Determination of Conductor Cross Section 6 Providing Grid Energy to Agricultural Settlements 7 Electrical Lighting Technique in Agriculture 8 Midterm Exam							
	9 Ventilation Techniques in Agriculture (Natural and Artificial Ventilation Methods) 10 Ventilation Techniques in Agriculture (Natural and Artificial Ventilation Methods) 11 Calculation of Ventilation capacity in Agriculture 12 Calculation of Ventilation capacity in Agriculture 13 Electric Motors and Their Use in Agriculture 14 Electric Motor Selection for Electrification Applications in Agriculture							
Learning Outcomes	1) Makes the calculation of the most suitable conductor cross-section for the operation of all kinds of electrical machines to be used in agricultural production. 2) It draws electrical energy from the main grid to agricultural production areas. 3) Makes the selection and calculation of the power of light sources to be used in plant and animal production. 4) Calculates the capacity of fans to be used for ventilation in agricultural production. Calculates the power of electric motors to be used in agricultural production. 5) Makes the selection and calculation of the power of light sources to be used in plant and animal production.							

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0700007001 - (7TH SEMESTER - INTRA-DEPARTMENTAL COURSES)							
Course Code	**Course Name**	**Z/S**	**D**	**U**	**L**	**K**	**ECTS**
1	**HYDROELECTRIC AND BIOMASS ENERGY AGRICULTURAL PRACTICES**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Today, which we can define as the century of energy, it is seen that our country is foreign-dependent in terms of conventional energy values. In terms of primary energy resources, 2.5 times the energy produced in our country is consumed, and this figure is up to 10-12 times in terms of oil and natural energy. Within the scope of this course, after examining the situation of conventional energies statistically, we will learn about alternative energy technologies that can be used to close this gap. to provide information. Alternative energies and the technologies used in their production are explained and ways of utilizing these energies are explained.						
Course Content	Power generation and consumption applications in agriculture, different types of energy, hydraulic energy and technology, biomass energy and conversion technologies						
Course Subjects	1 DEFINITION AND CLASSIFICATION OF ENERGY; Definition of Energy, Classification of Energy, MACHINERY-EnERGY RELATIONSHIPS; ENERGY PRODUCTION AND CONSUMPTION IN THE WORLD AND TURKEY; Energy Sector Outlook in the World, Energy Production and Consumption Status in Turkey 2 SOLAR ENERGY AND TECHNOLOGY; Solar Energy Potential, Properties of Solar Energy, Solar Energy Technology, History, Solar collector technology, Flat Surface Solar Collectors, Focused collectors, Various application areas of solar energy technology, Electric energy production, Usable heat energy production, Cold production, Fresh water production, Tractor and water pump operation, Acceleration of plant growth 3 WIND ENERGY TECHNOLOGY; Birth of Wind and Ability to Do Work; Wind Energy Technology, History, Structural parameters of wind power machines, Aerodynamic properties and useful power of the wind devitken wheel, Transmission system, Automatic steering system, Braking system, Tower (pylon) 4 Wind Energy Plants, Wind mill plants, Wind turbine plants, Wind power plant plant, Other wind energy plants, Economic study of wind power machines. 5 HYDRAULIC ENERGY AND TECHNOLOGY: Definition and Classification of Hydraulic Energy, Hydraulic Energy Potential, Hydraulic Energy Elements, Hydraulic Energy Technology, Classification of hydraulic power machines, History of water wheels and turbines. 6 Structural parameters, Water wheels and their structural properties, Michell-Banki-Ossberger turbine, Calculations related to water wheels. 7 BIOMASS ENERGY AND TECHNOLOGY; Definition, Potential, Biogas energy technology and utilization 8 Biodiesel Production technology and utilization 9 Course Review and Midterm Exam 10 Bioethanal Production Technology and utilization of hydrogen energy 11 GEOTHERMAL ENERGY AND TECHNOLOGY; Definition and Properties of Geothermal Energy, Geothermal Energy Potential, Geothermal Energy Technology, Electric energy production, Use of geothermal energy in heating, Use of geothermal energy in the field of 12 NUCLEAR ENERGY AND TECHNOLOGY; Definition and Classification, Potential, Nuclear Energy Technology, Uses of Nuclear Energy in Agriculture, INTEGRATED ENERGY SYSTEMS 13 TECHNOLOGIES FOR CONTROLLING NATURAL ENERGIES; Artificial Rainmaking Methods, Ways to Intervene in Other Natural Phenomena, TECHNOLOGIES FOR SHORT-CUT RECOVERY OF ENERGY: Definition and Classification, Waste During Ventilation						
	Heat Utilization Technologies, Heat Utilization from Milk, Heat Pumps as an Energy Recovery Tool. 14ENERGY TRANSFORMATION IN AGRICULTURAL PRODUCTION; Transformation, Resource Waste, Post-Transformation, ENERGY PRODUCTION OPTIMIZATION; Optimization Modeling, Calculation of Energy Inputs, Calculation of Output Energy, ENERGY EFFICIENCY A N D ENERGY SAVING; Efficiency in Energy Use, Energy Saving Ways						
Learning Outcomes	1 Know the definition and importance of energy; 2 Should know what conventional and alternative energies are; 3 Should know the production methods and technologies of solar, wind and hydraulic energy; 4 Should know geothermal energy and technologies to utilize this energy; 5 Know what biomass energy means and its types; 6 Know the production technologies of biogas; 7 Know the production and utilization technologies of biodiesel and bioethanol fuels; 8 Should know nuclear and hydrogen energy and the ways of production of this energy;						

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2	**ERGONOMY**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To comprehend the concepts and applications of general ergonomics, to examine the issues related to ergonomics in agriculture and agriculture-based industry, agricultural production and technology and to have the necessary equipment to be able to relate machine-human-environment issues in related subjects						
Course Content	Definition and classification of landscape and introduction of the subject and working areas / scales of Landscape Architecture profession; History of Landscape Architecture profession Explaining the development of landscape planning and design and understanding the relations of Landscape Architecture with other branches of planning, design and engineering.						
Course Subjects	1 Ergonomic approach in human-machine relations 2 Ergonomic approach in human-machine relations 3 Ergonomic factors in machine design 4 Ergonomic factors in machine design 5 People and work environment 6 People and work environment 7 Work and energy consumption 8 Anthropometry 9 Characteristics of machines and control organs 10 Vibration and working environment 11 Noise and working environment 12 Lighting and working environment 13 Environmental conditions and climate characteristics 14 Assessment of environmental conditions						
Learning Outcomes	1 Define ergonomic factors in the working environment with the machine; 2 Knows the methods by which ergonomic factors affecting work efficiency can be measured; 3 Can make the basic analysis necessary to create more efficient working environments by considering machine-worker-environment harmony in the working environment;						
3	**UNMANNED AERIAL VEHICLES IN AGRICULTURE**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	The aim of this course is to provide training in parallel with the increase in the use of unmanned aerial vehicle systems in agriculture. To provide the undergraduate students of the Department of Machinery and Technologies Engineering with the knowledge, skills and equipment they may need in this field.						
Course Content	Basic structure and characteristics of unmanned aerial vehicles, historical development process of unmanned aerial vehicles, basic legislation on the use of unmanned aerial vehicles, basic problems in the use of unmanned aerial vehicles in agriculture, basic unmanned aerial vehicle classes, flight safety and flight suitability certificates in unmanned aerial vehicles, unmanned aerial vehicle basic flight preparation, unmanned aerial vehicle basic flight information, unmanned aerial vehicle basic control software, basic agricultural land mapping software for unmanned aerial vehicles, basic agricultural land mapping with unmanned aerial vehicle, interpretation of unmanned aerial vehicle basic agricultural land maps, cost analysis of basic mapping of agricultural land with the help of unmanned aerial vehicles, basic approaches to the use of unmanned aerial vehicles in agriculture, basic use of unmanned aerial vehicles in natural resources and vegetation studies, basic use of unmanned aerial vehicles in soil and fertilizer management, basic use of unmanned aerial vehicles in agricultural crop management, basic use of unmanned aerial vehicles for irrigation control and water management in agricultural crop growing, basic use of unmanned aerial vehicles in agricultural lands basic use of unmanned aerial vehicles for weed control, basic use of unmanned aerial vehicles for disease detection and pesticide use in agricultural crops						
	use of unmanned aerial vehicles for agricultural crop yield forecasting and weather forecasting, expected developments from unmanned aerial vehicles in agriculture.						

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Course Subjects	1 Use of Technology in Agricultural Areas and Agriculture 4.0 2 Air Vehicles Used in Agriculture (Airplane, Helicopter, Balloon). 3 Air Vehicles Used in Agriculture (Unmanned Aerial Vehicles-UAV). 4 Classification and Structural Organs of UAVs 5 Performance Characteristics and Selection Criteria of UAVs. 6 Meteorological Factors in UAV Flights. 7 Laws-Regulations on UAV Flights. 8 Midterm Exam 9 Cameras Used in UAVs and Their Features 10 Imaging with UAVs Used in Agricultural Areas 11 Methods of Processing Images Obtained by UAVs. 12 Pesticide, Fertilizer and Seed Applications with UAVs. 13 Use of UAVs in Disaster Risk Management in Agriculture. 14 IoT (Internet of Things) - Artificial Intelligence - UAV Relations and Applications in Agriculture. 15 Application Examples of UAVs in Agriculture. 16-17Semester Final Exams						
Learning Outcomes	Knows the relationship between UAVs and Agriculture 4.0. Recognizes the cameras used in the imaging of agricultural areas. Recognizes image processing methods. Knows the laws and regulations related to UAVs. Knows meteorological factors.						
4	**WASTEWATER AND MANAGEMENT IN AGRICULTURE**	**S**	**2**	**0**	**0**	**2**	**4**
Course Objectives	To train agricultural engineers who have the knowledge and skills necessary for the use of urban and rural wastewater in agriculture under the most favorable conditions physically, chemically and biologically, taking into account the source and pollution patterns, properties and quantity of this water.						
Course Content	Water pollution, pollutant factors, pollution patterns in different sources, urban and rural wastewater sources, reuse of wastewater with or without treatment conditions.						
Course Subjects	Water resources and pollution Water resources and pollution Use and method of saline wastewater in irrigation Salinity management Pesticide pollution Fertilizer pollution Midterm exam Wastewater treatment processes: Physical processes Wastewater treatment processes: Chemical processes Wastewater treatment processes: Biological processes Wastewater treatment processes: Tersosmosis method Natural treatment plants Wastewater regulation Wastewater facilities						

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Learning Outcomes	1. Develop a general understanding of the importance of water use and the current situation regarding the recovery and reuse of wastewater. 2. Compare legislation and know the main requirements/limitations in the legislation on wastewater reuse and related practices. 3. Learns wastewater reuse applications and related important issues. 4. Selects appropriate technologies for wastewater recovery and learns reuse areas.						
5	**AGRICULTURAL DROUGHT MANAGEMENT**	**S**	**2**	**0**	**0**	**2**	**2**
Course Objectives	The aim of the course is to introduce the systems and structures used for the supply of healthy drinking and potable water in rural settlements and agricultural enterprises and to introduce the to teach how to determine the necessary water requirement						
Course Content	In this course, the studies carried out to meet the drinking and utility water needs of rural settlements and agricultural enterprises are explained.						
Course Subjects	1 Theoretical General information about water resources and planning of resources 2 Theoretical Factors in determining the need for water 3 Theoretical Determination of unit water consumption 4 Theoretical Methods of population estimation 5 Theoretical Classification of water resources 6 Theoretical Source selection 7 Theoretical Springs 8 Theoretical Water wells 9 Midterm Exam (Midterm) Midterm 10 Theoretical Compilation of water 11 Theoretical Transmission of water 12 Theoretical Transmission of water 13 Theoretical Distribution of water 14 Theoretical Case study solution 15 Theoretical Case study solution 16 Final Exam (Final) Final exam						
Learning Outcomes	1 Recognizing water structures used in rural areas 2 Learning the elements of rural water supply facilities 3 Understanding the issues to be considered in determining the water needs of a settlement and / or enterprise. 4 Classification and recognition of water resources 5 Choosing a source for water needs 6 To learn the structures necessary for the transmission, storage and distribution of water.						
6	**ENGINEERING ECONOMICS**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	The aim of the Engineering Economics course is to enable prospective engineers to evaluate the alternative options involved in engineering decisions from a financial perspective. and gain the skills to calculate these criteria.						
Course Content	Engineering economics, Simple interest, Compound interest, Time value of money, Net present value analysis, Payback rate, Simple payback period, Payback period, Annual Cost analysis, Annual equivalent cost, Break point analysis, Break-even point analysis, Critical point analysis, Sensitivity analysis, Basic interest formulas, Interest calculation.						
Course Subjects	1 Introduction to engineering economics and its relation to engineering decisions 2 Time value of money and interest calculations (simple and compound interest) 3 Inflation, nominal and effective interest rates 4 Return on investment, Cost, Cost of capital, Cash flow analysis, Working capital requirements 5 Net present value analysis 6 Head-to-Head Point Analysis 7 Internal Profitability ratio analysis Benefit/Cost ratio analysis 8 Course review and midterm 9 Decision making between alternatives, Decision criteria, Decision processes 10 Sensitivity (risk and uncertainty) analysis 11 Decision making in an inflationary environment 12 Renewal analysis 13 Depreciation and taxes 14 Feasibility applications						

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Learning Outcomes	1 To assimilate the basic concepts of engineering economics and their importance in engineering decisions; 2 To be able to evaluate alternative engineering projects and investments in financial and economic terms using engineering economics criteria; 3 To be able to prepare economic feasibility reports of engineering projects; 4 To be able to use the factors of production in the most effective and efficient way by applying the principles of engineering economics to engineering decisions; 5 Gain an advantage for managerial positions in professional career by having basic engineering economics knowledge as well as technical engineering knowledge to do it;						
7	**SUSTAINABLE AGRICULTURE**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	It aims to ensure soil fertility, environmental protection and food security in order to ensure ecological, economic and social sustainability.						
Course Content	Agricultural practices and environmental impact, sustainable agricultural practices, food safety, biodiversity, genetically modified organisms, risk in agriculture management, expectations from agriculture. Organic agriculture, principles and purpose, advantages of organic agriculture, the need for organic production, organic agriculture practices in the world, international organizations. Quality control system in organic agricultural production organic standards control certification Accreditation. Quality control system in organic agricultural production						
	organic standards, control, certification, accreditation. Soil and its properties, formation, soil organic matter, soil fertility, tillage. Soil pollution, causes and effects, saline and sodic soils, organic cover, importance, cover types. Soil erosion, formation and effects, prevention of erosion, soil water relationship, importance of water in soil, water supply and irrigation water, irrigation methods, water conservation. Balanced nutrition, plant nutrients, plant health, importance of soil organic matter, plant nutrient cycle. Rotational crop production, fertilizers and fertilization in organic agriculture, organic fertilizers and nutritional value, animal fertilizers, commercial organic fertilizers, commercial organic fertilizers, liquid organic fertilizers, mineral and microbiological fertilizers, green fertilizers. Pest and disease management in organic production, plant health, preventive measures, plant protection methods, natural enemies, natural pesticides, herbal pesticides, natural pesticides. Organic farming law.						
Course Subjects	1 Sustainability, sustainable agriculture, risk, risk analysis, risk assessment concepts 2 Environmental problems encountered in agriculture (pesticide and fertilizer pollution and contamination, soil erosion, etc.) 3 The role of soil in food production 4 Soil resources and management in sustainable agriculture 5 Water resources and management in sustainable agriculture 6 Fertilizers, nutrients and management in sustainable agriculture 7 Climate and its impacts on sustainable agriculture 8 Biodiversity and biological resources in sustainable agriculture 9 Pesticides and management in sustainable agriculture 10 Energy resources and management in sustainable agriculture 11 Systemic and integrated approaches to agriculture 12 Socioeconomic aspects of agriculture 13 Socioeconomic aspects of agriculture 14 Social changes in agriculture from past to present						
Learning Outcomes	Ability to ensure soil fertility, environmental protection and food security in order to ensure ecological, economic and social sustainability wins.						
8	**QUALITY CONTROL AND STANDARDIZATION**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	It is aimed to gain qualifications related to quality assurance and standards in business life.						
Course Content	To gain qualifications related to quality assurance and standards in business life, the concept of quality, standard and standardization in the production and service sector. Understand the importance and standards of management quality and standards.						

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Course Subjects	1 Quality Concept 2 Standard and Standardization 3 The importance of standard in production and service sector Management quality and standards 4 Management quality and standards Environmental standards 5 Environmental standards Quality management system models 6 Quality management system models strategic management 7 Strategic management Participation in management Process management system Resource management system 8 Strategic management Participation in management Process management system Resource management system 9 Resource management system Efqm excellence model 10 Quality control in production Inspection and sampling 11 Inspection and sampling Total quality control 12 Total Quality Control 13 Control Diagrams 14 Statistical Distributions						
Learning Outcomes	1 Quality concepts, importance and application in terms of business, country, society 2 Necessary stages in achieving quality, creation of total quality management 3 Creating quality control circles, Creating just-in-time production method 4 KGS system application and ISO 9000 standards, benefits to the business 5 TSE, and the establishment of professional standards, ergonomic factors						
9	**FOOD PROCESSING MACHINES**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Raw material preparation machines, separation machines, mixing machines, heat treatment machines and equipment, size reduction machines, packaging and packaging to have knowledge and skills about the systems.						
Course Content	Overview of the food industry, conveying and conveying devices, sieves and grading machines, filters, centrifuges, mixers for solid and liquid foods, homogenizers, tubular and plate heat exchangers, evaporators, dryer systems, mills, presses, cutting, portioning machines, packaging machines.						
Course Subjects	1 Food processing methods and machinery 2 Mechanical transportation and transmission systems 3 Cleaning and sorting of products 4 Grinding and shredding machines 5 Pressing and presses 6 Filtration and separation 7 Homogenization 8 Heating techniques 9 Pasteurization and strilization 10 Evaparation 11 Drying 12 Cooling 13 Automation and machine design 14 Machine and capacity relationship						
Learning Outcomes	1 Raw Material Preparation Machines 2 Sorting Machines 3 Mixing Machines 4 Heat Treatment Machinery and Equipment 5 Size Reduction Machines 6 Packaging and Packaging Systems						
10	**GREENHOUSE CULTIVATION**	**S**	**2**	**0**	**0**	**2**	

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Course Objectives	Introducing greenhouse cultivation systems, teaching the principles of greenhouse cultivation.
Course Content	Identification and differentiation of different greenhouse systems, ecological, economic and social factors affecting the establishment of greenhouses, technical factors affecting the establishment of greenhouses, general principles of vegetable cultivation in greenhouses (planting density, pruning and suspension, pollination and fertilization assistance, irrigation, fertilization and harvest).
Course Subjects	1. Making the definition of greenhouse cultivation, the different aspects of agriculture in plant production, the benefits it provides. Application: Dividing students into working groups, giving a different type of vegetable for each group. 2. Classification of plant growing systems under cover. Application: Planting of seedlings in the greenhouse by students. 3. The history of greenhouse agriculture, the general situation of greenhouse agriculture in Turkey and in the world (statistics). Application: Students take care of their plants in the greenhouse 4. Classification of greenhouses in different ways 1 Application: Students work on the care of plants in the greenhouse; suspension, pruning, hoeing, fertigation, irrigation, etc. 5. Classification of greenhouses in different ways 2 Application: Students work on the care of plants in the greenhouse; suspension, pruning, hoeing, fertigation, irrigation, etc. 6. Ecological, economic and social factors influencing the establishment of greenhouses. Application: Maintenance o f plants in the greenhouse; suspension, pruning, hoeing, fertigation, irrigation practices. 7. Effective technical factors in the installation of the greenhouse 1 Application: Students care of plants in greenhouse; suspension, pruning, hoeing, fertigation, irrigation practices. 8. Midterm exam 9. Effective technical factors in the installation of the greenhouse 2: Maintenance of plants in the greenhouse; suspension, pruning, hoeing, fertigation, irrigation practices.
	10. Greenhouse air conditioning-1. a) Heating b) Cooling and cooling c) Lighting Application: Visual introduction of greenhouse air conditioning systems explained in the theoretical course this week in greenhouses in the application area. Students' greenhouse plant care practices; suspension, pruning, hoeing, fertigation, irrigation and harvesting practices. 11. Air conditioning in greenhouses 2 a) Ventilation, b) Humidification, c) CO2 fertilization. Application: visual introduction of air conditioning systems in greenhouses in the application area. Maintenance of the plants in the greenhouse; suspension, pruning, hoeing, fertigation, irrigation and harvesting practices. 12. Soil preparation in greenhouse 1 a) Cleaning of plant residues, b) Soil cultivation, c) Removal of salinity, Application: Students work on plant care in the greenhouse; suspension, pruning, hoeing, fertigation, irrigation and harvesting practices. 13. Soil preparation in greenhouse 2 a) Increasing the organic matter content of the soil, b) Soil disinfection, c) Introduction of soilless cultivation. Application Applied solarization to the students. 14. Different growing periods in greenhouses, effective factors in the selection of suitable vegetable species and varieties for greenhouse cultivation, planting in greenhouse, Application: Students' greenhouse plant care practices; suspension, pruning, hoeing, fertigation, irrigation and harvesting practices. 15. General introduction of pruning, pollination and fertilization, irrigation, fertilization and fertigation in greenhouses and emphasizing the differences from open cultivation. Application: Reinforcement of the pruning processes they have learned by doing it themselves in the previous weeks. Care of the plants in the greenhouse; suspension, pruning, hoeing, watering and harvesting practices 16. Final exam
Learning Outcomes	Recognize and differentiate different under cover systems Learns the ecological and social factors that are effective when establishing a greenhouse Knows and defines the structural characteristics of greenhouses Learns the basic principles of greenhouse air conditioning by associating with plants Learns the principles of plant growing in greenhouses (planting density, pruning, fertilization, irrigation, pollination,

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	etc.) Can technically supervise the establishment of the greenhouse and operate the greenhouse in a sustainable way

0700008001 - (8TH SEMESTER - INTRA-DEPARTMENTAL COURSES)							
Course Code	**Course Name**	**Z/S**	**D**	**U**	**L**	**K**	**ECTS**
10000000000	**BIOMASS PRODUCTION TECHNOLOGIES**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	1. To give information about biomass energy potential, biomass types, structure and properties of biomass. 2. Physical and chemical transformation processes and how biomass components behave in these processes. 3. To give information about obtaining various fuels and chemicals from biomass.						
Course Content	Biomass energy potential. Biomass types. Structure and properties of biomass. Biomass combustion technologies. Physical conversion processes. Gasification of biomass. Liquefaction of biomass. Activated carbon production from biomass. Production of synthetic liquid fuels with high oxygen content. Microbial transformation. Organic chemicals production.						
Course Subjects	1. Week Introduction 2. Week Biomass : Basic Concepts 3. Week Biomass: Energy Potential 4. Week Biomass: Structure 5. Week Combustion technologies and Physical conversion processes 6. Week Gasification of biomass 7. Week Liquefaction of biomass 8. Week Midterm 9. Week Activated carbon production 10. WeekFuel production 11. WeekFuel production						
	12. WeekMicrobial transformation 13. WeekProduction of organic chemicals 14. WeekProduction of organic chemicals						
Learning Outcomes	1. What biomass is, its types and global potential and market size, 2. What are the physical treatments applied to biomass before conversion processes, 3. What are the chemical and thermal processes applied to biomass such as pyrolysis, gasification, combustion, liquefaction and carbonization and what factors affect these processes, 4. Effects of macromolecular components of biomass such as hemicellulose, cellulose, lignin and extractive material and mineral content in conversion processes, 5. Which parameters are effective in fuel and energy production from biomass.						
2	**MACHINE MANUFACTURING TECHNOLOGY**	**S**	**2**	**1**	**0**	**2**	**4**
Course Objectives	It is aimed to gain competencies of basic manufacturing processes using hand tools, drill, drill, lathe, milling and grinding machines.						
Course Content	The scope of the course includes basic materials and manufacturing technology topics such as basic knowledge of manufacturing materials and the behavior of these materials in manufacturing and manufacturing properties, metal casting technology, forming procedures, sheet metal processes, machining, joining procedures and modern manufacturing methods and modern manufacturing methods of this manufacturing. The course includes the introduction of the machine-tool, workplace, workpiece, process and process characteristics and factors affecting these processes						

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	components, as well as basic occupational safety and environmental information in manufacturing.
Course Subjects	1 File, types of cutters, measuring, control and marking tools, cutting principles and types. Producing parts using filesand other cutters, marking and measuring during production, 2 Cutting tools suitable for the material, pedestal sanding stone benches, drill sharpening, disassembling and assembling sanding stones in the stone suitable for the material of the drill sharpen. 3 Types of drills, drill bit angles, material properties of the parts to be drilled and drills, drilling process sequence, speed calculation. Parts of the stundrill, chuck disassembly and assembly, vise work to connect and drill holes. 4 Types of reamers, taps, dies, screw combs, sequence of tapping with taps and dies. To tap the guide and die to the workpiece. 5 Types of lathes, parts, turning types, chucks, bearings, cutting tools. Application in the workshop environment with the supervisor 6 Turning pens, types, tailstock drill, speed, feed rate calculations, face and cylindrical turning process sequence. Application 7 Surface roughness, types of channel pencil, angles, sharpening, measuring instruments, taper turning methods, taper calculation, taper measuring gauges. Supervisor together with the application in the workshop environment 8 Types of drills, gradual hole drilling principles, caterpillar types. Application in the workshop environment with the supervisor 9 Course repetition and midterm exam Course repetition and midterm exam 10 Types of screws, gauges, types of screw pens, screwing in the blind hole, the number of holes in the screws. Application in the workshop environment with the supervisor. 11 Machine reamer types, reaming techniques on the lathe, workpiece reamer coaxial clamping technique.application in the workshop environment with the supervisor. 12 Milling machines, surface milling cutters, cutter clamping elements, chip depth and feed rate calculations, milling directions, parallel clamping of the workpiece Application in the workshop environment with the supervisor 13 Channel and pocket milling cutter types, channel milling safety precautions Hole enlargement apparatus, invoiced hole enlargement, simple splitting in milling, splitting apparatus. Application in the workshop environment with the supervisor 14 Grinding machines, grinding stone types and properties, balancing methods, stone bonding techniques, stone sharpening technique. In the workshop environment with the supervisor Application
Learning Outcomes	1 To be able to make geometric drawings of angles, lines, arcs and polygons, Angle drawings, Arc and curve drawings and Polygon drawings; 2 To be able to comprehend projection and projection types, methods of view extraction, to draw special and auxiliary views. To be able to draw projections of lines and planes, to be able to draw the full length of a line and the actual size of a plane, to be able to draw sufficient views of parts and to be able to draw and draw auxiliary and special views when necessary; 3 To be able to make dimensioning of views and perspectives and to know and apply standard dimensioning rules (TS 88); 4 To be able to comprehend the need for sectioning and appropriate cross-sectional planes, to determine the appropriate cross-sectional plane, to know the properties of the cross-sectional view and to explain the types of cross-sections and special cases in cross-sections; 5 To be able to comprehend the importance of perspective drawings and perspective drawings. To know the methods of perspective drawing, using these methods on the arc and

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	to be able to draw perspectives including circles and to draw appropriate perspectives of parts whose appearance is given; 6 To explain the importance of surface quality in the operation of the part and on the machine. To know the meaning of surface roughness symbols and to be able to show them on the picture; 7 Understand the importance of dimensional, shape and position tolerances, read and show dimensional tolerances and running tolerances on the drawing. To organize the tolerance letterhead; 8 To know the importance of shape and position tolerance and explain the importance of shape and position tolerance in manufacturing. To be able to read and show shape and position tolerance symbols; 9 To be able to comprehend and draw construction drawings, to determine the adequate appearance for the construction drawing, to take the necessary sections, to make appropriate dimensioning, tolerance and apply surface roughness, arrange letterhead and fix materials;						
3	**SOIL PLANT AND WATER RELATIONS**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Investigation of the relationships between plant roots and the surrounding soil, water and atmosphere to create optimum conditions in the root environment and better plant growth and product production is aimed.						
Course Content	Properties and types of water in the soil.Movement of water in plants.Movement of water in soil-plant-atmosphere continuity.Water requirement of plants, plant nutrients The importance and function of water in the uptake of substances.						
Course Subjects	1 The topics to be given in weeks are explained. Explanations are made about the exams related to the course, their contribution to the success grade, the resources to be used in the course, the way the course is taught, the expectations of the students. 2 Environment, environmental factors and properties, soil and its definition 3 Soil as an environmental factor, its formation and types 4 Soil moisture - Proportional water content, other mass and volume relationships with soil phases 5 Soil Texture Definition, Importance of Texture Texture Classes, Analysis Method 6 Soil clay and its properties, 7 The importance of clay minerals in crop production and soil water availability 8 Functions and important properties of water as an environmental factor 9 Problems in crop production in water deficiency and water excess and precautions to be taken 10 Properties and types of water in soil 11 Water in plants 12 Movement of water in plants 13 Movement of water in the soil-plant-atmosphere continuum 14 Water requirement of plants, importance and function of water in the uptake of plant nutrients						
Learning Outcomes	1-Knows the properties of important environmental factors in terms of plant growth and agricultural production, and the measures to ensure that some environmental and soil factors that can be controlled for plant growth and agricultural production are at optimum level. 2-Knows the mass and volume relationships between the phases that make up the soil, Know how a change in one phase will cause a change in other phases and its effect on plant growth 3-Know the functions of water and evaluate the effects of water state changes (transition states of water to solid-liquid-gas phases) on soil and plants 4-Know the potential energy of soil water and make evaluations about the state of soil water 5-Know the movement of water in soil-plant-atmosphere continuity and evaluate its effect on plant growth. 6-Soil plant and water can interpret the diffusivity and uptake of plant nutrients in the environment and their possible effects on plant production						
4	**DESIGN OF AGRICULTURAL STRUCTURES**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Students will be able to comprehend the basic design principles of structures, prepare design projects of agricultural production structures and facilities according to these principles and prepare design projects of existing design to be able to evaluate their projects.						
Course Content	Planning of the settlement layout of agricultural structures in the business center, environmental relations in the design of agricultural structures, principles of climatic environmental control in agricultural structures, heat balance, planning and design of production structures such as barns, corrals and poultry houses, planning and design of storage and protection structures, planning and design of fertilizer management systems, preparation of bill of quantities and surveys, preparation of sample design projects for agricultural structures						

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Course Subjects	1 Definition of agricultural structure and design concepts and the scope of a design project, 2 Planning the layout of agricultural structures in the enterprise center 3 Environmental relationships in the design of agricultural structures 4 Principles of climatic environmental control in agricultural buildings						
	5 Heat balance in agricultural buildings 6 Design of cattle shelters 7 Design of ovine shelters 8 Midterm Exam 9 What is a greenhouse 10 Design of greenhouses 11 Design of agricultural product warehouses 12 Preparation of quantity and exploration reports in buildings 13 Structural practices in fertilizer management 14 Irrigation structures 15 Presentation of assignments 16-17Semester Final Exams						
Learning Outcomes	1) Access to resources related to the field, to benefit from these resources and continuous self-renewal 2) Prepares the projects of soil water structures, animal shelters, storage structures and crop production structures. Static analyzes in terms of strength. Determines the material properties to be used in construction, makes tests related to materials. 3) Have the ability to recognize, decide and analyze problems in professional issues.						
5	**GREENHOUSE CONSTRUCTION TECHNIQUE**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To have knowledge and skills in the planning of greenhouse systems and air conditioning of greenhouses						
Course Content	Greenhouse plant growing systems, benefits of growing plants in greenhouses, classification of greenhouses, greenhouse cover materials, factors affecting greenhouse planning, greenhouse ventilation, heating, cooling systems						
Course Subjects	1 The importance of greenhouse cultivation, definition of greenhouse and greenhouse cultivation in the world and in Turkey 2 Problems and solutions of greenhouse farming in Turkey 3 Mulches and superficial covers 4 Under Cover Systems; mini tunnels, low plastic tunnels 5 High plastic tunnels 6 Classification of greenhouses 7 Greenhouse locations and features 8 Climatic factors affecting the choice of greenhouse location 9 Midterm Exam 10 Greenhouse building materials and their properties 11 Greenhouse ventilation systems and windbreaks 12 Greenhouse loads and calculations 13 Greenhouse heating and cooling systems 14 Computerized automation systems in greenhouses						
Learning Outcomes	1. To learn the definition and importance of greenhouse cultivation 2. Defining and installing greenhouse systems 3. Learning ventilation, cooling, heating and irrigation systems in greenhouses 4. Organizing the greenhouse interior according to plant cultivation						
6	**ENGINEERING MATHEMATICS**	**S**	**2**	**0**	**0**	**2**	

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Course Objectives	To create an undergraduate level of knowledge in students by defining and examining existing concepts in mathematics, integrals, integration techniques, to teach concepts such as definite integral applications, sequences, series.						
Course Content	Series Fourier Series. Limits of Functions of Several Variables. Continuity. Partial derivative. Total differential. Derivatives of composite, implicit and inverse functions. Variable transformation. Maximum and minimum problems. Vector Analysis. Double Integrals (Volume Calculus. Surface Areas). Triple integrals. Curvilinear Integrals Surface Integrals						
Course Subjects	1 Indefinite integral and continuous functions 2 Sub and supersums and fundamental theorems 3 Definite integral and Riemann sum 4 Inequalities and improper integrals 5						
	Variable substitution method, partial integration method and simple fractionation method 6 Trigonometric integrals, binomial integrals, integrals of exponential transformations. 7 Midterm exam 8 Curve length calculation and volume calculation 9 Area and volume calculations of rotating surfaces. 10 Area and arc length in polar coordinates 11 Sequences and convergence of sequences 12 Series, positive term series, ratio test, alternating series, power series, integral test and taylor series. 13 Multiple integrals 14 Multiple integrals applications of integrals						
Learning Outcomes	1. To be able to identify, evaluate and use data in appropriate places; 2. To be able to take integral, to learn what integral means and its application areas; 3. To be able to pose a problem, to reach what is desired based on what is given and to gain the formation of solving the problem;						
7	**PNEUMATICS AND HYDRAULICS**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Understand hydraulic and pneumatic systems						
Course Content	Basic Principles of Hydraulics, Hydraulic Elements and Circuits, Basic Principles of Pneumatics, Pneumatic Elements and Circuits						
Course Subjects	1 Hydraulic energy and its advantages, hydrostatic and hydrodynamic principles. Hydraulic circuit elements, directional control valves, pressure control valves, safety valves, pressure sequencing valves 2 Flow control valves, check valves, speed control in cylinders. Hydraulic cylinder, hydraulic power unit 3 Hydraulic pumps and motors, types, properties of hydraulic oils, pipes, hoses, hydraulic accumulators and applications 4 Filters, manometers, working principle of hydraulic circuits, drawing and reading of hydraulic circuits 5 Power and speed calculation in hydraulic circuits. Hydraulic circuit applications 6 Electro hydraulic circuits. Electrical circuit elements ents 7 Applications of hydraulic circuits in the automotive field. Applications of hydraulic circuits in other industrial fields 8 Definition and properties of pneumatics Basic principles Preparation of compressed air 9 Pneumatic operating elements, directional control valves, flow control valves, pressure control valves Cylinders, pumps, motors "And", "Or" valve, time relay 10 Conditioner and air preparation. Air drying methods 11 Hydropneumatic systems, pneumatic control circuits 12 Design of pneumatic control circuits, applications of pneumatic control circuits 13 Pneumatic application areas, application examples of pneumatic control circuits 14 Electro pneumatic circuits						
Learning Outcomes	To be able to install and analyze hydraulic and pneumatic systems						
8	**FLOOR MECHANICS**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To introduce the soil by showing the soil classification and properties and to teach the main concepts and principles necessary to analyze the problems related to the soil and to gain the ability to solve problems.						
Course Content	Introduction to Soil Mechanics, Index Properties of Soils, Classification of Soils, Soil Water, Stress-Strain Behavior of Soils and Shear Strength, Compaction, Soil Stresses, Stress Distribution in Soils, Compaction of Soils, Consolidation and Settlements, Lateral Earth Pressures - Retaining Walls.						

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Course Subjects	1 Introduction to Soil Mechanics 2 Index Properties of Soils 3 Classification of Soils 4 Ground Water 5 Ground Water 6 Stress-Strain Behavior and Shear Strength of Soils 7 Stress-Strain Behavior and Shear Strength of Soils 8 Compaction 9 Soil Stresses 10 Stress Distribution in Soils 11 Compaction of Soils, Consolidation and Settlements						
	12 Compaction of Soils, Consolidation and Settlements 13 Lateral Earth Pressures - Retaining Walls 14 Lateral Earth Pressures - Retaining Walls						
Learning Outcomes	1 Performs laboratory experiments by working individually and in groups, determines soil properties and prepares reports. 2 Analyzes soil water and its effects. 3 Understands the stress-strain behavior of soils, determines the shear strength of soils. 4 Determines the distribution of vertical stresses in soils. 5 Knows soil improvement methods and performs compaction analysis. 6 Performs consolidation analysis and determines the duration and amount of settlement.						
9	**SOLAR AND WIND ENERGY AGRICULTURAL PRACTICES**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Today, renewable energy sources, which are taking firm steps towards becoming an alternative to fossil-based energies, attract the attention of people from almost every branch. attracts. In this context, the aim of this course is to provide a solid foundation in the basic concepts and principles of climate change, solar energy and wind energy, and to provide the student with the opportunity to make effective use of the knowledge gained about the applications of solar and wind energy.						
Course Content	Energy, Work, Power concepts and their relations, energy sources and conversion systems, Solar energy technologies, Wind energy technologies						
Course Subjects	1 Introduction and the importance of the concept of energy Analysis of course expectations 2 Energy sources and classificationGiving homework topics and information 3 Fossil-based energies and their effectsExamination of visuals and videos describing fossil-based energy sources and their effects 4 Global warming and climate change Examination of visuals and videos describing the effects of global warming and climate change 5 Renewable energy sources and positive and negative aspects of these sourcesExamination of visuals and videos describing renewable energy sources 6 Solar radiationSolar radiation calculations 7 Solar energy systems Solar energy system selection and design 8 Solar drying, greenhouse heating, cooling and electricity generationSolar drying, greenhouse heating, cooling and electricity generation calculations 9 Review and Midterm Exam Solar drying, greenhouse heating, cooling and electricity generation calculations 10 Solar energy based energy solutionsSolar energy based project design 11 Characteristics and structural parameters of windCalculations on structural parameters of wind 12 Wind mechanics and aerodynamics Wind mechanics and aerodynamics calculations 13 Wind energy based energy solutionsWind energy based project design 14 General ReviewDesign of solar and wind energy hybrid systems						

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Learning Outcomes	1 To be able to comprehend the importance of the concept of energy and the effects of fossil-based energy sources on the world; 2 To be able to analyze the positive and negative aspects of renewable energy sources; 3 To be able to comprehend different application areas of solar energy and develop solar energy based energy solutions for a facility with energy requirements; 4 Understand the different application areas of wind energy and develop wind energy based energy solutions for a facility with energy requirements;						
10	**IRRIGATION AND DRAINAGE SYSTEMS AUTOM.**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Irrigation systems irrigation automation types tools and equipment used in irrigation automation						
Course Content	Automation of the irrigation system is the operation of the system without or with minimal manual intervention. To gain theoretical and practical knowledge about the shapes						
Course Subjects	1. Information about course content, processing and application method, Brief history of irrigation 2. The importance of automation and the use of automation in irrigation and agriculture 3. An overview of irrigation system types, large field irrigation systems (Center pivot etc.), lawn, vegetable and fruit garden irrigation systems (surface, sprinkler, conventional, pop-up, drip irrigation) 4. An overview of irrigation system types: greenhouse hydroponic and aquaponic systems, mechanized irrigation systems for seedling cultivation in greenhouses, misting systems, suitable system selection 5. Common components of irrigation systems: PVC pipes and fittings, polyethylene pipes, drip irrigation pipes, drippers and nozzles, solenoid valves, control units (timers, tensiometers, soil moisture sensors, etc.) 6. Automation in sprinkler and drip irrigation systems 7. Features to be considered in irrigation system and design: Flow and pressure 8. Midterm exam 9. Features considered in irrigation system design: Filters, flow backflow prevention, check valves 10. On/off control mechanisms: Solenoid valves-installation (includes gestational electrical wiring information) and maintenance 11. Automatic control of irrigation: Timers and sensors 12. Fertigation (fertilization with irrigation water) systems: Injectors and connection to the water system 13. Principles of controlled drainage systems 14. Principles of controlled drainage systems						
Learning Outcomes	Knows that uniform distribution of water can be achieved by using flow and pressure control methods. Design and install a simple irrigation system related to on/off control mechanism. Calculate the costs associated with the construction and operation of a simple irrigation system. Know the working principles of controlled drainage systems						
11	**MACHINE DYNAMICS**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To show how to apply the basic laws and principles of dynamics to mechanisms and machines.						
Course Content	Particle kinematics; Particle kinetics: Force and acceleration, Work and energy, Impulse and momentum; Planar kinematics of rigid body; Planar kinetics of rigid body: Force and Acceleration, Work and energy, Impulse and momentum, Three dimensional kinematics of rigid body, Three dimensional kinetics of rigid body, Vibrations. K						

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Course Subjects	1 Introduction to machine dynamics, basic definitions and concepts. 2 Static and quasi-static equilibrium problems in mechanisms and machines 3 Newtonian equilibrium equations 4 Newtonian equilibrium equations 5 The principle of virtual works and its applications 6 The principle of virtual works and its applications 7 D'Alembert's concept of dynamic equilibrium, application to dynamic problems. 8 The principle of virtual forces, application to static and dynamic problems. 9 The principle of virtual forces, application to static and dynamic problems. 10 Course review and midterm 11 First (direct) and second (inverse) fundamental problems of dynamics, Stübler's theorem, lamda method 12 First (direct) and second (inverse) fundamental problems of dynamics, Stübler's theorem, lamda method 13 Equation of motion of the machine, force field of the machine, unevenness. 14 The equation of motion of the machine, the force field of the machine, irregularity.						
Learning Outcomes	Apply the principles of dynamics to mechanisms and machines;						
12	**SOILLESS AGRICULTURE TECHNIQUES**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	The aim of this course is to enable students to understand why soilless plant cultivation is needed, to comprehend the developments related to soilless farming techniques, To be able to comprehend the approaches in providing water and nutrient requirements of plants in soilless agriculture, to be able to plan and apply soilless plant cultivation in commercial sense, to be able to solve the problems that can be encountered in soilless plant cultivation.						
Course Content	To explain the reasons for soilless agriculture. Plant production in soilless environment. To plan and apply soilless farming techniques in different plant species. To be able to solve the problems encountered in soilless plant cultivation. To be able to determine the environmental impact of soilless agriculture and to be able to design environmentally sensitive production. Hydroponics to learn breeding systems.						
Course Subjects	1 Definition and developmental stages of soilless culture 2 Reasons for the transition to soilless culture and aims of use 3 Soilless culture methods (straw bales, ring culture ect.) 4 Solid media culture (org. inorg.) 5 Bed culture, bag-pack and pot culture 6 Substrate culture and problems that may be encountered in the use of these methods 7 Nutrient solutions and their properties 8 Midterm 9 Water culture-hydroponic / tank culture 10 Hydroponic varieties 11 Still water culture 12 Hyponica and Aeroponics 13 Feeder film						
	technique (N.F.T.) 14 Practical work						
Learning Outcomes	1-To be able to understand why there is a need for soilless plant cultivation 2-To be able to comprehend the developments related to soilless agriculture techniques 3-To be able to understand the plants in soilless agriculture To be able to comprehend the approaches to provide water and nutrient requirements, 4-To be able to plan and implement hydroponic plant cultivation in a commercial sense, to be able to solve the problems that can be encountered in hydroponic plant cultivation.						
13	**SUSTAINABLE AGRICULTURE**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	The aim of this course is to define and evaluate sustainable agricultural systems.						
Course Content	Definition and objectives of sustainable agriculture. Results and problems of current agricultural systems. Overview of sustainable agricultural systems. Goals and objectives for sustainable agriculture. techniques (preservation of soil fertility in sustainable agriculture, reclamation for sustainability, control of pests, diseases and weeds, reduction of tillage, etc.).						

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Course Subjects	1	Definition and importance of sustainable agriculture
	2	Results and problems of today's agricultural systems
	3	Results and problems of today's agricultural systems (continued)
	4	Assessment and demonstration of more sustainable farming systems
	5	Objectives and techniques for sustainable agriculture
	6	Objectives and techniques for sustainable agriculture (continued)
	7	Soil fertility in sustainable agriculture
	8	Midterm exam
	9	Plant breeding for sustainable agriculture
	10	Control of pests, diseases and weeds in sustainable agriculture
	11	Tillage in sustainable agriculture
	12	The economics of sustainable agriculture
	13	Development and evaluation of prototype systems
	14	Term project presentations
	15	Term project presentations
	16	Final Exam
Learning Outcomes	1	Synthesize the aims and benefits of environmental sustainability
	2	To be able to produce sample models in projects for the transformation of existing systems into sustainable agricultural systems
	3	To be able to think about the problems of today's agricultural systems and propose solutions
	4	To be able to comprehend the importance of utilizing sustainable agricultural techniques in agricultural production
	5	Develop appropriate methods and techniques for more sustainable agricultural systems
	6	To be able to create sustainable environmental awareness

0701205000 - (5TH SEMESTER)							
Course Code	**Course Name**	**Z/S**	**D**	**U**	**L**	**K**	**ECTS**
1	**MOLECULAR LABORATORY TECHNIQUES**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	In this course, students will learn the concepts of molecular biology and genetics, the structure and functions of the cell, the molecular structure and functions of hereditary material. to learn.						
Course Content	The aim of this laboratory-oriented course is for students to see first-hand the techniques used in many research laboratories and to better understand what is being done and why. The course covers various spectrometric techniques adapted to biology, chromatography, Gel Electrophoresis, eukaryotic cell culture, in vitro gene transfer, It presents many experiments such as protein stability to students visually. This course is designed for second year Molecular Biology and Genetics students.						
Course Subjects	Week 1: Introduction and general Laboratory rules Week 2: Introduction to the Central Laboratory and general instrumentation Week 3: Introduction to Bioinformatics and its applications in Biology Week 4: DNA Isolation Week 5: Polymerase chain reaction (PCR) and gene duplication Week 6: RNA Isolation: Whole RNA isolation from blood Week 7: Observation of Nucleic Acids in Agarose and Acrylamide Gels Week 8: Bacterial Transformation with Plamzid DNA Week 9: Eukaryotic Cell Culture Week 10: Spectroscopy Protein Thermal Stability and Denaturation Investigations with Techniques Week 11: Fourier Transform Infrared (FTIR) Spectroscopy and Molecular						
	Determination of Changes Week 12: Light Microscopy Week 13: Gene Transfer by Micro Launcher Particle Bombardment Technique in Plant Cells (BIOLISTICS) Week 14 General Review and Final Exam						
Learning Outcomes	Upon successful completion of the course, students will be able to observe the instruments and techniques frequently used in molecular biology laboratories and how experiments are performed. will have understood. They will be able to reinforce some of the topics they have covered in theoretical courses with visuals and experiments.						
2	**SOIL FERTILIZER PLANT ANALYSIS**	**S**	**1**	**2**	**0**	**2**	**4**
Course Objectives	The aim of the course is to provide students with theoretical and practical knowledge about plant and soil analysis.						

Course Content	This course includes description of the general structure and properties of soil and plant, sampling and preparation for analysis, soil pH, cation exchange capacity, organic matter and macro and micro element determination methods, dry and wet burning methods in plants, interpretation and evaluation of analysis results.						
Course Subjects	1 Introduction to soil science and soil diversity of Turkey 2 Physical and chemical properties of soil, visual and manual identification methods 3 Plant definition, characteristics and analysis. Plant and agricultural product diversity of Turkey 4 Plant and soil sampling. Preparation of the sample for analysis, and soil Ph analysis 5 Methods and necessary chemicals for macro_micro element analysis in soil and plant samples 6 Plant growing media and hydroponics 7 Midterm exam 8 Greenhouse agriculture and its importance for Turkey 9 Fertilization and spraying methods 10 Macro and micro element needs of plants. Deficiency and toxicity symptoms 11 Irrigation methods in agricultural production 12 Organic farming, good agriculture and conventional farming. Differences between them. Necessary conditions to start organic farming, organic production, organic products market preparation, and important points in this process 13 Natural control of diseases and pests in organic farming 14 Project Presentations 15 Review of the period 16 Final						
Learning Outcomes	The students who succeeded in this course will be able to; Explain the general structure and properties of soil Explain the general structure and properties of plants Analyze the soil Will be able to analyze plants will be able to list the issues to be considered in plant and soil analysis						
3	**GENETIC ENGINEERING**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To teach DNA structure, DNA repair, basic properties of mutations and basic principles of heredity						
Course Content	Definition and history of genetic engineering, DNA and RNA isolation, properties of DNA, RNA and RNA endonuclease and other enzymes used in genetic engineering, construction of genetic maps, vector systems, creation and selection of molecular clones, construction of DNA, RNA and protein probes, construction of DNA libraries and gene banks, directed mutation techniques, principles of polymerase chain reactions (PCR), DNA sequencing techniques, legal and ethical issues in genetic engineering.						
Course Subjects	1 Introduction, Introduction of course content and course resources, History of genetics, basic concepts in genetics 2 Structural properties of DNA, types and structural properties of hereditary material in living organisms 3 Gene concept, Gene types, gene penetrance, 4 Single gene inheritance, Mendel's work, examples of inheritance mechanisms that follow Mendel's rules from various living things. 5 Mutual effects of genes, interactions between allelic and non-allelic genes, deviations from mendelian rules 6 Gene linkage, linkage maps, applications of Khi square test in genetics 7 Multi-allelicity, polymerization and pleotropy 8 Cytoplasmic inheritance, control mechanisms, examples of cytoplasmic inheritance from different organisms						

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	9 Midterm Exam 10 Mutation, chromosome and gene mutations, mutagenic factors, DNA repair mechanisms, 11 Mutagenicity tests, test systems and analysis principles applied in mutagen-carcinogenic substance analysis 12 Mobile genetic elements, genome structures of these elements, their effects on host organisms, diversity of mobile genetic elements 13 Introduction to the control mechanisms of gene expression, general principles of transcription and translation 14 Introduction to human genetics, Human genetic structure, properties of human genome						
Learning Outcomes	1 Knows the basic concepts of genetics; 2 Knows the biochemical properties of genetic material; 3 Knows the principles of heredity in accordance with Mendelian rules; 4 Knows different gene groups and interactions between genes; 5 Knows DNA damages and repair mechanisms; 6 Knows cytoplasmic inheritance and its principles; 7 Know the mobile genetic elements involved in genome dynamics; 8 Knows mutation analysis techniques; 9 Knows the basic concepts of gene expression; 10 Know the basic features of the human genome;						
4	**RURAL DEVELOPMENT**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	By learning rural development and basic concepts, students will be able to analyze both rural development studies and approaches; as well as rural development gain the knowledge and skills to support their work.						
Course Content	Rural development and basic concepts, Relationships between rural development and other branches of science, Rural development approaches, Definition of rural areas and basic features of rural areas, Objectives, tools and methods applied in rural development studies, Basic features of rural development policies and practices, Rural Development Strategies, Determining potential in rural development, Risk analysis in rural development, Rural development policies in the EU, Rural development in Turkey policies, practices and results, evaluation of the results of rural development projects implemented and being implemented in Turkey						
Course Subjects	1 Rural development and its basic concepts, relations between rural development and other disciplines, definition of rural areas and basic characteristics of rural areas in Turkey and in some countries 2 Objectives, tools and applied methods of rural development studies 3 Basic features of rural development policies and practices, 4 Rural development policies and policy changes in the EU 5 Changes in rural development policies in the world 6 Rural development policies, practices and results in Turkey 7 Course Review+Midterm 8 Evaluation of the results of rural development policy implementations in Turkey 9 Rural development projects implemented and being implemented in Turkey 10 Evaluation of the results of implemented and ongoing rural development projects in Turkey 11 Potential identification and inventory studies in rural development 12 Problem analysis techniques, priority setting, risk analysis and solution approaches in rural development studies 13 Turkey-National Rural Development Strategy 14 Rural development strategies implemented in developing countries						

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Learning Outcomes	1 Ability to understand and analyze rural areas and their problems; 2 To be able to evaluate and interpret rural development studies, approaches and strategies; 3 To have an idea about the importance of rural development studies for countries and the factors that cause rural development studies, ; 4 To have knowledge about the changes, paradigms and methods in rural development approaches; 5 To be able to evaluate and interpret rural development studies and approaches in Turkey; 6 To have an idea about rural development policies and policy changes in the EU, ; 7 Having knowledge about Turkey-National Rural Development Strategy, ;						
	8 To gain the principles of project development for rural development and monitoring and evaluation skills in rural development studies, ; 9 Developing the ability to research, analyze and synthesize through experiences in writing term projects; 10 Gaining an analytical perspective that can produce solutions to rural problems;						
5	**ENZYME AND MICROBIAL BIOTECHNOLOGY**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Biyomühendislikte biyoteknolojinin tanım ve kapsamları / Geleneksel ve modern biyoteknoloji uygulamaları ve uygulama örnekleri: sağlık, tarım, ekonomi ve endüstri açısından önemleri / Biyoteknolojide temel işlemler / Fermentasyon teknikleri: sürekli ve kesikli fermentasyon, fermantasyon uygulama ve ürünleri (mikrobiyal enzim, vitamin, organik asit, pigment, vb. Biosensors / Agricultural and environmental biotechnology applications (starter, biofertilizer, biogas, nitrification, delignification, etc.), applications with genetically modified organisms (GMO) and crops (GMU), biotechnology and biodiversity interaction / Hybrid biosensors / Biological separations						
Course Content	• Production of medicinal and aromatic plant extracts and essential oils (bClevenger hydrodistillation system), determination of antimicrobial properties of these substances • Enzyme production by column chromatography, enzyme activity determination and enzyme kinetics studies • Studies on recycling and reuse of agricultural residues and waste materials • Edible film production • Fermentation optimization and monitoring studies • Determination of antimicrobial properties of bacteriophages and phenolic substances						
Course Subjects	1. WeeksStructure of Enzymes; Classification and Nomenclature 2. WeeksStructure of Enzymes; Classification and Nomenclature 3. WeeksProduction of Enzymes by Fermentation 4. WeeksPurification Methods of Enzymes 5. WeeksPurification Methods of Enzymes 6. WeeksEnzyme Immobilization 7. WeeksEnzymes Produced by Microorganisms 8. WeeksBacterial Enzymes 9. WeeksFungal Enzymes 10. WeeksApplications of Enzymes in Textile Industry 11. WeeksApplications of Enzymes in Detergent Industry 12. WeeksApplications of Enzymes in Leather Industry 13. WeeksApplications of Enzymes in Food and Animal Feed Production 14. WeeksApplications of Enzymes in Pharmaceutical and Chemical Industry						
Learning Outcomes	Will be able to explain the structure, classification and nomenclature of enzymes. (Explain enzyme structure.) Will be able to explain the production of enzymes by fermentation. will be able to list the enzymes produced by microorganisms. will be able to explain the applications of enzymes in textile, detergent and leather industry. will be able to explain the applications of enzymes in pharmaceutical and chemical industry.						
6	**OIL PLANTS**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To gain knowledge and skills in oil crops cultivation and breeding, even the problems and solutions of oil crops agriculture in Turkey Biosystem engineers.						

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Course Content	The places where oil crops are used and their plant characteristics (root, stem, leaf, flower, fruit and seed) within the order of the 14-week foreseen teaching plan of the course demonstrations will be made directly on plant materials. Green plant materials will be shown in field conditions according to the season.						
Course Subjects	Introduction to oil crops, production of oil crops in the world and Turkey Sunflower utilization areas, origin, production and trade Sunflower taxanomia, wild and cultivated species Sunflower adaptation and cultivation techniques, tillage, fertilization and crop rotation Sunflower cultivation techniques, sowing-maintenance and harvesting operations						
	Sunflower breeding Soybean adaptation and breeding techniques Soybean breeding Colza cultivation techniques Colza breeding Breeding techniques and breeding of groundnut Breeding techniques and breeding of sesame Aspirin cultivation techniques and breeding Poppy cultivation techniques and breeding						
Learning Outcomes	To know the importance of oil crops in Turkey and the world To be able to prepare national production projects related to oil crops To be able to transfer information to farmers about production techniques of oil crops To be able to bring solutions to problems encountered in oil crops production To have knowledge about oil crops breeding To be able to make seed production of oil crops To be able to develop applications that will increase production in oil crops To be able to contribute to the development of oilseed industry						
7	**PLANT PROTECTION GUIDANCE**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Within the scope of this course, it is aimed to provide information about the process to students who want to obtain a certificate of application of plant protection products.						
Course Content	International code system for pesticides, fungicides and their mechanisms of action, insecticides and their mechanisms of action, herbicides and their mechanisms of action						

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Course Subjects	1. INTRODUCTION 1.1. pH and TANK MIXING IN SPRAYING WATER 1.2. PESTICIDE FORMULATION TYPES AND INTERNATIONAL CODE SYSTEM 2. FUNGICIDES 2.1. FRAC General Knowledge and Management of Resilience 2.2. FRAC Mobility of Active Substances Licensed in Turkey in Plants 2.3. FRAC Active Substance List of Fungicides Licensed in Turkey 2.4. Classification of Fungicides according to FRAC Mode of Action 2.5. Fungicides Licensed in Turkey According to FRAC Mechanisms of Action and Usage Information 2.6. FRAC Active Substances Not Classified by Mode of Action 2.7. Biological Fungicides and Active Substances Licensed in Turkey 2.8. Active Substances Licensed in Turkey by Plant and Their Rates 3. INSECTICIDES 3.1. IRAC General Knowledge and Management of Resilience 3.2. IRAC Mobility in Plants of Active Substances Licensed in Turkey 3.3. IRAC Active Ingredient List of Insecticides Licensed in Turkey 3.4. IRAC Classification of Insecticides by Mode of Action 3.5. Insecticides Licensed in Turkey According to IRAC Mechanisms of Action and Usage Information 3.6. IRAC Authorized Active Substances Not Classified by Mode of Action 3.7. Active Substances Licensed in Turkey by Plant and Their Rates 4. HERBICIDES 4.1. Global HRAC / WSSA General Information 4.2. HRAC Mobility in Plants of Active Substances Licensed in Turkey 4.3. HRAC Active Substance List of Herbicides Licensed in Turkey 4.4. HRAC-WSSA Classification of Herbicides by Mode of Action
	4.5. Herbicides Licensed in Turkey According to HRAC Mechanisms of Action and Usage Information 4.6. Active Substances Licensed in Turkey by Plant and Their Rates 5. PLANT ACTIVATORS 6. PLANT GROWTH REGULATORS 7. INDEX 7.1. Active Pharmaceutical Ingredients Banned / Restricted in Turkey 7.2. Active Substance List and/or FRAC-IRAC-HRAC Code (May 28, 2021) 7.3. Plant Protection Products Preparation List (May 28, 2021)
Learning Outcomes	Students will have information about the process of obtaining plant protection products application certificate Have general information about plant protection products Have knowledge about the licensing of plant protection products used in our country

0701206000 - (6TH SEMESTER)							
Course Code	**Course Name**	**Z / S**	**D**	**U**	**L**	**K**	**ECTS**
1	**AGRICULTURAL VALUATION AND INFORMATION.**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objective	To teach the concepts related to agricultural valuation, methods of agricultural valuation and preparation of expert reports related to agricultural valuation						

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Course Content	This course covers property and property rights, economic principles of appraisal, the valuation process, data collection and analysis, methods used, as well as It includes many applications that take into account the multiple structures present in the agricultural sector.							
Course Subjects	1 Introduction Appraisal and the Meanings of Agricultural Appraisal 2 Changes in the Value of a Good for Various Purposes and Conditions 3 Valuation Methods-Market Value Method 4 Valuation Methods-Market Value Method 5 Valuation Methods-Cost Method 6 Valuation Methods-Capitalization of Revenues Method-Finding the Capitalization Rate 7 Appraisal Methods-Capitalization of Revenues Method-Capitalization Process 8 Midterm Exam 9 Appraisal Methods-Substitution P r i c e Method-Transformation P r i c e Method-Supplementary Appraisal Method-Total Gross Multipliers Method-Combination Method-Other Methods 10 Appraisal Methods-Substitution P r i c e Method-Transformation P r i c e Method-Supplementary Appraisal Method-Total Gross Multipliers Method-Combination Method-Other Methods 11 Legal Status of Appraisal in Turkey - Expropriation in the Constitution - Expert Witness According to Various Laws Legal Status of Appraisal in Turkey Status-According to the Expropriation Law Expertise and Valuation 12 Legal Status of Appraisal in Turkey - Expert Witness and Appraisal according to the Expropriation Law 13 Expertise - Legislation on the basis of Expertise - Selection of Expert and Going to Court - Expertise on Expropriation 14 Expertise - Expertise on Loss and Damage Determination - Expertise on Agricultural Insurance - Processing the collected data, Writing the expert report and giving 15 Expert Witness - Examples of Expert Reports 16 Final Exam							
Learning Outcomes	1 Concepts related to agricultural appraisal, why agricultural appraisal is done, its importance and the agricultural engineers who will make appraisal should have learns what the necessary features are 2 Concepts related to agricultural appraisal, why agricultural appraisal is done, its importance and the agricultural engineers who will make appraisal should have learns what the necessary features are 3 Learns agricultural valuation methods. 4 Learns agricultural valuation methods. 5 Appraises the value of agricultural holdings, agricultural land, related rights and other agricultural property using agricultural valuation methods. 6 Appraises the value of agricultural holdings, agricultural land, related rights and other agricultural property using agricultural valuation methods. 7 Prepares expert reports on agricultural valuation. 8 Prepares expert reports on agricultural valuation.							
2	**RESEARCH EXPERIMENT METHODS**	**S**	**2**	**0**	**0**	**2**	**3**	
Course Objectives	Experiments established in field, greenhouse and laboratory conditions should be organized according to a specific experimental design and their outputs should be evaluated through this technique. In this course, the basic experimental techniques that the students of the Faculty of Agriculture will need for their future research are covered. This For this purpose; issues such as selection of appropriate experimental design, planning and establishment of the experiment, evaluation and interpretation of the results obtained are addressed.							
Course Content	Planning, Implementation, Execution, Evaluation and Interpretation of Trials; Trial Layouts and Patterns. Non-replicated Trials, Basic Statistical Definitions and Tests, Interpretation of Interactions, Orthogonal Comparisons, Single Factor Trials, Trial Designs with Mathematical Models, Incomplete Plots, Two Trials with Factors, Trials with Three Factors, Trial Designs with Three Factors. Comparison of Variety Qualified Levels, Orthogonal Comparison of Dose Qualified Levels							

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Course Subjects	1 Introduction, scope, rationale and importance of the course. 2 Basic principles of experimental methods, planning of experiments, site selection, observations and measurements. 3 Repetitions, blocking, experimental designs, basic statistical concepts used in research. 4 Analysis of variance of single factorial trials: Coincidence plots experimental design, experimental errors and interpretation of results. 5 Analysis of variance of single factorial trials: Coincidence block design and interpretation of results. 6 Comparison of means: LSD and Duncan tests. 7 Orthogonal decomposition of dose factors. 8 Two-factor experimental designs: Split plots. 9 Two factorial experimental designs: Simple factorial arrangement and interactions. 10 Interpretation and statistical comparison of means in two-factor experiments. 11 Three-factor experimental designs: Simple factorial design. 12 Three-factor experimental designs: Divided split plots. 13 Interpretation of double and triple interactions. 14 Comparison of means in case of double and triple interactions.						
Learning Outcomes	1. To understand the importance of agricultural research 2. Ability to plan research and select the most appropriate model 3. To be able to produce ideas and solutions related to the research done or to be done 4. To be able to determine the appropriate place, variety / genotypes for production and to recommend them to the producer 5. To be able to interpret the obtained research outputs from a different perspective						
3	**AGROCHEMICALS AND AGRICULTURAL PESTICIDES**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	The concept and measurements of disease in plants; general disease symptoms caused by biotic and abiotic agents and control against diseases to gain knowledge about the general principles of the methods.						
Course Content	The course covers the basic concept of disease in plants and related measurable parameters (such as incidence rate, prevalence rate, disease severity, crop losses), abiotic and This course includes general disease symptoms caused by biotic factors, theoretical and practical information about cultural, biological, chemical, physical and integrated control methods used today in the fight against diseases.						
Course Subjects	1. The concept and importance of disease in plants 2. General symptoms of abiotic diseases 3. General symptoms of biotic diseases 4. The history and current place of plant disease control						
	5. Cultural measures 6. Chemical control of plant diseases and pesticides 7. Agricultural pesticide applications 8. Midterm exam 9. Tools and equipment used in the application of pesticides 10. Laws and regulations on pesticide applications in Turkey 11. Physical methods of struggle 12. Biological Control Methods 13. Quarantine and practices in Turkey 14. Integrated fight against diseases 15. Integrated product management 16. Final exam						

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Learning Outcomes	1. To learn the concept of disease in plants and the main terms related to diseases 2. To learn biotic and abiotic disease agents in plants and their general symptoms 3. To have knowledge about the relationship between biotic disease agents and disease symptoms in plants 4. To have general knowledge about the preparations used in the fight against plant diseases 5. To have knowledge about plant diseases and a control methods						
4	**MEDICINAL AND AROMATIC PLANTS**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	Introduction of Medicinal and Aromatic Plants and giving information about their use						
Course Content	General characteristics of medicinal and aromatic plants, usage areas and cultivation possibilities, important medicinal plants that we import and export, classification of medicinal plants, morphological characteristics of medicinal plants that are very important for our country, their origins, production of medicinal plants in the world and in our country, usage patterns, cultivation techniques, harvesting and drying.						
Course Subjects	1 To be able to recognize medicinal and aromatic plants in their natural environment; 2 To be able to identify diseases and pests in the cultivation of medicinal and aromatic plants and to carry out studies on their control; 3 To be able to harvest medicinal and aromatic plants; 4 To be able to carry out the drying and storage of plants collected as green; 5 To be able to take part in the sales and marketing of medicinal and aromatic plants;						
Learning Outcomes	1 Introduction 2 General characteristics of medicinal and aromatic plants 3 General characteristics of medicinal and aromatic plants 4 Uses and cultivation possibilities 5 Uses and cultivation possibilities 6 Important medicinal plants we import and export 7 Visa 8 Classification of medicinal plants 9 Classification of medicinal plants 10 Morphological characteristics of medicinal plants that are very important for our country 11 Morphological characteristics of medicinal plants that are very important for our country 12 Origins, production of medicinal plants in the world and in our country 13 Uses, cultivation techniques 14 Harvesting and drying						
5	**GENERAL HERBOLOGY**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	The aim of this course is to introduce the principles of weed science and to introduce the weeds which have an important place in agricultural production due to the damages they cause, and also to introduce the development of weed science and its relations with cultivated plants in all aspects. Biological characteristics of weeds, environmental factors and						
	relations, weed control methods, general properties of herbicides, classification and herbicide behavior. It is also used in human health and nutrition, cosmetics industry, ornamental plants, plant gene source, food and shelter for wildlife, erosion control, The other objectives of the course are to prevent soil fatigue, green fertilizer, trap plants for plant diseases and pests, cleaning of polluted water and heavy metals, technical works and textile industry.						

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Course Content	In this course, the definition, classification, biology, ecology, benefits, damages, allelopathic effects and control methods (cultural, physical, biological and chemical) of weeds will be given. Parasitic weeds will also be covered in this course. General information about alternative uses of weeds will also be given. In this context, information about the origin of agriculture will be given; the place and importance of weeds in this subject will be explained; some weeds used as food and herbal medicine will be introduced and information will be given about their importance for our health and their effects and uses. In addition to these, the use of weeds in cosmetic industry and as ornamental plants, their importance in cleaning polluted waters and heavy metals, the use of some weeds as dye plants, the role of weeds as trap plants for diseases and pests in agricultural plants, erosion control, soil The importance of weeds in the fatigue and productivity of weeds and the use of weeds as green fertilizers are alternative areas of use in this field and are thought to be of interest to students as they will bring a different perspective to weeds.							
Course Subjects	1 History of weed science and weed concept, classification of weeds, biology and ecology of weeds 2 Classification of weeds according to life stages, generative reproduction and spreading ways in weeds, vegetative reproduction and exchange of storage substances in weeds, germination and dormancy types in weeds and their agricultural importance 3 Parasitic alien plants 4 Abiotic and biotic factors affecting weeds, effects of humans and animals 5 Weed-crop competition, allelopathy 6 Economic importance, benefits and damages of weeds, information about the origin of agriculture 7 Weeds that are problematic in different crops (garden and field crops) 8 Population dynamics and early warning in weeds, criteria for weed control 9 Advantages of weeds over cultivated plants, measures taken against weeds - cultural, physical, biological and chemical control. Herbicide applications 10 Distribution of herbicides in plants, classification, selective effects and various properties. Factors that reduce the effectiveness of herbicides, side effects of herbicides 11 Introduction, collection and drying of some important weeds used as food, medicine, tea and spices, their effects and uses 12 Introduction of some weeds that are important in cleaning polluted water and heavy metals, as trap plants for diseases and pests, as green manure, erosion control, soil fatigue and fertility 13 Botanical Garden Excursion 14 Term paper presentation							
Learning Outcomes	To learn the concept of weeds, to learn the biology and ecology of weeds To learn the methods of controlling weeds and the advantages and disadvantages of these methods To understand the economic importance of weeds To understand the benefits and harms of weeds To know the effects of weeds on agricultural systems To have knowledge about the benefits of weeds in terms of human health and nutrition and the use of some weeds as herbal medicines The use of weeds in plant gene resources, as well as in the cosmetics industry, as ornamental and dye plants, polluted water and heavy metals can learn information about alternative uses in cleaning and other fields.							
6	**INSTRUMENTAL FOOD ANALYSIS**	**S**	**2**	**0**	**0**	**2**	**3**	
Course Objectives	The aim of this course is to teach the basic principles of different analytical methods used in food analysis and to make applications with modern devices. The main objective is to train analysts for food quality control and food research. This course is for beginners, but contains enough information for many analysts.							
Course Content	Classification of chromatographic methods and general principles; High Pressure Liquid Chromatography (HPLC): instrumentation, columns, detectors, column separation methods, use of HPLC in food analysis; Gas Chromatography (GC): columns, detectors; Gas Chromatography (GC), Thin Layer Chromatography and other chromatographic methods, Electrophoresis; Spectroscopy: electromagnetic wave and its interaction with matter, atomic and molecular absorption, Beer's Law, UV-visible Instrumentation of region spectrophotometry; Atomic Absorption Spectrophotometry (AAS) and other spectrophotometric methods.							
Course Subjects	1 Course Introduction 2 Classification of Chromatographic Methods and General Principles 3 High Pressure Liquid Chromatography (Hplc): Instrumentation, Columns, Detectors, Column Separation Methods							

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	4 Hplc in Food Analysis 5 Gas Chromatography (Gc): Columns, Detectors, Gc in Food Analysis 6 Other Chromatographic Methods 7 Electrophoresis 8 Spectroscopy Electromagnetic Waves and Their Interaction with Matter 9 Spectroscopy Atomic and Molecular Absorption, Beer's Law 10 Spectroscopy Instrumentation of UV-Visible Region Spectrophotometer 11 Atomic Absorption Spectrophotometer 12 Other Spectrophotometric Methods 13 Definition of Potentiometry and Electrodes 14 Potentiometric Titration						
Learning Outcomes	1 Recognize the instruments for refractometric methods and be able to use them in practice 2 Recognize instruments for spectrometric methods and be able to use them in practice 3 Recognize instruments for chromatographic methods and be able to use them in practice 4 Recognize instruments for potentiometric methods and be able to use them in practice 5 Recognize the electrophoresis device and use the device in practice 6 Understand the basic theory and principles of instrumental analysis						
7	**EARTH PHYSICS**	**S**	**2**	**0**	**0**	**2**	**3**
Course Objectives	To reveal the phases that make up the soil and the static and dynamic relationships between these phases, the effects of soil physical properties affecting crop production evaluate and find solutions to problems.						
Course Content	Definition, importance and purpose of soil physics. Physical state of soil, volume and mass relations between three phases in soil. Soil composition classes, soil structure, aggregate formation and durability. Soil aeration and water structure. Water types and movement and the importance of soil temperature.						
Course Subjects	1 Definition, interests, importance and purpose of Soil Physics 2 Physical state of soil, volume and mass relations between three phases in soil 3 The solid phase of the soil, the structure of the soil 4 Soil composition classes, soil structure (structure) 5 Aggregate formation and durability 6 Determination of soil structural status 7 Soil aeration 8 Midterm exam, course evaluation 9 Soil water structure, adsorption on solid surfaces, electrical double layer, dispersion of soil colloids 10 Types of water in soil and water movements 11 Measuring and expressing the amount of water in the soil 12 Soil temperature 13 Potential energy of soil water 14 General repetition						
Learning Outcomes	1-Equipped with basic knowledge of soil physics. 2-Knows the effects of physical conditions of soils on plant growth. 3-To be able to do soil analysis to determine soil physical properties and use the tools and equipment used for this purpose; 4-Know how different agricultural practices will affect soil physical conditions and make suggestions for the solution of problems that may arise can be found.						

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SOCIAL-CULTURAL COURSES- (7TH AND 8TH SEMESTER)							
Course Code	**Course Name**	**Z/S**	**D**	**U**	**L**	**K**	**ECTS**
1	**PHYSICAL EDUCATION**		**3**	**0**	**0**		**4**
Course Objectives	The aim of this course is to make students adopt the philosophy of lifelong sports and to ensure their development in various branches of sports.						
Course Content	Basic concepts in physical education and sport, the place of physical education and sport in education and training, function, aims, philosophy, relationship with other sciences, physical education and sport The future of professional fields, its place and function in Turkish Education and Sports institutions.						
Course Subjects	1 Passing and dribbling techniques in basketball 2 Basketball lay-up techniques 3 Offense and defense techniques in basketball 4 Passing and dribbling techniques in handball 5 Passing and cheating techniques in handball 6 Offense and defense techniques in handball. 7 Match in handball 8 MIDTERM EXAM 9 Table tennis racket holding techniques 10 Table tennis serving techniques 11 Table tennis forent hitting techniques 12 Table tennis backhand techniques 13 Badminton racket holding techniques 14 Badminton serving techniques 15 Badminton match 16 Final						
Learning Outcomes	1 Explains basketball techniques. 2 Explains basketball techniques. 3 Learns handball techniques. 4 Learns handball techniques. 5 Explains table tennis techniques. 6 Explains table tennis techniques. 7 Explains badminton techniques. 8 Explains badminton techniques.						
2	**MUSIC**		**3**	**0**	**0**		**4**
Course Objectives	The aim of the course is to gain basic music knowledge.						
Course Content	The role and content of music in education, basic music knowledge, the nature and purpose of notation, introduction to instrument and voice training, collective playing and singing, musical hearing reading and writing exercises in developing creativity. School and camp anthems, National Anthem, marches at walking tempo, rhythm and movement exercises, keeping tempo, singing anthem and managing, accompanying action.						

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Course Subjects	1 General information 2 Romantic Period Music 3 Romantic Period Music 4 Romantic Period Music 5 20th Century Music 6 20th Century Music 7 20th Century Music 8 MIDTERM EXAM 9 Jazz Music 10 Jazz Music 11 Contemporary Turkish Music 12 Pop Music						
	13 Rock Music 14 Turkish Art Music 15 Turkish Folk Music						
Learning Outcomes	1 Understands the music culture of the Romantic Period. 2 Understands the music culture of the Romantic Period. 3 Understands 20th century music culture. 4 Understands 20th century music culture. 5 Understands jazz music culture. 6 Understands jazz music culture. 7 Understands the culture of contemporary Turkish music. 8 Understands the culture of contemporary Turkish music. 9 Understands pop music and rock music culture. 10 Understands pop music and rock music culture.						
3	**HALK GAMES**		**3**	**0**	**0**		**4**
Course Objectives	Students choreologically recognize the phenomenon of dance and ethnochoreologically recognize the phenomenon of folk dances, along with the components of folk dances in Turkey scale (music, costume, accessory) together and learn basic examples, become able to apply them within the framework of the requirements of the art of dance and experience interdisciplinary studies.						
Course Content	The emergence of Anatolian Turkish folk dances, the separation of folk dances according to regions, examples of regional folk dances, the history of Turkish folk music, the concept of folk song, folk music types, examples of local folk music.						

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Course Subjects	1 Concepts of Dance and Folk Dance 2 Concepts of Dance and Folk Dance 3 History of folk dances in the world and in Turkey 4 Classification of folk dances in Turkey 5 Folk dance practice 6 Folk dance practice 7 Folk dance practice 8 Folk dance practice 9 Folk dance practice 10 Folk dance practice 11 Folk dance practice 12 Folk dances and costumes 13 Folk dances and music 14 Staging of folk dances						
Learning Outcomes	1) Understands the definitions specific to the field of folk dances. 2) Understands the definitions specific to the field of folk dances. 3) Have knowledge about the history of folk dances. 4) Have knowledge about the history of folk dances. 5) Have knowledge about the classification of folk dances. 6) Have knowledge about the classification of folk dances. 7) Recognizes cultural heritage elements. 8) Recognizes cultural heritage elements. 9) Applies the basic examples of folk dances performed in the scale of Turkey. 10) Applies the basic examples of folk dances performed in the scale of Turkey.						
4	**THEATER**		**3**	**0**	**0**		**4**
Course Objectives	To recognize the concepts of the field of theater, to be able to follow the emotional and intellectual processes of the individual through animation, to recognize the theatrical processes in artistic means of expression,						
	to increase oral expression skills.						
Course Content	General information about the art of theater .History of Turkish drama .Village Middle Plays, Middle Play, Shadow Play (Karagöz), Meddah, Puppet.						
Course Subjects	1 Examining the concepts related to theater and theater. 2 The emergence of theater in classical Greek civilization. 3 Definition and types of drama concept. 4 Drama in the education process 5 The relationship between play and drama. 6 Turkish teaching and drama. 7 Planning the drama program in the educational process. 8 Midterm exam. 9 History of Turkish theater. 10 Modern theater and its types. 11 Warm-up and relaxation games. 12 Warm-up and relaxation games. 13 Warm-up and relaxation games. 14 Warm-up and relaxation games.						

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Learning Outcomes	1 It will increase emotional and intellectual development skills. 2 It will increase emotional and intellectual development skills. 3 Will be able to analyze written and oral speaking activities from a psychoanalytic perspective. 4 Will be able to analyze written and oral speaking activities from a psychoanalytic perspective. 5 Will be able to exhibit more active behaviors in self-knowledge activities. 6 Will be able to exhibit more active behaviors in self-knowledge activities. 7 Comprehend the concept of drama theoretically and practically. 8 Comprehend the concept of drama theoretically and practically. 9 Will have information about Turkish theater and its development. 10 Will have information about Turkish theater and its development.						
5	**SIGN LANGUAGE**		**3**	**0**	**0**		4
Course Objectives	To make our students love sign language, to raise awareness for this language which is necessary in the lives of hearing impaired people						
Course Content	To learn and teach the sign language used by hearing impaired individuals and to gain the ability to use this language when necessary in social life						
Course Subjects	1 Sign Language History 2 Grammar 3 Sign Language Alphabet 4 Words 5 Numbers 6 Words - questions 7 Words - Positive-Negative 8 CV and questions 9 Sentences 10 Deaf Culture 11 Time 12 Morphology 13 Application 14 Story						
Learning Outcomes	1) will be able to communicate using Turkish Sign Language on many issues in daily life, 2) will be able to communicate using Turkish Sign Language on many issues in daily life,						

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	3) will be able to give information about themselves and ask questions about other people, 4) will be able to give information about themselves and ask questions about other people, 5) will be able to use simple question structures. 6) will be able to use simple question structures.						
6	**PICTURE**		**3**	**0**	**0**		**4**
Course Objectives	To develop artistic creativity, a sense of cooperation, the habit of planned work, knowledge and skills about the protection of works of art and natural beauties is to ensure						
Course Content	Painting course introduction and drawing materials, different painting techniques, art movements in painting						
Course Subjects	1 Course Introduction and Materials 2 Explanation of Drawing Techniques 3 Explanation of Perspective Rules and Types 4 Application of Theoretical Knowledge with Various Objects 5 Color Information and Color Wheel Explanation 6 Texture, Stain, Line Study 7 Texture, Stain, Line Study 8 Still Life Applications 9 Explanation and Application of Paint Techniques 10 Application of Paint Techniques 11 Lavi Technique Expression and Application 12 Explanation and Application of Texture Studies with Colors 13 Explaining and Discussing Contemporary Art Movements 14 Application of Free Painting Techniques						
Learning Outcomes	1) Understands basic drawing skills 2) Gains basic drawing skills						

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