UÇAK MÜHENDİSLİĞİ

DERS İÇERİKLERİ/COURSE CONTENTS

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER101	Introduction to Aeronautical Engineering	(2,0,0)	2	3	Compulsory

To survey aerospace history, discuss pertinent topics and introduce basic concepts that promote an understanding of aerospace engineering and the profession. Introduction to flight vehicles in the atmosphere and in space; elements of aerodynamics, airfoils and wings; aerospace technologies including structures, materials and propulsion systems; elements of aircraft performance; basic principles of flight stability, control and systems integration.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MEC101	Technical Drawing	(2,0,2)	3	5	Compulsory

Principles of engineering graphics with the emphasis on laboratory use of AUTOCAD, CATIA, NX or SOLIDWORKS software. Plane Geometry, geometrical constructions, joining of arcs, Dimensioning principles, principles of orthographic projection, isometric and oblique drawing, principles of sectioning, reading engineering drawing from blueprints.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
CHE105	General Chemistry	(3,0,2)	4	6	Compulsory

Introduction to atomic and electronic structure, chemical bonding, molecular structure and bonding theories, properties of liquids, solids and solutions, chemical equilibrium, kinetics, thermodynamics, metal complexes, organic compounds and nuclear chemistry.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
PHY101	Physics I	(3,0,2)	4	6	Compulsory

The goal of this course is to provide a calculus-based physics course to help students pursuing advanced studies in engineering develop conceptual understanding of physical principles, the ability to reason, and gain skills for problem solving.Vectors; kinematics; particle dynamics work and energy; conservation of energy; system of particles; collisions; rotational motion.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MTH101	Calculus I	(4,0,0)	4	5	Compulsory

Limits and continuity. Derivatives. Rules of differentiation. Higher order derivatives. Chain rule. Related rates. Rolle's and the mean value theorem. Critical Points. Asymptotes. Curve sketching. Integrals. Fundamental Theorem. Techniques of integration. Definite integrals. Application to

geometry and science. Indeterminate forms. L'Hospital's Rule. Improper integrals. Infinite series. Geometric series. Power series. Taylor series and binomial series.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MTH112	Linear Algebra	(3,0,0)	3	4	Compulsory

Matrices, systems of Equations and Inevitability, Diagonal, Triangular and Symmetric Matrices, The Determinant Function, Evaluating Determinants by Row Reduction, Properties of the Determinant Function, Cofactor Expansion; Cramer's Rule, Euclidean n-space, Linear Transformation, Properties of Linear Transformations, Real Vector Spaces, Subspaces, Linear Independence, Basis and Dimension, Row Space, Column Space and Null space, Rank and Nullity, Inner Products, Angle and Orthogonality in Inner product Spaces, Orthogonal Bases; Gram-Schmidt Process, Eigenvalues and Eigenvectors, Diagonalization.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER104	Fundamentals of Engineering and Ethics	(2,0,0)	2	3	Compulsory

This course introduces students creative and innovative, ethical thinking and introduces them the engineering professions using multidisciplinary, societally relevant content. Students experience the engineering fundamentals and analysis in engineering including how to work effectively in teams. Students also develop skills in project management, engineering fundamentals, oral and graphical communication, logical thinking, and modern engineering tools (e.g., Excel, MATLAB, FORTRAN).

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
PHY102	Physics II	(3,0,2)	4	6	Compulsory

Kinetic theory of ideal gases. Equipartition of energy. Heat, heat transfer and heat conduction. Laws of thermodynamics, applications to engine cycles. Coulombs law and electrostatic fields. Gauss's law. Electric potential. Magnetic field. Amperes law. Faradays law.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MTH102	Calculus II	(4,0,0)	4	6	Compulsory

Lines and Planes. Functions of several variables. Limit and continuity. Partial differentiation. Chain rule. Tangent plane. Critical Points. Global and local extrema. Lagrange multipliers. Directional derivative. Gradient, Divergence and Curl. Multiple integrals with applications. Triple integrals with applications. Triple integral in cylindrical and spherical coordinates. Line, surface and volume integrals. Independence of path. Green's Theorem. Conservative vector fields. Divergence Theorem. Stokes' Theorem.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
CMP101	Programming Applications for Engineers	(2,0,2)	3	5	Compulsory

Basic computer programming concepts for engineering computations. Programming in different languages will be discussed.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MEC203	Statics	(3,0,0)	3	5	Compulsory

The study of forces, couples and resultants of force systems; free-body diagrams; two- and three-dimensional equilibrium, and problems involving friction; and centroids, center of gravity, and distributed forces.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MTH201	Differential Equations	(4,0,0)	4	6	Compulsory

First-order differential equations. Higher order homogeneous linear differential equations. Solution space. Linear differential equations with constant coefficient. Non-homogeneous linear equations; variation of parameters, operator methods. System of linear differential equations with constant coefficients. Laplace transforms. Power series solutions. Bessel and Legendre equations. Orthogonal functions and Fourier expansions. Introduction to partial differential equations. First- and second-order linear PDE's. Separation of variables. Heat and wave equations.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MEC205	Material Science	(3,0,0)	3	4	Compulsory

Different types of materials used in aerospace. Metals, composites, ceramics, polymers. Failure prediction and prevention. Modes of material failure, fracture, fatigue, creep, corrosion, impact. Effect of high temperature and multiaxial loadings. High temperature materials. Cumulative damage in fatigue and creep. Materials selection.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MEC207	Thermodynamics I	(3,0,0)	3	5	Compulsory

Basic principles of thermodynamics and their application to various systems composed of pure substances and their homogeneous non-reactive mixtures. Simple power production and utilization cycles.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MEC204	Dynamics	(3,0,0)	3	5	Compulsory

Kinematics of particles and rigid bodies, Newton's laws of motion, and principles of work-energy and impulse-momentum for particles and rigid bodies.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MEC214	Mechanics of Materials	(3,0,2)	4	6	Compulsory

Mechanical behaviour of materials; stress; strain; shear and bending moment diagrams; introduction to inelastic action. Analysis and design of structural and machine elements subjected to axial, torsional, and flexural loadings. Combined stresses and stress transformation. Deflections. Introduction to elastic stability.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER208	Processes in Manufacturing	(3,0,0)	3	4	Compulsory

Fundamentals of manufacturing processes and their limitations, metrology, machine shop practice, safety and health considerations, forming, conventional machining and casting processes, welding and joining, plastic production, and non-conventional machining techniques. Sustainable technologies. Laboratory includes instruction and practice on conventional machine tools and a manufacturing project.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER204	Electrics and Electronics	(3,0,2)	4	6	Compulsory

This course provides the basic phenomenon of Electrical Engineering. Topics covered are: Basic electrical quantities, fundamental circuit laws, sinusoidal steady-state analysis and transformers, three-phase circuits, principles of electromechanical energy conversion, DC and AC machines

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MEC208	Thermodynamics II	(3,0,0)	3	4	Compulsory

Brief review of ideal gas processes. Semi-perfect gases and the gas tables. Mixtures of gases, gases and vapours, air conditioning processes. Combustion and combustion equilibrium. Applications of thermodynamics to power production and utilization systems: study of basic and advanced cycles for gas compression, internal combustion engines, power from steam, gas turbine cycles, and refrigeration.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER306	Fluid Mechanics	(3,0,0)	3	4	Compulsory

Basic concepts and principles of fluid mechanics. Classification of fluid flow. Hydrostatic forces on plane and curved surfaces, buoyancy and stability, fluids in rigid body motion. Basic properties of fluids in motion. Lagrangian and Eulerian viewpoints, materials derivative, streamlines, etc. Mass, momentum, and energy conservation integral equations. Bernoulli equation. Basic concepts of pipe and duct flow. Introduction to Navier-Stokes equations. Similarity and model studies.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER333	Aerospace Structures	(3,0,0)	3	4	Compulsory

Analysis and design of aerospace structures from the standpoint of preliminary design. Introduction to elasticity. Deflection and stress analysis of structural components, including thin-walled straight beams. Material failure of highly stressed components, including connections. Torsion of thin-walled shafts and semimonocoque structures. Safety, durability

and damage tolerance strategies for aerospace structures to avoid corrosion, fatigue, and fracture. Energy principles. Stiffness method. Introduction to finite element method.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
EEE341	Signal and System Analysis	(3,0,2)	4	6	Compulsory

Presents fundamental principles and methods of signals and systems for aerospace engineering, and engineering analysis and design concepts applied to aerospace systems. Topics include linear and time invariant systems; convolution; transform analysis; and modulation, filtering, and sampling.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MTH301	Numerical Analysis for Engineers	(3,0,0)	3	5	Compulsory

Roots of algebraic and transcendental equations; function approximation; numerical differentiation; numerical integration; solution of simultaneous algebraic equations; numerical integration of ordinary differential equations.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER334	Aerodynamics I	(3,0,2)	4	6	Compulsory

Introduction to subsonic aerodynamics; aerodynamic characteristics of airfoils, wings, and other components; lift and drag phenomena; and topics of current interest. Flow conservation equations, incompressible Navier-Stokes equations, inviscid, irrotational and rotational flows: the Euler equations, the potential and stream function equations. Elementary flows and their superposition, panel method for non-lifting bodies. Airfoil and wing characteristics, aerodynamic forces and moments coefficients. Incompressible flows around thin airfoils, Biot-Savart law, vortex sheets. Incompressible flow around thick airfoils, the panel method for lifting bodies. Incompressible flow around wings, Prandtl's lifting line theory, induced angle and down-wash, unswept wings, swept wings.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER324	Flight Mechanics	(3,0,0)	3	4	Compulsory

This course aims to teach a thorough knowledge of the aircraft performance and the assumption that are made to get the kinematics and dynamic equations motion and trajectory analysis. Use of quasi-stationary equations of motion. Flight over flat earth is considered. After review of aerodynamics, It is shown how performance requirements will be handled in the design of air vehicles. Aerodynamic characters of a sample airplane is handled and flight analysis done as an example.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER302	Control Systems	(3,0,0)	3	4	Compulsory

Mathematical modelling of dynamic systems; linearization. Laplace transform; transfer functions; transient and steady-state response. Feedback control of single-input, single-output systems. Routh

stability criterion. Root-locus method for control system design. Frequency-response methods; Bode plots; Nyquist stability criterion.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/**Elective**
AER434	Aerospace Propulsion	(3,0,0)	3	5	Compulsory

Analysis and performance of various electrik, piston, jet and rocket propulsive devices. Foundations of propulsion theory. Principles of air-breathing jet engines (turboshaft, turboprop, turbojet, ramjet, scramjet) and their applications, aircraft engine matching. Design and analysis of inlets, compressors, combustion chambers, and other elements of propulsive devices. Emphasis is placed on mobile power plants for aerospace applications.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MTH312	Probability and Statistics in Engineering	(3,0,0)	3	5	Compulsory

Various mathematical and statistical models and techniques for analyzing data are explained in the course. This will include summarizing data; using probability distributions to model processes; using interval estimation for population parameters based o sample data; designing and performing tests about population parameters based on sample data; identifying and applying regression models that describe the relationship between a dependent variable and one or more independent variables.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER311	Gas Dynamics	(3,0,0)	3	5	Compulsory

Fundamentals of fluid mechanics. Fundamentals of thermodynamics. Introduction to compressible flow. Isentropic flow. Normal shock waves. Frictional flow in constant area ducts. Flow in constant area ducts with friction. Steady and two-dimensional supersonic flows.

Code	Course Name	(T,U,L)	Credit	ECTS	Compulsory/Elective
AER425	Flight Stability and Control	(3,0,0)	3	4	Compulsory

Illustrate concept of stability and application to dynamic systems like aircraft, and the role of primary controls and secondary controls in longitudinal stability. Understand the concept of slide slip angle, roll angle and yaw angle their concepts related to lateral directional stability. Learn about the mathematical modeling of an aircraft in longitudinal, lateral and directional cases. Estimate the longitudinal and directional parameters with the help of the linearized equations of aircraft motion. Analyze the different type of modes in longitudinal, lateral and directional motion of aircraft, and recovery from those modes.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
MEC315	Turbomachinery	(3,0,0)	3	5	Elective

The course aims at giving an overview of different types of fluid machinery used for energy transformation, such as pumps, fans, compressors, as well as wind- , hydraulic, steam- and gas-turbines. Applications for transfer to power, as well as for energy use in refrigeration and the built environment are important.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER420	Experimental Aerodynamics	(3,0,0)	3	5	Elective

Experimental techniques in aerodynamics; Pressure, temperature and velocity measurement techniques. Steady and unsteady pressure measurements and various types of pressure probes and transducers, errors in pressure measurements. Measurement of temperature using thermocouples, resistance thermometers, temperature sensitive paints and liquid crystals. Introduction to Velocity measurement using hot wire anemometry, Laser Doppler Velocimetry and Particle Image velocimetry. Data acquisition and digital signal processing techniques.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER452	Aircraft Design	(3,0,2)	4	6	Compulsory

How a general aviation aircraft design is considered. Starting from conceptual design fase, how design requirements stated, initial layout and cost analysis are shown. Constraint analysis are done to find wing projection area and powerplant thrust. Aircraft design including aerodynamic, structural, and power plant characteristics to achieve performance goals. Focus on applications ranging from commercial to military and from manpowered to high-speed to long-duration aircraft. Semester project is a collaborative or individual effort in which to complete the preliminary design cycle of an aircraft to achieve specific design requirements.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER200	Undergraduate Seminar I	(0,0,0)	0	1	Compulsory

Undergraduate seminars are designed to give students a broad overview of the major developments in aerospace industries. The students will attend a series of seminars where invited speakers from establishments, academia or industries.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER300	Undergraduate Seminar II	(0,0,0)	0	1	Compulsory

Undergraduate seminars are designed to give students a broad overview of the major developments in aerospace industries. The students will attend a series of seminars where invited speakers from establishments, academia or industries.

Code	Course Name	(T,U,L)	Credit	ECTS	Compulsory/Elective
AER120	Summer Internship I	(0,0,0)	0	1	Compulsory

Students to gain practical experience in the workplace before receiving their undergraduate degrees. The course can exhibit the ability to effectively work in a professional environment and demonstrate

work ethic and commitment in a work-based environment. Actual working conditions and practical skills of workplaces can be obtained by passing the courses before graduate as bachelor degree.

Code	Course Name	(T,U,L)	Credit	ECTS	Compulsory/Elective
AER220	Summer Internship II	(0,0,0)	0	1	Compulsory

Students to gain practical experience in the workplace before receiving their undergraduate degrees. The course can exhibit the ability to effectively work in a professional environment and demonstrate work ethic and commitment in a work-based environment. Actual working conditions and practical skills of workplaces can be obtained by passing the courses before graduate as bachelor degree.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER400	Graduation Design Project	(0,0,6)	3	8	Compulsory

Graduation project leading to BSc. degree, arranged between a student and the faculty member. The aim of the project is to tackle different engineering problems in aeronautical engineering discipline with a new scientific method for solving problems. Design, develop and present the project based on the knowledge acquired during undergraduate studies. For this project advanced application in September is needed and student will also apply to a project of TUBITAK or another association.

Code	Course Name	(T,U,L)	Credit	ECTS	Compulsory/Elective
AER465	Modeling and Simulation	(3,0,0)	3	5	Compulsory

Modeling and simulation (M&S) is the use of a physical or logical representation of a given system to generate data and help determine decisions or make predictions about the system. The numerical methods behind the simulation of air vehicle dynamics are explained. A number of suitable computational tools are introduced for their simulation and for the visualization of the aircraft behavior. Requirements for model testing, verification and validation are introduced. The process of building simulation models is described and demonstrated through example and computer exercises. A number of analytical tools are introduced including trimming and linearization. The material is supported by examples and hands-on experience with the computational tools.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER206	Dynamics of Systems	(3,0,0)	3	4	Elective

System concepts, Laplace transformation and its use, transfer function. Lumped parameter modelling of physical systems, state space formulation, linearization of nonlinear systems, time domain analysis of dynamic systems, response, feedback control systems, P, PD and PID control, frequency response methods.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER304	Heat & Mass Transfer	(3,0,0)	3	4	Compulsory

Introduction to Conservation laws; Introduction to conduction; One dimensional steady state conduction; thermal generation and extended surfaces; two-dimensional and transient conduction; Introduction to convection; external flow; internal flow; Free convection; Boiling and Condensation; Heat exchangers.

Code	Course Name	(T,U,L)	Credit	ECTS	Compulsory/Elective
AER423	Rotorcraft Aerodynamics	(3,0,0)	3	5	Elective

The purpose of this module is to provide competency based training in rotary wing aircraft aerodynamics and operational characteristics. Basic rotor aerodynamics and dynamics including multirotors, helicopter performance and trim, introduction to helicopter stability, control and vibration.

Code	Course Name	(T,U,L)	Credit	ECTS	Compulsory/Elective
MEC303	Design of Machine Elements	(3,0,0)	3	5	Elective

Mechanical design principles. Design, manufacture & assembly of basic machine elements. Machine frames, welded, adhesive & bolted joints, fasteners. Stepped shafts & features, rolling element bearings; gear mechanics & manufacture. Design for strength, design for other mechanical failure modes including fatigue, stress concentration. Safety, ergonomics & standards.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER455	Mechanics of Composite Materials	(3,0,0)	3	5	Elective

Composite materials and their structural properties. Composite systems. Principles of manufacturing. Structural mechanics of laminated composites. Generalized Hooke`s law. Classical lamination theory. Plane stress problems. Engineering applications. Design principles. Failure criteria and damage tolerance.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER456	Aeroelasticity	(3,0,0)	3	5	Elective

Static Aeroelasticity: lift distribution on an elastic surface, divergence, aileron effectiveness and reversal. Unsteady aerodynamics: oscillatory and arbitrary motions of a 2-D thin airfoil, strip theory. Dynamic response (to gusts, etc.).

Code	Course Name	(T,U,L)	Credit	ECTS	Compulsory/Elective
AER435	Introduction to Energy Conversion	(3,0,0)	3	5	Elective

Energy demand and available resources. Renewable sources: wind, wave, tide, geothermal, biogas and solar energy. Fossil fuels, combustion and combustion equipment. Steam generators. Atomic structure, nuclear reactions; decay, fusion and fission. Reactors. Environmental effects.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER447	Experimental Stress Analysis	(3,0,0)	3	5	Elective

General principles governing the approach to the solution of problems. Fundamental concepts of stress and strain in 2-D and 3-D. Mechanical and electrical strain gages, strain rosettes.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER412	Aircraft Maintenance	(3,0,0)	3	5	Elective

This course studies the international basics of the maintenance system, and the principles, rules and some important operations originated and derived from these basics. Course Aims and Objectives The course aims to provide students with information about international basics of the maintenance system, and the principles, rules and some important operations of the aircraft maintenance and airworthiness. In this context, basic conceptual duties, actors, procedures and certificates in the maintenance system of an aircraft are also dealt with.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER462	Kinematic Synthesis of Linkages	(3,0,0)	3	5	Elective

To learn techniques enabling the mechanical designer to dimension geometrically a mechanical system intended to accomplish a specified motion task. The role of kinematic synthesis in mechanical design. The qualitative synthesis of kinematic chains; displacement groups; kinematic bonds; Series and parallel arrays of kinematic sub-chains: applications to the qualitative synthesis of parallel-kinematics machines. Function-generation: planar, spherical and spatial four-bar linkages. The synthesis matrix and its condition number; exact and approximate synthesis.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER437	Fundamentals of Combustion	(3,0,0)	3	5	Elective

Fundamentals of Combustion. Basic flame types. Brief review of thermodynamics. React and product mixtures. Chemical equilibrium and adiabatic flame temperature. Transport phenomena. Fundamentals of chemical kinetics. Reaction mechanisms: The H_2-O_2 system, CO oxidation, methane combustion, NO formation. Analysis of reaction mechanisms. Chemical and thermal analysis of reacting systems: Constant pressure reactor, constant volume reactor, well stirred reactor and plug-flow reactor.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER468	Optimization in Engineering	(3,0,0)	3	5	Elective

Formulation of optimization problems encountered in aerospace engineering. Minima of functions and functionals, necessary conditions, calculus of variations, control formulation, two-point boundary-value problems. Applications to typical problems in aerospace engineering such as optimal launch, minimum time to climb, maximum range, and optimal space trajectories.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER467	Mechanical Behaviour of Materials	(3,0,0)	3	5	Elective

This course discusses the basics of mechanics and of materials science with the objective of rationalizing, predicting, modifying and describing the response of materials to stress. The focus is the correlation between structure-property-performance. The course starts with the correlation between stresses and strains in the elastic regime, followed by the theories of plasticity and failure. It concentrates on the physics of deformation and its interaction with the microstructure.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AER209	CAD	(3,0,0)	3	5	Elective

Integration of computers into the design cycle. Interactive computer modelling and analysis. Geometrical modelling with wire frame, surface, and solid models. Finite element modelling and analysis. Curves and surfaces and CAD/CAM data exchange. The integration of CAD, CAE and CAM systems.

Code	Course Name	(T,A,L)	Credit	ECTS	Core/Elective
AER315	Mechanical Vibrations	(3,0,0)	3	4	Elective

The course will cover fundamental concepts on the vibration of mechanical systems including, but not limited to, review of systems with one degree for freedom, Lagrange's equations of motion for multiple degree of freedom systems, introduction to matrix methods, transfer functions for harmonic response, impulse response, and step response, convolution integrals for response to arbitrary inputs, principle frequencies and modes, applications to critical speeds, measuring instruments, isolation, torsional systems, introduction to nonlinear problems. This course introduces one- and multi-degree-of-freedom systems. Natural frequencies and modes of vibra- tions, resonance, beat phenomenon, effect of damping, applications to practical problems, and methods to avoid excessive vibrations.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course
AIT151	Atatürk's Principles and the History of Turkish Revolution I	(2,0,0)	2	0	Compulsory
	The reasons that prepared the collapse of the Ottoman Empire and the Turkish Revolution. Disintegration of the Ottoman Empire, Tripoli War, Balkan Wars, First World War. Armistice of Mudros. The situation of the country in the face of the occupations and the reaction of Mustafa				

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective Course

Kemal Pasha, the departure of Mustafa Kemal Pasha to Samsun. The opening of the Turkish Grand National Assembly of the National Struggle. Treaty of sevr. The Lausanne Peace Treaty. Atatürk's Principles: Republicanism, Nationalism. Populism, Statism. Secularism, Revolutionism.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AIT152	Principles of Atatürk and the History of Turkish Revolution I	(2,0,0)	0	2	Compulsory

Abolition of the Sultanate; Proclamation of the Republic; Taking the Election Decision in the First Parliament; Establishment of the People's Party; Ankara Becoming the Capital, Proclamation of the Republic and Reactions; Abolition of the Caliphate (The Emergence of the Problem of the Caliphate and the Events Preparing the Abolition of the Caliphate), Progressive Republican Party and Sheikh Said Rebellion; Law of Takrir-i Sukun; Closing the Progressive Republican Party; İzmir Assassination Attempt), Free Republican Party and Menemen Incident; An Overview of Atatürk-Inönü Separation, Revolutions and Their Goals; Revolutions in Law; 1924 Organization-ı Esasiye Law; Adoption of the Turkish Civil Code; Adoption of Other Basic Laws; Revolutions in Women's Rights, Education and Culture; The Law of Unification of Education; Adoption of the New Turkish Alphabet; New Understanding of History and Language; From Darülfünun to Istanbul University; Fine Arts, Developments in Economics; Late Ottoman Economy; Turkish Economy Congress and Its Results; Economic Activities in the First Years of the Republic; Transition to the Practice of Statism, Revolutions Made in Social Life (Modernization in Clothing: The Law on Wearing Hats; Closure of Lodges, Zawiyas and Tombs, Adoption of International Time, Calendar, Numbers, Measurements and Week Holidays; Adoption of the Law on Surnames; Developments), Turkey's Foreign Policy in Atatürk Era; Years 1919-1923; Years 1923-1930, Going to the Second World War and Turkish Foreign Policy 1931-1939, Principles of Atatürk; General Overview of Atatürk's Principles; Republicanism, Nationalism, Populism, Statism, Secularism, Revolutionism, İsmet İnönü Period (1938-1950); Domestic Policy During the Second World War; Establishment of the Democratic Party, Democratic Party Period (1950-1960); May 27 Military Intervention and National Unity Committee

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AIT153	History I for International Students	(2,0,0)	0	2	Compulsory

Origins and rise of Ottoman Empire, Ottoman Administrative System, Ottoman Society, Law and Education, Revolts and Reform Attempts in Ottoman Empire, Reforms Through 19th Century, Military and Administrative Reforms, Reign of Abdülhamid II, Young Ottomans and Ottomanism, First Constitutional Era, Second Constitutional Era, Political Struggle for Power, The Ideologıcal Debates: 1913-1918, Ottoman Empire and Fırst World War I

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
AIT104	History II for International Students	(2,0,0)	0	2	Compulsory

The Armistice of Moundros and Its Aftermath, The National Resistance Movement and Mustafa Kemal Pasha, The Great National Assembly and the Treaty of Sevres, Great Offensive, Treaty of Lausanne and Sheikh Sait Rebellion, Declaration Of The Turkish Republic, The Major Periods in the Political History of Turkey I, The Major Periods in the Political History of Turkey II, Women and Nation building in the early Turkish Republic I, Women and Nation building in the early Turkish Republic II

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
ENG101	English I	(3,0,0)	3	4	Compulsory

Talking about biographies, talking about biographies 2, asking & answering about general knowledge, talking about past events, talking about past events 2, talking about technology in the future, asking for permission/making a request, formal phone conversations, informal phone conversations, making an appointment, talking about products, checking understanding/ asking for clarification.

Code	Course Name	(T,A,L)	Credit	ECTS	Compulsory/Elective
ENG102	English II	(3,0,0)	3	4	Compulsory

Health matters, health matters 2, restaurant problems-complaints and responses, talking about computer problems, reporting the news and the weather, reporting the news and the weather, product problems- complaints at the store, talking about the future possibilities, talking about the future possibilities 2, health problems and herbs, health problems and herbs, job qualifications and working conditions.

Code	Course Name	(T,A,L)	Credit	ECTS	Core/Elective
TUR151	Turkish I: Written Expression	(2,0,0)	0	2	Compulsory

Reading passages related to the chapter; grammar studies; vocabulary and translation activities; listening activities; debates on current issues related to the department (Repetition of tenses, Internet history, Health and medicine, passive frameworks, Social issues, Environmental issues, Repetition of modals, Law and punishment, repetition of adjective phrases, Language and Literature, Repetition of noun phrases.

Kodu	Ders Adı	(T,U,L)	Kredi	AKTS	Zorunlu/Seçmeli Ders
TUR152	Türkçe II: Sözlü Anlatım	(2,0,0)	0	2	Zorunlu

İmla, noktalama ve kompozisyon (noktalama işaretleri, diğer işaretler) , imla, yazım kuralları (büyük harflerin imlası, sayıların yazılışı, kısaltmaların imlası, alıntı kelimelerin yazılışı) , kompozisyon (Kompozisyonun amacı, kompozisyon yazmada yöntem) , kompozisyonda plan, giriş, gelişme, sonuç, Anlatım özellikleri, anlatımda duruluk, anlatımda sadelik, anlatımda açıklık içtenlik, anlatım bozuklukları (Eş anlamlı kelimelerin

cümle içinde kullanılışı) , deyimlerin yanlış kullanılışı, anlatım biçimleri (açıklama, hikaye, özlü anlatım, tasvir, hiciv, portre, kanıtlama, konuşma, manzum anlatım çeşitleri) , sözlü anlatım çeşitleri (günlük ve hazırlıksız konuşma, hazırlıklı konuşma, açıkoturum, münazara, panel) , yazılı anlatım türleri (Mektup, telgraf, tebrik, davetiye, edebi mektup) , iş mektupları, resmi mektup, dilekçe, rapor, tutanak, karar, ilan, reklam, sohbet, eleştiri, anı, gezi yazısı, röportaj, anket, otobiyografi, biyografi, roman, hikaye, masal, fabl, tiyatro, trajedi, dram, senaryo.) .

Code	Course Name	(T,U,L)	Credit	ECTS	Compulsory /Elective
YIT154	Turkish for International Students I	(2,0,0)	0	2	Compulsory

The Turkish Alphabet and how Phonetics is in Turkish Alphabet, how nouns are made plural in Turkish, how to form yes-no questions, how to form sentences with "there is/there are, possessives in Turkish, how to use personal pronouns, numbers and asking questions related to numbers, how to use noun states in Turkish, where and how to use present continuous tense and simple present tense.

Kodu	Adı	(T,U,L)	Kredi	AKTS	Zorunlu/Seçmeli Ders
YIT153	ciler için Türkçe I	(2,0,0)	0	2	Zorunlu

Türk Alfabesi ve Türk Alfabesi'nde Fonetik nasıldır, Türkçe'de isimler nasıl çoğul yapılır, evet-hayır soruları nasıl kurulur, Türkçe'de iyelik ekleri nasıl kullanılır, şahıs zamirleri, sayılar ve sayılarla ilgili soru sorma, Türkçe'de isim halleri nasıl kullanılır, geniş zaman ve şimdiki zaman nerede ve nasıl kullanılır?

Code	Name	(T,A,L)	Credit	ECTS	Compuslsory/Elective
AER344	Aerodynamics II	(3,0,0)	3	4	Compulsory

Additional to Aerodynamics I course inviscid, incompressible flows over airfoils and finite wings are widely handled here. Inviscid, compressible flows some preliminary aspects are introduced. Then normal shock waves and related topics are covered. After it, oblique shock and expansion waves are handled. Compressible flows through nozzles, diffusers, and wind tunnels are covered..

Code	Name	(T,A,L)	Credit	ECTS	Compuslsory/Elective
AER213	Engineering Experimentation	(2,0,2)	3	5	Compulsory

Experimentation is the main aspect of designing process. An engineer who is ought to design the parts of a able to understand the result only when it is tested practically. Preliminary simulations are conducted from t to know how the new concept of engineering acts in its first rough design.

Code	Name	(T,A,L)	Credit	ECTS	Compuls
AER438	Modeling and Simulation	(3,0,0)	3	4	Compulso

Code	Name	(T,A,L)	Credit	ECTS	Compuslsory/Elective

Modeling and simulation play a critical role in aerospace engineering, enabling engineers and researchers to analyze and optimize various aspects of aerospace systems. Using modeling and simulation techniques, aero engineers can reduce development costs, speed up the design process, and gain deeper insights into the per safety, and efficiency of aerospace systems.

Code	Name	(T,A,L)	Credit	ECTS	Compuslsory/Elective
AER209	CAD	(3,0,0)	3	4	Elective

CAD stands for Computer-Aided Design which is a technology used in various industries to create, modify, ar optimize designs and drawings. CAD software allows designers and engineers to create 2D and 3D models of buildings, or mechanical components using specialized tools and features. CAD systems provide a wide range such as geometric modeling, parametric design, assembly modeling, simulation, rendering, and drafting.