

1. Semester

Course Code: HST181	Course Title: Atatürk's Principles and History of Revolutions I			Semester: 1
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	This course teaches the spirit and significance of Atatürk's Revolution which aimed at achieving contemporary civilization.			
Course Content:	Introduction, Fall of the Ottoman Empire, Tanzimat and Islahat Eras, Tripoli and Balkan Wars, World War I, The Armistice of Moudros, the Occupation of Anatolia and the National Reactions, The Birth of the Turkish Revolution, Turkish War of Independence, The Armistice of Mudanya, The Treaty of Lausanne			

Course Code: TRK181	Course Title: Turkish Language I			Semester: 1
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The aim of this course is to inform students about the content, characteristics, and development of Turkish language and to provide them with writing and reading skills in Turkish and to raise the awareness of using Turkish as the national language.			
Course Content:	This course is designed to teach the definition of language and culture, language-culture relation, the role of language as a social institution in societies, the situation of Turkish Language among world languages, the development and historical periods of Turkish language, the current condition of Turkish Language and span of usage, Turkish Phonology, inflectional and derivational morphemes in Turkish, types of lexicon in Turkish, and elements of the sentence.			

Course Code: FOL181	Course Title: Foreign Language I			Semester: 1
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The aim of this course is to equip students with language knowledge and skills which are essential for general communication purposes and future academic studies, and also help students develop positive attitudes towards the target foreign language.			
Course Content:	The course is designed to teach basic grammatical structures of English languages such as to be, there is/are, have/has got, tenses, modals, passives, conditionals, noun clauses, reported speech, gerunds/infinitives.			

Course Code: CME183	Course Title: Information Technologies And Applications			Semester: 1
Lecture: 2	Practice: 2	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The aim of this course is to teach the importance of basic information technologies.			
Course Content:	Computer hardware, software and operating system, internet and internet browser, e-mail management, newsgroups and forums, web based learning, word processing, spreadsheet, presentation maker, personal web site development, e-commerce and making a identifier material.			

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: PHY183	Course Title: General Physics I			Semester: 1
Lecture: 4	Practice: 0	Lab: 0	Credit: 4	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	To teach the concepts of statics, dynamics and kinematics given in the course content, their applications in daily life and modern technology.			
Course Content:	Units, Physical quantities and vectors, Linear motion, Motion in two and three dimensions, The Newton laws of motion, Applications of Newton's laws, Work and kinetic energy, Potential energy and conservation of energy, Linear momentum, Impuls and collisions, Rotation of a rigid body, Dynamics of rotational motion, Equilibrium and elasticity, Gravitation			

Course Code: CHE183	Course Title: General Chemistry			Semester: 1
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	This course teaches and examines the behavior of atoms and molecules and providing knowledge to students to forecast the behaviour of them in reactions.			
Course Content:	Knowledge of matter , structure of atom, sequence of electrons, periodic system, Chemical bonds and interactions, classification and atomicity, mole and equivalency concept, chemical laws, reactions, gases, solutions and concentration.			

Course Code: CAL183	Course Title: Mathematics I			Semester: 1
Lecture: 4	Practice: 0	Lab: 0	Credit: 4	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	This course aims at giving students the concept of sets, types of numbers, properties of one variable functions, meaning of limit, continuity and derivative over one variable functions. Explaining how the student use the derivative concept in engineering applications. Constructing the ability of solving maxima-minima problems. Giving the ability of solving engineering problems by using mathematics knowledge.			
Course Content:	This course covers, numbers, absolute value, inequalities, induction, coordinates. The concept of a function and function types. Some kinds of special functions and their domains. Limit and continuity of functions. Properties of continuous functions. The concept of the derivative. Rate of change, the mean value theorem and applications. Finding the maximum and minimum and their applications. Hyperbolic functions and derivatives, implicit and inverse functions and derivatives, parametric equations and their derivatives, and curve sketching. Polar coordinates.			

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE101	Course Title: Fundamentals of Railway Systems Engineering			Semester: 1
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:		Introducing the undergraduate students about history of railway systems engineering, sub-disciplines of railway systems engineering, skills necessary for a degree in railway systems engineering and curricula, and career opportunities in railway systems engineering.		
Course Content:		History of railway systems engineering, its areas of interest and its relationship with the other engineering disciplines. Sub-disciplines of railway systems engineering, design, materials, mechanical and thermal sciences. Emerging technologies and latest trends in railway systems engineering. Skills necessary for a degree in railway systems engineering and curricula. Typical railway systems engineering projects and problems. Engineering problem solving techniques and their applications to some problems. Importance of written, oral and electronic communications. Importance of creative thinking, problem solution, lifelong learning and team work. Library use, computer use, internet and other sources of information. Use of computers in railway systems engineering. Career opportunities in railway systems engineering. Professionalism and ethics. Technical and legal responsibilities of railway systems engineers. Current legislature. Professional societies. Engineering and industrial applications including side visits.		

Course Code: RSE105	Course Title: Computer Aided Technical Drawing I			Semester: 1
Lecture: 2	Practice: 2	Lab: 0	Credit: 3	ECTS: 6
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:		To learn the basic principles and equipments about technical drawing, to draw and read manufacturing drawing of a part and to perform the technical drawing in CAD media.		
Course Content:		Definitions and terms of technical drawing, technical drawing equipments, preparation of technical drawing sheets, standard fonts and heights of fonts, line types, properties and usage places of line types, drawing rules, geometrical drawings, inside and outside tangent drawings of lines with arcs, inside and outside tangent drawings of circles with each other; helical, ellipse, evolvment, cycloid, parabola and hyperbola drawings; scales, scales of enlargement and reduction, methods and planes of projection, views; auxiliary, special, rotated and local views; perspective views; isometric, cavalier, cabinet and bird's-eye projections; terms of rules dimensioning, sections and applications of sections, surface treatment symbols, surface quality, indication of surface conditions; definition of CAD system, operating CAD software, sample applications; learning line drawing on computer environment, arraying, conditional drawing, trimming; drawing circle and arc, adjusting view settings; drawing ellipse, polygon, polyline, spline, rectangular; moving, rearranging and scaling drawings; dimensioning, obtaining section view, hatching, texting, filleting, chamfering, extending, stretching, making block, replacing block, forming table and letterhead, calculating distance and area, view and zooming commands.		

2. Semester

Course Code: HST182	Course Title: Atatürk's Principles and History of Revolutions II			Semester: 2
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: This course provides the Turkish youth with consciousness about Atatürk's Principles and Revolutions and educates them in accordance with Kemalism.				
Course Content: Political Reforms, Legal Reforms, Educational and Cultural Reforms, Economic Reforms, Social Reforms, Atatürk's Principles, Atatürk's Foreign Policy, Turkey in the World War II, The concept of Jeopolitics and Jeopolitics of Turkey.				

Course Code: TRK182	Course Title: Turkish Language II			Semester: 2
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: This course aims at comprehending elements of sentences and their functions to form sentences; introducing and applying types of written and spoken expressions, differentiating and correcting the mistakes in language exercises; getting acquainted with the rules regarding the preparation of research articles; and developing students' writing and speaking skills via texts chosen from Turkish and World literature, and history of thought.				
Course Content: This course is designed to teach the definition of sentence and elements of sentence; sentence analysis and examples of sentence analysis; types of sentences; composition skills; planning of written composition; types of written and oral expression and examples; means of expression and brainstorming in forming paragraphs; ambiguities in sentences; and the rules employed in the conduction of research articles.				

Course Code: FOL182	Course Title: Foreign Language II			Semester: 2
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: The aim of this course is to improve the students' fluency and comprehension skills in the target language, to teach the students to use the grammar points correctly, to understand the passage they read and to make sentences using tenses and the other grammar items.				
Course Content: This course is designed to teach adjectives and adverbs, relative clauses, adverbial clauses, pronouns, nouns, quantifiers, articles, causatives, tag questions, prepositions.				

Course Code: CME182	Course Title: Computer Programming			Semester: 2
Lecture: 2	Practice: 2	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: This course teaches the fundamental concepts of programming, algorithm for the solution of a problem and writing programme for it.				

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Content:

Introduction to programming languages, Algorithm design and flow chart, Data types and variables, operators(arithmetic, relational, logical), control structure (if, while, for), User defined function, arrays and strings, pointers, recursion, searching algorithms, sorting algorithms, file operations

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Course Code: PHY186	Course Title: General Physics II			Semester: 2
Lecture: 4	Practice: 0	Lab: 0	Credit: 4	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The application of the electrical and magnetic interaction to static and mobile charges and the related fundamental laws and principles.			
Course Content:	Electric charge and electric fields, Gauss's law, Electric potential, Capacitance and dielectrics, Current, resistance and electromotive force, Direct-current circuits, Magnetic fields and magnetic forces, Source of the magnetic field, Electromagnetic induction and Faraday's law, Inductance, Alternating current, Electromagnetic waves			

Course Code: CAL186	Course Title: Mathematics II			Semester: 2
Lecture: 4	Practice: 0	Lab: 0	Credit: 4	ECTS: 4
Course Level: ASc - Associate of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	To make students competent in mathematical field in their work life. To be able to use mathematical concept in practice, to use mathematics for developing solutions.			
Course Content:	Functions, trigonometry, linear equation systems and matrices, limit and continuity, derivation, integral, differential equations, statistics.			

Course Code: CAL192	Course Title: Linear Algebra			Semester: 2
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The aim of this course is to introduce the concepts of matrices, determinant, vector spaces and inner products.			
Course Content:	Matrix Algebra, Elementary Row Operations on Matrices and Solution of Linear Equations, Special Types of Matrices, Elementary Matrices, Equivalent Matrices, nxn Determinants, properties of Determinants, Vector Spaces, Subspaces, Linear Independence, Basis and Dimension. Linear Transformation and matrix of a Linear Transformation, Eigenvalues and Eigenvectors, Diagonalization Inner Product Spaces			

Course Code: MCE102	Course Title: Statics			Semester: 2
Lecture: 4	Practice: 0	Lab: 0	Credit: 4	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The purpose of this course are to; 1-Introduce a clear understanding of the principles of rigid body mechanics 2-Teach the assumptions and idealizations 3-Give the knowledge about equilibrium and internal force concepts, related applications.			
Course Content:	Statics of particles: forces in plane, forces in space, equilibrium. Moment of a force, moment of a couple. Equivalent systems of forces on rigid bodies. Equilibrium in two dimensions. Equilibrium in three dimensions. Distributed forces: centroids and center of gravity. Analysis of structures: trusses, frames and machines. Internal forces in beams and cables. Friction. Moments of inertia of areas, moments of inertia of masses. Method of virtual work.			

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Course Code: MCE108	Course Title: Measurement Techniques			Semester: 2
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Purposes of this course is teach the measurement technique principles and give the measurement ability to students.			
Course Content:	The measurement and control. The measurement techniques. Measurement of the size, angle and area. Classic measuring and control devices. Caliper, micrometer, marking gauge, comparator, indicator, gage. Surface roughness. Hardness measurement techniques. Coordinate measuring. Measurement of vibration. Pressure, flow and temperature measuring. Energy productivity. Uncertainty analysis. Design and reporting of the experiments.			

Course Code: RSE106	Course Title: Computer Aided Technical Drawing II			Semester: 2
Lecture: 2	Practice: 2	Lab: 0	Credit: 3	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	To develop in students the capability to create technical drawing and 3D designing the single or multi machinery systems 3D on PC media, to make animation of 3D assembly models.			
Course Content:	Intruduction to assembly drawing, the basic principles of design in assembly modelling. Drawing the manufacturing drawing of machine part and assembly: assembly letterhead, surface texture symbols, dimensioning and geometric tolerances, create to 2D manufacturing drawing from 3D model. Standard machine elements (Screw, nut, bolt, washer, coupling, wedge, pulley, pin, pin, ring, bracelet, spring, gear wheel, bearing, etc.). Section views on assembly modelling and applicaitons. 3D solid modeling methods with a current 3D design software. User interface, tool bars, file save and copy, file delete, opening of multiple file and windows. View control. Solid feature modeling: Primitive features. Secondary features. Feature modify, feature processes. Parametric modelling. Create to work planes. Surface modeling, interactive surface modeling. Assembly, Assembly-Part processes. 3D Part and assembly modelling. Assembly animation, views, section views processes, dimensioning, surface texture symbols, size and geometric tolerances. Printing processes on technical drawing papers. Industrial design applications.			

3. Semester

Course Code: CAL283	Course Title: Differential Equations			Semester: 3
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The main aims of this course are provide the student general knowledge about the usage of natural language of mathematics as a toll for modeling, formulating and solving of engineering problems.			
Course Content:	Classification of differential equations, obtaining of differential equations, first order differential equations, higher order linear differential equations, Laplace transform.			

Course Code: MCE201	Course Title: Strength of Materials I			Semester: 3
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The purpose of this course are to;Introduce the basic principles of stress analysis and application of strenght theory by connecting the internal force and moment with the stresses on basic elements under simple loading conditions.			
Course Content:	Support types of structures and reaction forces, internal forces and section method; Introduction to Strength of Materials; Stress: Normal, shear and bearing stresses; Strain: Hooke's law and modulus of elasticity, Deflections of axially loaded bars, Strain measurement and strain gages; Stress transformations: Mohr circle; Failure theories; Stresses in thin-walled pressure vessels, Moments of areas: First moment of an area, Second moment of an area (Moment of inertia); Torsion; Pure bending; Beams under transverse loading: Internal shear force, normal force and bending moment in beams; Shear force and bending moment diagrams; Stresses in beams; Deflections of beams and elastic curve: Double integration method, superposition method, moment area method; Statically indeterminate beams.			

Course Code: MCE207	Course Title: Dynamics			Semester: 3
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The objectives of the lecture are to develop the capacity to predict the effects of force and motion. In lectures, different applications of engineering systems are solved in order that students understand subjects and apply his knowledge rapidly.			
Course Content:	Kinematics of particles; velocity and acceleration in rectangular, cylindrical, spherical and normal and tangential coordinates. Rectilinear motion. Relative motion. Kinetics of particles; Newton's law of motion. Equation of motion. Work. Impulse. Momentum. Principle of work and energy, principle of impulse and momentum. Angular momentum, angular impulse and momentum principle. Kinetics of systems of particles. Planar kinematics of rigid bodies, instantaneous center of rotation. Planar kinetics of rigid bodies. Three dimensional kinematics of rigid bodies. Three dimensional kinetics of rigid bodies.			

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: MCE219	Course Title: Manufacturing Processes I			Semester: 3
Lecture: 3	Practice: 1	Lab: 0	Credit: 4	ECTS: 5
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	To develop in students the capability to understand, analyze, design, and/or select the processes of metal casting, joining, bulk deformation, sheet metal, and plastic components for the production of metallic and polymer components. The focus will be on enabling students to understand the process technologies with particular emphasis on: – the identification of product defects; the safe design of forming tooling and the selection of forming equipment; the optimum and efficient use of materials and energy and the selection of appropriate manufacturing processes with particular emphasis on safety, both personal and environmental.			
Course Content:	Metal Casting Processes: Sand casting, Sand moulds, Type of patterns, Pattern materials, Pattern allowances, Types of Moulding sand, Properties, Core making, Methods of Sand testing, Moulding machines, Melting furnaces, investment casting, Ceramic mould, Lost Wax process, Pressure die casting, Centrifugal casting. Joining Processes: Fusion welding processes, Types of Gas welding, Arc welding equipments, Electrodes, Coating and specifications, Principles of Resistance welding, Spot/butt, TIG welding, Weld defects, Brazing, Soldering process. Bulk Deformation Processes: Hot working and cold working of metals, Forging processes, Typical forging operations, Rolling of metals, Types of Rolling mills, Flat strip rolling, Shape rolling operations, Defects in rolled parts, Principle of rod and wire drawing, Tube drawing, Principles of Extrusion, Types of Extrusion, Hot and Cold extrusion. Sheet Metal Processes: Sheet metal characteristics, Typical shearing operations, Bending, Drawing operations, Stretch forming operations, Formability of sheet metal, Hydro forming, Rubber pad forming, Metal spinning, Introduction to Explosive forming. Manufacturing of Plastic Components: Types of plastics, Characteristics of the forming and shaping processes, Moulding of Thermoplastics, Working principles and typical applications of Injection moulding, Plunger and screw machines, Compression moulding, Transfer moulding, Blow moulding, Rotational moulding, Film blowing, Extrusion, Thermoforming, Bonding of Thermoplastics.			

Course Code: MKM221	Course Title: Thermodynamics I			Semester: 3
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	1. To teach basic principles of classical thermodynamics. 2. To give basic concepts of thermal system design based on first law. 3. To introduce basic principles of energy conversion.			
Course Content:	Basic concepts and definitions: System, boundary, surrounding, property, equilibrium, state and process, cycle. Properties of a pure substance. Equations of state, the state for ideal gas, specific heat. Energy (by heat and work) interactions between system and surrounding. Closed and open systems. First law of thermodynamics. Internal energy and enthalpy. Second law of thermodynamics, reversibility and irreversibility, Carnot cycle.			

Course Code: MME261	Course Title: Materials Science			Semester: 3
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	1. Teach the general purpose of the Materials Science. 2. Teach atomic structure of materials. 3. Explain the general physical properties of materials. 4. Establish the relationship between the product's features with the atomic structure of materials. 5. Classify advanced technological materials, to teach their usage fields. 6. Demonstrate the required important points for their usage areas and manufacturing, quality and the structure of the functional materials in engineering field is aimed.			

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Course Content:

Classification of materials, metals, semiconductors, plastics, ceramics, composites, metals and alloys, Crystal structure and defects, Types of chemical bonding, energy levels and band structures, Solid solutions, atomic diffusion, Phase transformations and phase diagrams, Ferro alloys, iron and steel production, Non-ferrous alloys, Polymers, Ceramics, Semiconductors, Composites, Mechanical properties of materials, Thermal and electrical properties of materials, Material characterization methods, the selection of high quality materials.

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Course Code: RSE203	Course Title: Electrical-Electronics of Railway Systems			Semester: 3
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The objective of this course is to introduce the basic electrical definitions and electrical measurement instruments, basic electrical laws and circuit analysis, circuit components and to gain the practicing abilities of the circuits.			
Course Content:	Fundamentals of electricity . Electrical and electronic components. Measuring instruments. Direct current circuits. Circuit analysis. Electronic circuit applications.			

Course Code: FOL281	Course Title: Technical Foreign Language I			Semester: 3
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	This course teaches engineering terminology in English and develops text comprehension, writing, reading and listening skills			
Course Content:	The Concept and Basic definitions of science, technology, engineering, engineer. History of engineering. The methodology of engineering work The concept and steps of scientific method. The concept and steps of engineering design process. Problem solving techniques in engineering. Seven steps to problem solving in engineering. Fields of engineering: Aerospace Engineering,Biological Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, Engineering Science, Financial Engineering,Industrial Engineering, Meterial Engineering, Mechanical Engineering,Military Engineering, Nuclear Engineering, Ocean Engineering,Petroleum Engineering, Reverse Engineering, Geoengineering,Textile Engineering, Safety Engineering			

4. Semester

Course Code: MCE202	Course Title: Engineering Materials			Semester: 4
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: To give students the background required to pursue further studies in materials processing, design and related engineering fields. To develop an understanding of the differences between engineering materials through the application of laboratory experiments to determine their physical and mechanical behavior.				
Course Content: Classification of engineering materials. Iron and steel production. Types and use of steel and cast iron. Heat treatment of metals and alloys. Non-ferrous metals and alloys and their use in engineering applications. Types, properties, principal uses and manufacturing techniques of ceramics, polymers and composite materials. Failure of materials. Nondestructive testing of materials. Materials selection in engineering design.				

Course Code: MCE212	Course Title: Mechanisms			Semester: 4
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: Teaching preliminary concepts of mechanisms, methods of analysis for the transmission of motion in mechanisms, kinematics of cam and gear mechanisms.				
Course Content: Position analysis of mechanisms, Instant centers of rotation, Velocity analysis of mechanisms, Acceleration analysis of mechanisms, Gear Mechanisms, Cam Mechanisms				

Course Code: MCE216	Course Title: Manufacturing Processes II			Semester: 4
Lecture: 3	Practice: 1	Lab: 0	Credit: 4	ECTS: 5
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: To develop in students the capability to understand cutting theory and analyze, design, and/or select the processes of material removing processes of turning, shaping, milling, drilling, grinding, discharging. To understand CNC machining and programming aspect for the production of components. The focus will be on enabling students to understand the process technologies with particular emphasis on: – the identification of product defects; the safe design of forming tooling and the selection of forming equipment; the optimum and efficient use of materials and energy and the selection of appropriate manufacturing processes with particular emphasis on safety, both personal and environmental.				
Course Content: Introduction to material removal processes. Types of machine tools. Theory of metal cutting. Chip formation, Orthogonal cutting. Cutting tool materials. Tool wear, Tool life. Surface finish. Cutting fluids. Universal lathe. Cutting tool geometry. Various operations: Taper turning, Thread cutting, Special attachments. Machining time and power estimation. Turret lathes, Automats, Automatic screw type, Turret Indexing mechanism, Bar feed mechanism. Reciprocating machine tools: shaper, planer and slotter. Milling: types, milling cutters, operations. Hole making: Drilling, reaming, boring, tapping. Sawing machine: Hack saw, band saw, circular saw. Broaching machines: Broach construction, Push, pull, surface and continuous broaching machines. Abrasive processes, Grinding wheel, Specifications and selection, Types of grinding process. Cylindrical grinding. Surface grinding. Centreless grinding. Honing, lapping, super finishing, polishing and buffing. Abrasive jet machining. Electro Discharge Machining. Theory of discharging. Parameters. Wire Electro Discharge Machining. CNC machine tools and types, constructional details. Design considerations of CNC machines for improving machining accuracy. Structural members, Slide ways, Linear bearings, Ball screws, Spindle drives and feed drives. Part programming fundamentals, Manual programming, Computer assisted part programming. Safety measures about the processes.				

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Course Code: MCE218	Course Title: Thermodynamics II			Semester: 4
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: 1- To teach basic terms related second law such as energy quality, entropy and exergy. 2- To give second law analysis. 3- To introduce application of thermodynamic laws to power and refrigeration cycles. basic principles of energy conversion.				
Course Content: Clausius inequality and definition of entropy, Principle of the increase of entropy, Entropy balance for closed and open systems. Adiabatic efficiencies. Entropy change of pure substances, liquids and solids, ideal gases. Exergy, second law analizi. Gas power cycle (Otto, Diesel, Stirling, Ericsson, Brayton), Vapor power cycle (Rankine), Cogeneration, binary vapor cycle, combined gas-vapor power cycle. Refrigeration cycles (vapor –compression, gas, absorption, and thermoelectric), heat pumps.				

Course Code: MKM220	Course Title: Strength of Materials II			Semester: 4
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: The purpose of this course are to;Introduce the transverse shear and combined loads 2-Teach the stress and strain transformation, express to design and deflection of beams and shafts, bucling of column				
Course Content: Stress transformations: Mohr circle; Failure theories; Stresses in thin-walled pressure vessels, Moments of areas: First moment of an area, Second moment of an area (Moment of inertia); Torsion; Pure bending; Beams under transverse loading: Internal shear force, normal force and bending moment in beams; Shear force and bending moment diagrams; Stresses in beams; Deflections of beams and elastic curve: Double integration method, superposition method, moment area method; Statically indeterminate beams.				

Course Code: MCE260	Course Title: Mechanical Vibrations			Semester: 4
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: To present the basic characteristics of vibrations and their place and importance in the mechanical engineering applications.To teach and to apply the methods using analysis of engineering problems including vibrations.				
Course Content: Basic concepts. Degree of freedom systems: Equations of motion, damped and undamped vibrations, free and forced vibrations, the system response to forcing. Vibration isolation. Two degree-of-freedom systems: Equations of motion, coordinate transformation, natural coordinates, vibration modes. Torsional vibrations. Introduction to multi degree-of-freedom systems.				

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE204	Course Title: Dynamics of Railway Systems			Semester: 4
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 5
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: The aim of this course is to teach the student rail vehicles' dynamics and rail-track interactions.				
Course Content: Rail vehicle dynamics and interaction between vehicle and track, The track and the vehicle (in brief), Fundamentals of vehicle-track interaction, Some simple vehicle models and pertinent equations of motion, Eigenvalue analysis, transfer functions and other types of analysis, Models of wheel sets, bogie frames and car bodies, Creep (sliding), creep forces (friction forces), ride stability and curve negotiation, Track forces. Safety against derailment: wheel flange climbing, vehicle turnover, rail turnover, Wheel and rail wear, Ride comfort, Vehicle gauging, Examples on different vehicles' dynamic interaction with the track, Simulation and measurement in practice, Exercises. Assignments. Project task (computer work): simulation of dynamic interaction between rail vehicle and track.				

Course Code: FOL282	Course Title: Technical Foreign Language II			Semester: 4
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: In global world ,it is too important following developed technology and new acedemic studies.By this lecture, the students can learn technical English and this enables to beter understand of acedemic issue or new design techonology. Furthermore , their translation and communication skills can improve by this way.				
Course Content: Basic technical terms of industrial engineering, systems engineering, operations research, computer engineering, hardware and network software engineering, metallurgical engineering, iron and steel casting, ceramic engineering, mechanical engineering, mechatronics and mechanic,electrical engineering, automotive engineering in English				

5. Semester

Course Code: RSE399	Course Title: Industrial Practice I			Semester: 5
Lecture: 0	Practice: 0	Lab: 0	Credit: 0	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: Students recognize factories and learn factory production processes, so they gain practical information.				
Course Content: Students are required to make a summer internship for at least four weeks (twenty-four working days) in a suitable workshop plant. Students can make engineering measurements, machining, foundry work, metal forming, welding, non-traditional machining, heat treatment, excellence and so on. applications, such as manufacturing processes. Report on the work done by the student should be prepared.				

Course Code: MCE301	Course Title: Fluid Mechanics I			Semester: 5
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: This course introduces the student to knowledge of the the basic concepts of fluid mechanics and the basic equations of hydrostatic.				
Course Content: Basic concepts and definitions. Fluid statics. Manometers and pressure measurements. Hydrostatic forces on immersed bodies. Forces on immersed and floating bodies.Fluid as Rijid body translation and rotation.				

Course Code: MCE307	Course Title: Dynamics of Machinery			Semester: 5
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: Teaching basic concepts of mechanisms, methods of analysis for the motion and force transmission in mechanisms, fundamentals of vibrations and principles of balancing of machinery.				
Course Content: Kinematic analysis of simple mechanisms,Force analysis of linked mechanisms,Force analysis of gear mechanisms,Force analysis of cam mechanisms,Mechanical vibration,Balancing: Balancing of rotating and reciprotating masses,Balancing line engine				

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: MCE325	Course Title: Machine Elements I			Semester: 5
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: 1. To introduce the analysis phase and machine elements in mechanical design. 2. To develop mathematical models for functional analysis and stress calculation of machine elements by using engineering sciences. By using the available experimental models determine the input and output values of the machine system elements. 3. To use the standards and design criteria. 4. To improve the goal recognition, creativity and intuition and also to enable the students to gain experience in machine design. 5. To provide the necessary knowledge and capability for task specification, concept formation and synthesis phases of the machine design. To develop the further stages of the machine design; manufacturing of prototypes, testing and marketing.				
Course Content: Mechanical engineering design activity and importance of machine elements knowledge in this activity. Fundamentals of design and applications of machine elements. Welded, soldered, adhesive bonded, riveted joints. Shaft-hub connections. Bolted joints and power screw mechanisms. Pins, knuckles, springs, shafts and axles, coupling and clutches, lubricants and lubrication theory, sliding and rolling bearings, Fundamentals of speed reduction mechanisms, kinematics and geometry of gearsbelt drive and chain mechanisms.				

Course Code: RSE311	Course Title: Design of Bogie and Suspension Systems			Semester: 5
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: The aim of this course is introducing to student different types of bogie and suspension systems and teaching to their design procedures				
Course Content: Main Functions of the Running Gear and Terminology, Bogie Components, Common Passenger Vehicle Bogie Designs, Common Freight Wagon Bogie Designs, Common Tram Bogie Designs, Principles of Selecting Suspension Parameters, Advanced Bogie Designs, Suspension Design Concepts and Optimisation, Basics of Active Suspensions, Tilting Trains, Active Secondary Suspension, Active Primary Suspensions, Modelling Vehicle-Track Interaction, Simulation Methods, Computer Simulation, Dynamics in Railway Vehicle Engineering				

Course Code: RSE313	Course Title: Mechanics of Rail Vehicle			Semester: 5
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: Learning about details of vehicle statics, dynamics and parameters about behavior of the vehicle. Comprehending the resistance forces during the motion of the vehicles and the required performance criteria to overcome these forces.				
Course Content: Evaluation of mechanical phenomena encountered on rail vehicles. Resistance of motion. The rail vehicle mechanics. Brake mechanics.				

Course Code: FOL381	Course Title: Speaking and Reading Tech. At Foreign Language			Semester: 5
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: This course is aimed to improve speaking skill of English in both academic and social environment, to have effective communication skill, to provide proficiency in using English.				

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Content:

The weighted subject is speaking skill. The contents of lecture are ; source searching in web, academic presentation about occupational subject, group and team studies, acting, speaking , communication etc.

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: SOC301	Course Title: Education of Values			Semester: 5
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Value education and the basic concepts of the framework and requirements and importance of value education in educational institutions, examination of the world and Turkey values education studies.			
Course Content:	Concepts of value and basic concepts of values education. Sociological, psychological and philosophical values. Value types and properties of values.			

Course Code: ESC301	Course Title: Labour Law			Semester: 5
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	To teach the basic concepts of labor law and employee-employer rights, basic properties of syndicates.			
Course Content:	Individual Labour law: Concept of Labour Law, Sections of labour law, sources of labour law, Basics of labour law: employee, employer relationships, workplace, plant, Labor contracts and kinds, labour contracts making			

Course Code: ESC303	Course Title: Patent and Industrial Design			Semester: 5
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	This course explores intellectual property rights, patent application for the industrial design and its examination, rights derived from industrial patents, protection of the rights of designer and patent owners, and international agreements. This course is to train student's capacity in the thinking, method, and skill in industrial design. It is expected that the students will be able to understand and grasp the logic of design process for industrial artefacts.			
Course Content:	Introduction to intellectual property rights, Product design and development, Industrial design, General provisions, Patent application for the industrial design and its examination. Industrial design patent, Rights derived from industrial patents, Industrial design use, Protection of the rights of designer and patent owners, International agreements, Examination of sample patents, Preparation of a sample patent.			

Course Code: ESC305	Course Title: Entrepreneurship			Semester: 5
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	To introduce set-up and development as well as knowledge of entrepreneurship on the historical and society level. The course offers students a good arena to understand what entrepreneurship is and if it is something for them.			
Course Content:	The course introduces the students to the preceding and early phases of an enterprise. It provides the students with basic ideas about entrepreneurial orientation, opportunity recognition			

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: ESC307	Course Title: Communication Skills			Semester: 5
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	To teach base business concepts of behavioral sciences and relationships between individual, environment individuality, culture, attitude.			
Course Content:	Historical development of behavioral sciences, Scientific methods of social psychology, Research techniques of social psychology, Individual and its environment, Individuality-character relationship.			

Course Code: MSD309	Course Title: International Communication			Semester: 5
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The aim of this lecture is to educate students how to communicate in the conditions of globalizing world.			
Course Content:	Definiton of international communication, Purpose and Progress of International communication, a short history of international communication. Relationship between international communication to basic definitions such as economy, culture, politics. The relevance of the communication process with the process of globalization, international, technology, raw material, organization, and the transfer of the law.			

Course Code: ESC311	Course Title: Critical Analytic Thinking Techniques			Semester: 5
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The aim of this lecture is to educate student to think in a critical way.			
Course Content:	Definitions, brain as the thinking organ, Grouping thinking, optional thinking and properties, Critical and Analytical thinking.			

Course Code: RSE305	Course Title: Heat Transfer			Semester: 5
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	This course is designed to teach students fundamentals of conduction, convection and radiation heat transfer. Students are informed about the analysys and solution of basic heat transfer problems with analitical solution techniques, practical tables and charts given.			
Course Content:	General laws of heat transfer, steady one-dimensional heat conduction, differential equation of heat conduction, unsteady heat conduction, an overview of the convective heat transfer.			

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE315	Course Title: Hydraulics and Pneumatics			Semester: 5
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Students learn the elements of hydraulic and pneumatic circuits and can design hydraulic and pneumatic systems			
Course Content:	Introduction to hydraulics and pneumatics; Principles of power hydraulics and pneumatics; Hydraulic and pneumatic fluids; Hydraulic and pneumatic piping and sealing; Hydraulic and pneumatic actuators; Directional control valves; Servo valves; Pressure control; Hydraulic pumps; Hydraulic symbols; Hydraulic circuits and symbolic presentation; Pneumatic system elements and symbols; Pneumatic circuits design; Applications of hydraulic and pneumatic system			

Course Code: RSE317	Course Title: Plumbing Systems and Design			Semester: 5
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	To present plumbing systems and to teach its necessary design and sizing.			
Course Content:	What is plumbing? The importance of systems, City water, the shapes, the application states, Indoor and outdoor installation, Indoor plumbing and partitions, Pressurization systems, air pressure tanks, Water tanks, Water softening systems, Clean water supply, Wet places in the building structure and organization of information, Plumbing materials and end materials, Waste water installations inside buildings, partitions, Rain water and fire fighting equipment, Clean and dirty water pipe diameter of the accounts, Clean and dirty water pipe diameter of the accounts.			

Course Code: RSE321	Course Title: Automatic Transmission			Semester: 5
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Purpose of this course is to advance knowledge the students about automatic transmissions			
Course Content:	Hydraulic friction clutch, torque converters, planet gear systems, mechanical circuit of automatic transmissions, calculation of gear ratios, hydraulic circuits, electrical and mechanical control circuits, operation principles of circuits, application examples			

Course Code: RSE331	Course Title: Vehicle Damage Analysis			Semester: 5
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The aim of this course is to teach the mechanics of car damage using the basic numerical methods, impulse, momentum and energy principles.			
Course Content:	Impact and kinematics characteristics of the impact, the impact estimated by the method of winding, the main effect and drive model, numerical methods, the estimated response, impulse, momentum and energy of the impact, significance and re-construction.			

6. Semester

Course Code: MCE304	Course Title: Fluid Mechanics II			Semester: 6
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	This course introduces the student to knowledge of the the basic concepts of fluid mechanics conservation laws and the basic equations of hydrodynamics.			
Course Content:	Introduction to differential analysis of fluid motion.Continuity, momentum and energy equations. Incompressible viscous flow. Dimensional analysis and similarity. Incompressible viscous flow, Navier-Stokes equations. Laminar and turbulent boundary layer flow. Flow around immersed bodies. Introduction to compressible flow.			

Course Code: MCE316	Course Title: Computer Aided Design I			Semester: 6
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Solid model used to create computer-aided, are primitive (lines, arcs, circles, rectangles, surfaces, etc..) And create solid models. Free-surface model development. Industrial and engineering products to modeling. Part of creating a model able to make appropriate beginning. Assembly can make. And construction techniques to create images.			
Course Content:	3D solid modeling design software with a current 3D methods. The Software User Interface, Toolbars, File Storage and Backup Creating, Deleting Files, Multiple Files and Window Opening Session, apparently Control, Appearance Mode, Mouse Gestures for Object Orientation Process. Solid Modeling Elements: Home Elements, Secondary Elements. Correction factors, Element Operations. Surface Modeling, Interactive Surface Design. Assembly, Assembly-Track Operations. Drawing (Technical Drawing), measurement classification, Surface Roughness, Size and Geometric Tolerance signs, Drawing File Creation. Industrial Applications.			

Course Code: MCE330	Course Title: Machine Elements II			Semester: 6
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	To teach the sizing, strength calculations and design of machine elements encountered in engineering applications.			
Course Content:	Spur Gears, Helical Gears, Cone Gears, Shaft, Spiles, Cotter Pin, Coupling, Break and Flywheel, Belt and Chain Connections			

Course Code: RSM302	Course Title: Railway System Engineering Laboratory			Semester: 6
Lecture: 1	Practice: 1	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: Turkish	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	In order to provide the students make experiments for system parameters by designing the experiment setup, installing and calibrating.			

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Course Content:

Enabling students to make experiments on “thermodynamics” and “energy” areas of mechanical engineering. Given the basic mechanical engineering subjects, student groups will design of the experiment setup, installation and calibration and make experiments for specified system parameters. Detailed reports will be prepared and presented for each experimental study.

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE312	Course Title: Design of Locomotive and Wagon			Semester: 6
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: Aim of this course teaching different types of locomotives and wagons also explaining design procedures of locomotives and wagons				
Course Content: Introduction to General Electric Transportation, GE Location of Equipment, GE Locomotive Trucks, Electro Motive Diesel Introduction, EMD Location of Equipment, EMD Locomotive Trucks, Motivepower Locomotive Models, Railpower Locomotive Models, Alstom Locomotive Models, Electric Passenger Locomotive Models, design steps of the locomotive designs, types of freight wagon, types of passenger wagon, design steps of wagon. Analysis steps of wagon and locomotives in PC media				

Course Code: FOL382	Course Title: Foreign Language for Business			Semester: 6
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: The aim of this course is to teach Business English to students.				
Course Content: Job application to various institutions and companies, project application, writing articles to establish commercial relations, job interviews with companies, talking on the phone, Working in English-dominated work environment, preparation of documents such as the application, request, response , report forms etc.				

Course Code: ESC302	Course Title: Research and Presentation Skills			Semester: 6
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: The aim of this course is to teach scientific research and analyzing techniques and to teach the use of obtaining data and presentation of obtaining data.				
Course Content: Scientific research and analysis techniques. Data collecting and data analysis according to scientific research techniques. Reporting the results of researchs according to report writing techniques. Presentation of research subjects. The use of presentation equipments and technologies.				

Course Code: ESC304	Course Title: Human Resources Management			Semester: 6
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: It is aimed that students have recognition of principles like conditionality, being scientific and being historical while evaluating cases and problems. •It is aimed that students have ability to function on a project as a team member or leader. •Improving the ability of oral and written communication. •It is aimed that students have recognition of universal values like reconciliation, change and sharing. •It is aimed that students have ability to analyze, explain and solve the problems				
Course Content: Personnel management, definitions and scope. Relationship with other sciences. Personnel problems and solutions. Personnel control. Human resources (internal resourcing and outsourcing). Work load analysis. Workforce analysis. Personnel evaluation methods. Personnel education and development. Work evaluation techniques. Wage systems. Motivation. Leadership. Complaint mechanism. Communication. Discipline. Health and protection.				

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: ESC306	Course Title: Management Systems			Semester: 6
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: To teach scientific knowledge and abilities for managing production and service systems				
Course Content: Definition of management. Historical development of management concept. Definition, and types of organization. Organization charts. Management of information, learning, culture, structure, continuity, power and politics in organizations. Management ethics. Gender and management. Management functions (planning, organising, carrying out, coordination, auditing). New management techniques. Management with objectives. Management according to exceptions. Quality control chambers. Benchmarking. Management of change. Strategic management. Relationships between organizations.				

Course Code: MSD308	Course Title: Occupational Health and Safety			Semester: 6
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: The aim of this course is to introduce importance of work safety and healthy and to emphasize work safety and healthy in terms of employee and employer.				
Course Content: Basic concepts of occupational safety and health. Basic working areas of ergonomics. Reasons of work accidents. Avoidance models. Calculation of costs. Investigation and reporting. Occupational illness, its types and avoidance methods. Occupational safety methods at workshop and laboratories. Personal and machine protective equipments. Fire and explosion prevention methods. Principles and objectives of first aid. ISG legislation.				

Course Code: ESC310	Course Title: Corporate Behavior			Semester: 6
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: The aim of this course is to introduce technical and humanistic aspects of industrial R&D and R&D management and to explain importance of technology, impacts of technology and permanent development of technology.				
Course Content: Configuration of technology and industry. Advantages of technology and competition. Technologic options, strategies and analytic tools. Partnerships and strategic agreements. Technology and structure. Technology and process. Technology and culture. Technology and total quality. Technology transfers. R&D management. R&D productivity. National politics and R&D. Technoparks and innovational organizations. University-industry R&D association. Patents and legal regulations. R&D trends.				

Course Code: ESC312	Course Title: Standardization			Semester: 6
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: To teach the principles and practices of standardization in national and international areas.				
Course Content: Principles of standardization, standardization in Turkey, International Trade Relations for Standardization, Application of Standards which is compulsory in Turkey				

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Course Code: RSE308	Course Title: Economy of Transportation Technology			Semester: 6
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 6
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Vehicle Technology provides a practically based university education with special focus on design, calculation, testing and proving, measurement techniques, acoustics, vehicle construction, customer service, etc. In addition to their technological and scientific education, students also obtain social skills and an understanding of the economic and legal aspects of the industry as well as the relevance of environmental factors.			
Course Content:	The emphasis of the course is on the analysis and evaluation of the performance of road vehicles. Introduction to vehicle dynamics, tires and their mechanics, drive train model, breaking stability, steering of vehicles, suspension kinematics and vehicle ride models. For students to understand the system vehicle and other comparably complex systems as a unified whole and with reference to ecological factors, the interaction between the automotive industry, suppliers and customers and all related			

Course Code: RSE310	Course Title: System Dynamics and Controls			Semester: 6
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 6
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	In order to give the students knowledge about the fundamentals of classical control systems.			
Course Content:	Transfer functions and block diagrams. Basic concepts of automatic control. Control actions. Time response. Stability and Routh-Hurwitz criterion. Root locus. Frequency response methods and Bode diagrams.			

Course Code: RSE314	Course Title: Cooling Technology			Semester: 6
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 6
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	This course teaches basic principles of refrigeration, methods of refrigeration and properties of refrigerants and refrigeration system components.			
Course Content:	Cooling methods, mechanical refrigeration systems, refrigeration system elements, refrigerants and oils, household-type coolers.			

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Course Code: RSE328	Course Title: CNC Machine Programming			Semester: 6
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 6
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: Aim of this course; 1-To introduce CNC machine tools, building components and teach the working principles. 2-CNC lathes and milling machines manual programming skills.				
Course Content: CNC machining and their advantages, CNC vertical milling machines and CNC lathes. Programming on CNC milling machines. Technological and geometrical information for programming. Operating and programming on cnc turning machines. Selecting proper cutting tools and Ideal machining parameters and conditions for cutting tools. General safety rules and principles of clamping and fixing workpieces on the machine table. Absolute and incremental dimensioning, M and G codes, linear and circular interpolation, counturing, milling and turning cycle programming. Control panels and their functions, tool magazines. Practice of programming methods on the CNC machines. Practical work and practicing and using these programming methods on the machines. Peck drilling, thread cutting. etc .. operations and other machining cycles.				

Course Code: RSE360	Course Title: Heating Technology			Semester: 6
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 6
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: To teach applications of heating system and tools used in the heating systems.				
Course Content: Importance of heating and heaters, heating systems, local and central heating systems, efficient of boiler, boiler montage rules, piping, chimneys, dilating tanks, hot water heating systems, function of pumps, maintenance of pumps, floor heating systems, high temperature water heating systems.				

7. Semester

Course Code: RSE403	Course Title: Graduation Project I			Semester: 7
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: The aim of this course is to make the project students who wish to specialize in one area, individually or in groups, from the perspective of a scientific theoretical and / or practical and to teach project preparation, presentation, prepare for working life.				
Course Content: Project topic selection, team work, a machine, a system or a process design, project preparation, implementation, completion of all the stages.				

Course Code: RSE405	Course Title: Signalization			Semester: 7
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: In order to gain the students knowledge and technique about rail signaling systems that are being used.				
Course Content: Logic and knowledge of signaling, techniques and equipment used for signaling, signaling types and applications.				

Course Code: RSE435	Course Title: Computer Aided Manufacturing			Semester: 7
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: Aims of the this course is; teach the necessary machining operations using CAM programme for turning and milling parts. make the toolpath of cutting tools on turning and milling. teach convert the toolpath to NC code. choose the available cutting tool and machine.				
Course Content: Manufacturing model creation by any type of CAD part format. Operation step organizing for special machine center. Tool and fixture setting CNC manufacturing for specific 3d model. Milling, drilling and turning operations. Cutter location data creation, inspection, simulation and post processing.				

Course Code: RSE437	Course Title: Welding Technology			Semester: 7
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: To understand welding effects on components which constitute the structure in all engineering structures using welded connection, to choose welding method in welded works, to know destruction which welding may cause to material, to know testing methods.				
Course Content: Welding types, welding capability, distortions which may occur at welded parts, comparison of welding methods, metallurgical structure in weld, occupational safety in welding techniques.				

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE499	Course Title: Industrial Practice II			Semester: 7
Lecture: 0	Practice: 0	Lab: 0	Credit: 0	ECTS: 4
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: Students recognize factories and learn factory production processes, so they gain practical information.				
Course Content: Students are required to make a summer internship for at least four weeks (twenty-four working days) in a suitable workshop plant. Students can make engineering measurements, machining, foundry work, metal forming, welding, non-traditional machining, heat treatment, excellence and so on. applications, such as manufacturing processes. Report on the work done by the student should be prepared.				

Course Code: RSE407	Course Title: Design of Vehicle Body and Materials			Semester: 7
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 8
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: The purposes of this course are to teach the today's manufacturing technology in need of railway system engineers and have the ability to use computer-aided systems.				
Course Content: Concepts in vehicle body design and material selection. Conditions of vehicle development, schedules. Design for bending, torsion, and vibration. Style and ergonomics. Fundamentals of crash mechanics, accident analysis and re-construction. Active and passive safety systems. Topology, material selection, composite materials, packaging and manufacturing constraints. 3-D modeling and finite element analysis.				

Course Code: RSE409	Course Title: High Speed Railway Systems			Semester: 7
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 8
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: This course is intended for current railway practitioners and provides a specialized railway training focusing on the main specifics of high-speed rail lines, transmitting the current state-of-the-art and the experience acquired from the most relevant European practice. The course addresses planning, design and maintenance of the main infrastructure sub-systems (track, switches, substructure, bridges, signalling, catenary, electrification, stations) with the participation of recognized European experts from the different fields				
Course Content: 1) Ballasted and Ballastless Track 2) Infrastructure and Installations 3) Maintenance of High-Speed Rail Infrastructure 4) Planning and Management of High-Speed Rail Systems				

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE411	Course Title: Railways Traffic Control			Semester: 7
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 8
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The aims of the course is to teach students the concepts related to railways traffic control and traffic management systems.			
Course Content:	Definitions of persons, facilities and units directly related to the traffic in railroad systems, Types of information transmitting about trains to the railway staffs and passengers, Manoeuvres, Railroad traffic management systems.			

Course Code: RSE413	Course Title: Tribology			Semester: 7
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 8
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The course aims at introducing students to the tribology and its componenets, and enabling them to use these in the designing, manufacturing and management phases.			
Course Content:	Surface physics in tribology. Surface roughness analysis and measurement techniques. Contact between solid surfaces. Adhesion of solids. Friction and friction mechanisms. Wear and wear mechanisms. Lubrication and lubricants			

Course Code: RSE415	Course Title: Optimization Technique			Semester: 7
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 8
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Establishment of mathematical models providing optimal decision-making, showing of application fields encountered in real life and implementation of solution methods			
Course Content:	Classical Optimization Techniques, Linear Programming, Nonlinear Programming, Dynamic Programming			

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE419	Course Title: Urban Rail Transportation Systems			Semester: 7
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 8
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: In order to give students information about transport planning, railway systems used in urban.				
Course Content: Urban Railway Systems and their characteristics, frequency of use and preferred criteria according to the fields, bus stops and departure time optimization. Measures and improvements that need to be done around the rail system lines.				

Course Code: RSE421	Course Title: Finite Element Method on Railway Systems			Semester: 7
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 8
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: Giving the railway engineering students the ability on how to solve problems commonly encountered in engineering applications by discretization				
Course Content: Setup of equation systems, Stiffness matrix, Boundary conditions, Minimum potential energy, Plane stress and strain relations, Body and surface forces, three dimensional stress analysis, Heat and mass transfer applications: One, two, and three dimensional problems				

Course Code: RSE423	Course Title: Composite Materials of Railway Systems			Semester: 7
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 8
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: To give information about the definition, importance, application and production methods of composite materials.				
Course Content: General definitions and classification of the composite materials. Analysing of micromechanical and macromechanical behavior of the composite materials. Applications of the composite materials. Reinforcements in a composite materials. Reinforcements-matrix interface and wetting. Processing of metal matrix composites, ceramic matrix composites and polymer matrix composites. Some commercial metal matrix composites, ceramic matrix composites and polymer matrix composites.				

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE425	Course Title: Computer Aided Design II			Semester: 7
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 8
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	This course introduces extended CAD applications. Emphasis is placed upon intermediate applications of CAD skills. Upon completion, students should be able to use extended CAD applications to generate and manage drawings.			
Course Content:	Introduction to Computer-aided design. The benefits of solid modeling. Two-dimensional design. Katiya conversion. Track details of creation. Creating a large number of tracks. Assembly. Image subtraction. Surface modeling techniques.			

Course Code: RSE427	Course Title: Computer Applications in Construction			Semester: 7
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 8
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The aim of this course is teaching to student computer based mechanical construction techniques and technologies			
Course Content:	Design Theory – Statics and Strength of Materials, Analysis and Design of Mechanical Construction Systems, Construction Methods and Materials, Construction Graphics, Estimating Methods, Planning and Scheduling, Safety			

Course Code: RSE429	Course Title: Ergonomic Product Design			Semester: 7
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 8
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Aim of this course to teach effect of the human factors on the mechanical design.			
Course Content:	Human Factors And Systems, Human Factors Research Methodologies, Human Output And Control, Workplace Design, Environmental Conditions, Human Errors, Accidents And Safety, Human Factors And The Automobile, Human Factors In Systems Design			

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE431	Course Title: Kinematic Synthesis			Semester: 7
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 8
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Mekanizma tasarım tekniklerini anlamak için yeterli derecede teorik ön bilgiyi vermek ve uygulamadaki mekanizma tasarımı problemlerini tanıtmak.			
Course Content:	Introduction to kinematic synthesis. Basic bar mechanism design: Grashof Theorem, the optimum connecting angle, arm-pendulum and Slider-Crank mechanism. Two, three and four position synthesis: graphical and analytical methods, modeling with complex numbers, applications of Freudenstein equation. Correlation of arm angle. Current practices.			

Course Code: RSE433	Course Title: Computational Methods in Mechanical Engineering			Semester: 7
Lecture: 2	Practice: 1	Lab: 0	Credit: 2	ECTS: 8
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	To teach the basic numerical methods used in solving engineering problems, to gain the skill of implementation of numeric methods and to improve the ability of computer-use.			
Course Content:	Error analysis, Solving sets of linear equations and the equation, Solving sets of nonlinear equations , interpolation, Numerical differentiation, numerical integration, numerical solution of ordinary differential equations.			

8. Semester

Course Code: RSE400	Course Title: Graduation Thesis			Semester: 8
Lecture: 0	Practice: 2	Lab: 0	Credit: 1	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: The aim of the thesis is to make the thesis students who wish to specialize in one area, individually or in groups, from the perspective of a scientific theoretical and / or practical and to teach thesis preparation, presentation, prepare for working life.				
Course Content: Graduation thesis topic selection, team work, a machine, a system or a process design, thesis preparation, implementation, completion of all the stages.				

Course Code: RSE404	Course Title: Graduation Project II			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: The aim of this course is to make the project students who wish to specialize in one area, individually or in groups, from the perspective of a scientific theoretical and / or practical and to teach project preparation, presentation, prepare for working life.				
Course Content: Project topic selection, team work, a machine, a system or a process design, project preparation, implementation, completion of all the stages.				

Course Code: ENG402	Course Title: Engineering Ethics			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 2
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: The aim of the course is provide information for engineering ethics and ethical values ??in business.				
Course Content: Ethical concepts. Professionalism and professional ethics codes. Ethics in design. Rights and responsibilities of business life. Ethical problem-solving techniques. Risk, safety and accidents. Responsibility for scientific research. Responsibility for the experimental study. Powers and responsibilities of the printing and publication of research results.				

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE436	Course Title: Transport Techniques			Semester: 8
Lecture: 3	Practice: 0	Lab: 0	Credit: 3	ECTS: 3
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Compulsory	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The main objective of the course is to provide the student with a basic engineering information about hoisting and conveying machinery. Students are encouraged to specialize on specific topics with design projects.			
Course Content:	Components of hoisting and conveying machineries; components for load, drive components, reduction gears between motors and load. Sheaves and sheave systems, drums. Stopping and load blocking brakes, arresting gears. Feeders and belt, chain, vibrating, screw conveyors. Pneumatic conveying systems. Design projects.			

Course Code: RSE406	Course Title: Geographical Information Systems			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Our lesson provides information and skills accumulation about geographical information systems to students who will do investigation in the geophysics area.			
Course Content:	Geographical information systems (GIS) basics, physical and functional components of GIS, geographical coordinate systems and map projections, data define in GIS, data structures and spatial data models, data species. Geographical model approaches. Crossing simple to mixed model, software systems, analyzing graphics and raw data together, spatial models, numerical analysis methods.			

Course Code: RSE408	Course Title: Design and Production and Welding of Rail			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Aim of this course is to teach design and construction of rails used for railway systems and also assembling technologies of these rails.			
Course Content:	Selection of Rail materials and construction of them. Cross-tie selection. Track spike metallurgy, design and construction. Rail assembling technologies.			

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE410	Course Title: Railway Communication			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Provide information about equipment and techniques used in railway communications, signal types, locking control and the voyage coherence			
Course Content:	Railway communications, communication equipments, transmission lines and parameters, signalization, signal types, noise, line faults, hybrid circuits, phantom values??, braking distance, pupins lines and bus capacitors, Traffic Safety Control, fiber optic cables, numerical communication systems, coding techniques, external telephone systems, light signaling and operating procedure, interlocking control, coherent and incoherent expeditions			

Course Code: RSE412	Course Title: Design of Railway Infrastructure			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	In order to give the student knowledge about the construction of the railway infrastructure, the promotion of technical size and concepts, the forces acting on the basis of the infrastructure elements that make up the infrastructure for the manufacture of teaching the features, aimed at teaching methodologies and processes for protecting and maintaining the infrastructure.			
Course Content:	This course involves the basic technical principles of railways, tunnels, ports, railways construction and protection.			

Course Code: RSE414	Course Title: SCADA Systems			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Belonging to a large area to teach technical subjects to students, fulfill the function of supervision and management.			
Course Content:	What is Enterprise Resource Management Layer and how it works, Business Management Layer, the Process Control Layer, Business Control Layer.			

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE416	Course Title: Total Quality Management			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	The aim of this course is to teach TQM philosophy, basic concepts related with TQM, basic techniques in TQM applications, impacts of TQM on companies, success factors in TQM, TQM applications and quality assurance systems			
Course Content:	Total quality management. Continuous improvement. Quality control activities. Quality losses. Quality system design. Parameter design. Taguchi methods. Tolerance design. Quality function deployment. Quality standards. Quality awards.			

Course Code: RSE418	Course Title: Computer Aided Vehicle Design			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	Students learn basic information about the U.S. design, mechanical engineering to solve problems, develop skills of using computer support, computer-aided design of studies of automotive engineers have the ability to do the training.			
Course Content:	Vehicle design principles, computer-aided design and analysis techniques, vehicle dynamics and resistance movements, computer use in vehicle design step, the transport element modeling and analysis of the BDM (Computer Aided Engineering) techniques, BDM vehicle design project work.			

Course Code: RSE420	Course Title: Division of Railway System			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives:	It is aimed to introduce rail systems management and have preliminary information about this subject.			
Course Content:	Rail systems, properties and places in the transportation master plan. Railways planning, economy, cost, and land survey. Matters to be considered in project planning. Geometric elements to be used for project planning. Transport modeling.			

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE422	Course Title: Railway Planning			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: In order to provide basic information about the planning of transportation and to pay attention to the systematic transfer plans and to follow with projects and studies.				
Course Content: Planning criteria of Railways, Railway necessities, time and cost estimates Railways to lay lines. Optimization of Railways stops and movement times.				

Course Code: RSE424	Course Title: Principals of Train and Railway Maintenance			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: To teach how to plan, execute and control maintenance activities which increase the availability of the production plant resources as machines and other plant facilities in production systems where maintenance activities are the main issues of the logistics.				
Course Content: Definition Of Basic Preventive And Corrective Maintenance Activities, Maintenance Organizations, Maintenance Training, Work Order Systems, Maintenance Planning And Scheduling, Preventive Maintenance , Reliability Centered Maintenance, Maintenance Inventory And Purchasing, Computerized Maintenance Management, Management Reporting And Analysis				

Course Code: RSE426	Course Title: Security Standart of Railway			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: In order to introduce the students about the safety standarts of railways and to give information about serious train accidents, such as derailments and collisions with fatal consequences and also to teach student about such precautions to block these accidents.				
Course Content: Safety rules and standards, such as operating rules, signalling rules, requirements on staff and technical requirements applicable to rolling stock.				

RAILWAY SYSTEMS ENGINEERING PROGRAM LECTURE CONTENTS

Course Code: RSE428	Course Title: Programmable Control Systems (PLC)			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: To be learned the programming logic and the programming of control devices				
Course Content: Memory and Project Organization, Industrial Sensors, Input and Output Modules, Math Instructions, Risk Assessment, Motion and Velocity Controls				

Course Code: RSE430	Course Title: Design of HVAC on Railway Systems			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: Teaching to project Fundamentals and rules of air conditioning.				
Course Content: The introduction of ventilation and air conditioning systems, and the introduction of the machines belonging to this system, representing use and purpose as practical.				

Course Code: RSE434	Course Title: Aerodynamic of Railway Systems			Semester: 8
Lecture: 2	Practice: 0	Lab: 0	Credit: 2	ECTS: 7
Course Level: BSc - Bachelor of Science	Language: English	Course Type: Elective	Mode of Delivery:	Work Placement(s):
Prerequisites and Co-requisites:				
Course Objectives: To give the basic concepts of incompressible aerodynamics, To solve the problems of the basic aerodynamics				
Course Content: Ideal flow models, wing profiles, thin profile theory, finite wing theory, effects of compressibility and viscosity.				