Faculty	Department	Course Code	Name of the Course	Inst. Language	Academic Year	ECTS	Learning Outcomes	Dersin İşleyişine Yönelik Genel Bilgi	Requirements / Prerequisites for Students
Tecnology Faculty	Machine Engineering	To be confirmed	ADDITIVE MANUFACTURING	English (to be confirmed)	2026–2027 (to be confirmed); Fall / Semester 5	4	1. Explain additive manufacturing principles and compare them with conventional manufacturing. 2. Apply design for additive manufacturing, mesh and lattice design, topology optimisation and basic strength and build-time calculations. 3. Select suitable vat photopolymerisation, material extrusion, material jetting and binder jetting processes. 4. Select powder bed fusion, directed energy deposition and sheet lamination methods and appropriate process parameters. 5. Evaluate feedstock properties, quality defects and post-processing options.	Undergraduate elective, 3 hours of theory per week, no scheduled practical hours; 3 local credits, 4 ECTS. Covers digital design, topology and lattice structures; polymer, metal and ceramic additive manufacturing; laser power, scan strategy, build orientation, layer thickness and feedstock selection; quality control and post-processing. Teaching uses lectures, simulations, videos, discussion and illustrative polymer printing demonstrations. Assessment in the supplied Turkish course form: midterm 40%, final 60%.	No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.
Tecnology Faculty	Machine Engineering	To be confirmed	ALTERNATIVE ENERGY SOURCES	English (to be confirmed)	2026–2027 (to be confirmed); Spring / Semester 6	4	1. Explain the principles of renewable and alternative energy sources and perform engineering analyses. 2. Evaluate technologies in terms of environmental impacts, economics and sustainability, and analyse energy efficiency. 3. Identify engineering problems in alternative energy systems and develop solutions using appropriate modelling and simulation techniques. 4. Prepare technical reports and contribute to engineering projects individually or in teams.	Undergraduate elective, 3 hours of theory per week, no scheduled practical hours; 3 local credits, 4 ECTS. Covers energy conversion, solar, wind, biomass, hydrogen and geothermal energy, fossil fuels and nuclear energy; biogas, LPG, natural gas, ethanol and methanol; hybrid and fuel-cell vehicles; energy efficiency and sustainable energy management. Teaching uses lectures, technical calculations, academic readings, case studies and group work; site visits may be arranged if feasible. Assessment in the supplied Turkish course form: midterm 30%, homework 20%, final 50%.	No formal prerequisite is stated in the supplied course form. Students should complete assigned reading, calculations, homework and individual or group activities.
Tecnology Faculty	Machine Engineering	To be confirmed	POWDER METALLURGY	English (to be confirmed)	2026–2027 (to be confirmed); Spring / Semester 4	4	1. Explain the fundamentals and industrial applications of powder metallurgy. 2. Select suitable powder metallurgy production stages and processing parameters for a given material and component.	Undergraduate elective, 3 theory hours/week, no scheduled practical hours; 3 local credits, 4 ECTS. Topics: powder production and characterisation; powder blending, compaction and sintering; post-sintering operations; component design, characterisation and mechanical properties. Proposed teaching: lectures and component case discussions. Assessment arrangements are to be specified by the AKU instructor. Content and outcomes adapted from Ege University's undergraduate Introduction to Powder Metallurgy course; this is a proposed AKU course description.	AKU prerequisites are to be confirmed. The reference course lists none. Basic materials science and manufacturing knowledge is recommended.
Tecnology Faculty	Mekatronics Engineering	SD335	SPECIAL ELECTRICAL MACHINES	English	Fall / Semester 5	3	1 Explains the basic principles of special electrical machines. 2 Identify different types of special electrical machines (synchronous reluctance motors, linear motors, switched reluctance motors, etc.) and explain their operating principles. 3 Performs mathematical modeling and analyzes of special electrical machines. 4 Evaluates design criteria and performance parameters of special electrical machines. 5 Explains industrial applications of special electrical machines and compares their usage areas in different sectors. 6 Examines control methods of special electrical machines and selects appropriate control strategies. 7 Performs experimental tests of special electrical machines and analyzes their results. 8 Evaluates the performance of special electrical machines using simulation software (MATLAB/Simulink etc.). 9 Discuss the advantages and disadvantages of special electrical machines in terms of energy efficiency and sustainability. 10 Follows future development trends and new technologies of special electrical machines.	1 Introduction to special electrical machines, basic concepts and classification 2 Working principle and structure of synchronous reluctance motors 3 Switched reluctance motors (SRM): Structure, working principle and applications 4 Linear motors: Basic principles, types and applications 5 Brushless direct current (BLDC) motors: Structure, drive systems and control methods 6 Stepper motors: Working principle, control methods and industrial applications 7 Servo motors: Structure, control principles and performance analysis 8 Midterm 9 Mathematical modeling and dynamic analysis of special electrical machines 10 Mathematical modeling and dynamic analysis of special electrical machines 11 Simulation techniques of special electrical machines (MATLAB/Simulink applications) 12 Control methods in special electrical machines: Open loop and closed loop control techniques 13 Evaluation of special electrical machines in terms of energy efficiency and sustainability 14 Industrial applications of special electrical machines and new technologies 15 General Assessment 16 2nd/final exam	No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.
Tecnology Faculty	Mekatronics Engineering	SD320	OBJECT ORIENTED PROGRAMMING	English	Spring / Semester 6	4	1 Knows the structure of a basic object-oriented programming language. 2 Knows the basic object-oriented structure of the programming language. 3 Develops console and form applications with the programming language. 4 Develops advanced applications with the programming language. 5 Edits advanced applications made with the programming language. 6 Uses the programming language to solve new problems.	1 Introduction to Object Oriented Programming 2 Classes and Objects 3 Encapsulation 4 Inheritance 5 Polymorphism 6 Abstraction 7 Object Oriented Design Principles 8 Midterm 9 Exception Handling 10 File Operations 11 Generic Programming 12 Data Structures and Object Oriented Programming 13 Design Patterns 14 Project Presentations 15 General Evaluation of the Course 16 2nd/final exam	No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.
Tecnology Faculty	Mekatronics Engineering	SD322	ELECTROMECHANICAL CONTROL SYSTEMS	English	Spring / Semester 4	4	1 Knows the Control Elements 2 Starts the asynchronous motor 3 Knows the remote control circuit. 4 Starts the asynchronous motor in star-delta 5 Changes the direction of rotation in the asynchronous motor.	1 Asynchronous Motors 2 Control Circuit Elements-I: Contact-Button-Key-Limit Switch-Relay 3 Control Circuit Elements-I: Time Relays-Bimetal-Thermostat-Package Switch 4 Control Circuit Elements-II: Contactor-Solenoid Valve-Fuses-Protection Relays-Thermistor 5 Motion Systems: Direct, Intermittent, Continuous Operation-Sealing 6 Motion Systems: Intermittent and Continuous Operation-Button Control 7 Package Switch Control-Remote Control 8 Midterm 9 Changing the Direction of Rotation: Mechanical Locking-Button Locking-Electrical Locking 10 Changing the Direction of Rotation: Applications 11 Starting Techniques: Starting with Resistance-Starting with Auto Transformer-Starting with Star-Delta-Single-Stage 12 Starting-Automatic Starting-Double-Stage Starting-Starting with Package Switch 13 Braking Techniques: Mechanical Braking-Dynamic Braking-Floor Braking-Sudden Braking 14 Using PLC in Control Circuits: PLC commands-PLC programming 15 Using PLC in Control Circuits: Applications 16 2nd/final exam	No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.

Tecnology Faculty	Metallurgical and Materials Engineering	SD337	SURFACE TREATMENTS	English	Offered every academic year in the autumn semester (5th semester)	4	1. Explain surface treatments used to extend the service life of materials. 2. Select appropriate surface treatments for material problems and application requirements. 3. Follow developments in surface treatment technologies. 4. Propose new applications for surface-treated materials.	This undergraduate elective course is delivered through three hours of face-to-face lectures per week. Topics include surface properties, surface hardening, thermochemical treatments, plasma-assisted coatings, PVD/CVD, electroplating, thermal spraying, ESD and functional coatings. Visual materials, presentations and industrial examples support learning. In-class question-and-answer sessions and discussions encourage participation. Explanations and feedback are also provided in response to questions outside the classroom. Assessment: midterm examination 30%, assignment 20%, final examination 50%. Instructor: Assistant Professor İsmail Sinan ATLI.	No prerequisite course is required. Basic knowledge of materials science and metallurgy is recommended. Students are expected to have sufficient English proficiency to follow lectures and understand course materials.
Tecnology Faculty	Metallurgical and Materials Engineering	SD366	SURFACE TREATMENTS	English	Offered every academic year in the spring semester (6th semester)	4	1. Explain surface treatments used to extend the service life of materials. 2. Select appropriate surface treatments for material problems and application requirements. 3. Follow developments in surface treatment technologies. 4. Propose new applications for surface-treated materials.	This undergraduate elective course is delivered through three hours of face-to-face lectures per week. Topics include surface properties, surface hardening, thermochemical treatments, plasma-assisted coatings, PVD/CVD, electroplating, thermal spraying, ESD and functional coatings. Visual materials, presentations and industrial examples support learning. In-class question-and-answer sessions and discussions encourage participation. Explanations and feedback are also provided in response to questions outside the classroom. Assessment: midterm examination 30%, assignment 20%, final examination 50%. Instructor: Assistant Professor İsmail Sinan ATLI.	No prerequisite course is required. Basic knowledge of materials science and metallurgy is recommended. Students are expected to have sufficient English proficiency to follow lectures and understand course materials.
Tecnology Faculty	Metallurgical and Materials Engineering	SD423	ADVANCED TECHNOLOGY MATERIALS	English-Türkçe	Offered every academic year in the autumn semester (7th semester)	4	1 The students who successfully finished the course gain a background in advanced technology materials such as ceramics, MMC and PMC's. 2 The students who successfully finished the course had gained the ability to define and develop advanced technology materials. 3 The students analyses and comparatively evaluate the final properties of the advanced materials as an acquisition of the course. 4 Ability to develop new recipes and production routes.	An elective undergraduate course conducted with 3 hours of face-to-face theoretical lecturing per week. It covers the definition, processing cycles, and end properties of advanced technology materials, focusing on ceramics, metal matrix composites (MMCs), polymer matrix composites (PMCs), interface materials, fibers, whiskers, and carbon nanotubes. Lecture notes, up-to-date literature, and industrial applications are utilized. Active participation is encouraged through in-class Q&A and technical discussions; teamwork is supported via take-home problem sheets and team presentations. Feedback is provided for student inquiries outside of class hours. Assessment is based on: 1st Midterm Exam (30%), Take-Home Sheets & Presentation (20%), and Final Exam (50%).	No prerequisite course is required. Basic knowledge of materials science and metallurgy is recommended. Students are expected to have sufficient English proficiency to follow lectures and understand course materials.
Tecnology Faculty	*Otomotive Engineering*	*OTO317*	*HYDRAULIC AND PNEUMATIC SYSTEMS*	*English*	*2026–2027 (to be confirmed); Fall / Semester 5*	*4*	*1. Recognise hydraulic and pneumatic circuit elements and their symbols. 2. Read and follow hydraulic, pneumatic and electropneumatic circuit diagrams. 3. Explain the operating principles of hydraulic and pneumatic systems. 4. Create hydraulic and pneumatic circuits, and detect and resolve common system faults.*	*Undergraduate elective, 2 hours of theory and 1 hour of practice per week; 2.5 local credits, 4 ECTS. Covers fundamentals of hydraulics and fluid power (force, pressure, work, power, energy and hydraulic fluid types); hydraulic and pneumatic circuit elements and their operating principles; drawing hydraulic, pneumatic and electropneumatic circuit diagrams; circuit design; fault detection and periodic maintenance of hydraulic and pneumatic systems. Teaching uses lectures, demonstrations, question-answer, discussion, case studies, problem solving, computer-aided teaching, homework and laboratory work. Assessment in the supplied course form: midterm 40%, final 60%.*	*No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.*
Tecnology Faculty	*Otomotive Engineering*	*OTO318*	*HYDRAULIC AND PNEUMATIC SYSTEMS*	*English*	*2026–2027 (to be confirmed); Spring / Semester 6*	*4*	*1. Recognise hydraulic and pneumatic circuit elements and their symbols. 2. Read and follow hydraulic, pneumatic and electropneumatic circuit diagrams. 3. Explain the operating principles of hydraulic and pneumatic systems. 4. Create hydraulic and pneumatic circuits, and detect and resolve common system faults.*	*Undergraduate elective, 2 hours of theory and 1 hour of practice per week; 2.5 local credits, 4 ECTS. Covers fundamentals of hydraulics and fluid power (force, pressure, work, power, energy and hydraulic fluid types); hydraulic and pneumatic circuit elements and their operating principles; drawing hydraulic, pneumatic and electropneumatic circuit diagrams; circuit design; fault detection and periodic maintenance of hydraulic and pneumatic systems. Teaching uses lectures, demonstrations, question-answer, discussion, case studies, problem solving, computer-aided teaching, homework and laboratory work. Assessment in the supplied course form: midterm 40%, final 60%.*	*No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.*
Tecnology Faculty	*Otomotive Engineering*	*OTO345*	*QUALITY MANAGEMENT SYSTEMS*	*English*	*2026–2027 (to be confirmed); Fall / Semester 5*	*4*	*1. Explain the basic concepts of quality and quality management systems. 2. Identify the structure and requirements of the ISO 9001 and IATF 16949 standards. 3. Apply quality control and quality assurance methods. 4. Analyse internal audit and certification processes. 5. Evaluate continuous improvement and automotive-specific quality practices.*	*Undergraduate elective, 3 hours of theory per week, no scheduled practical hours; 3 local credits, 4 ECTS. Covers the concept of quality, total quality management, quality assurance systems and quality control techniques; ISO 9001 clauses, requirements, documentation and records; the IATF 16949 automotive quality standard; internal auditing and certification; continuous improvement techniques; statistical quality control and quality applications in the automotive industry. Teaching uses lectures, in-class practice and short quizzes or question-answer sessions in selected weeks. Assessment in the supplied course form: midterm 40%, final 60%.*	*No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.*
Tecnology Faculty	*Otomotive Engineering*	*OTO346*	*QUALITY MANAGEMENT SYSTEMS*	*English*	*2026–2027 (to be confirmed); Spring / Semester 6*	*4*	*1. Explain the basic concepts of quality and quality management systems. 2. Identify the structure and requirements of the ISO 9001 and IATF 16949 standards. 3. Apply quality control and quality assurance methods. 4. Analyse internal audit and certification processes. 5. Evaluate continuous improvement and automotive-specific quality practices.*	*Undergraduate elective, 3 hours of theory per week, no scheduled practical hours; 3 local credits, 4 ECTS. Covers the concept of quality, total quality management, quality assurance systems and quality control techniques; ISO 9001 clauses, requirements, documentation and records; the IATF 16949 automotive quality standard; internal auditing and certification; continuous improvement techniques; statistical quality control and quality applications in the automotive industry. Teaching uses lectures, in-class practice and short quizzes or question-answer sessions in selected weeks. Assessment in the supplied course form: midterm 40%, final 60%.*	*No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.*
Tecnology Faculty	*Otomotiv Mühendisliği*	*OTO347*	*FUEL CELLS AND BATTERIES*	*English*	*2026–2027 (to be confirmed); Fall / Semester 5*	*4*	*1. Explain the factors affecting battery performance. 2. Describe the battery types used in electric and hybrid vehicles and their electrochemical structure. 3. Explain lithium-ion cell components (electrodes, electrolytes, separators) and the role of the battery management system (BMS). 4. Describe the structure, types, efficiency and power characteristics of fuel cells. 5. Explain hydrogen production, storage and safety.*	*Undergraduate elective, 3 hours of theory per week, no scheduled practical hours; 3 local credits, 4 ECTS. Covers electrochemical energy storage requirements in vehicles; battery components and performance factors; lead-acid batteries; battery types for hybrid and electric vehicles; lithium-ion electrodes, electrolytes and separators; battery management systems and battery pack integration; fuel cell fundamentals, history, types and comparison; hydrogen production, storage and fuel cell vehicles. Teaching uses lectures, demonstrations, question-answer, discussion, case studies, problem solving and project work. Assessment in the supplied course form: midterm 40%, final 60%. The workload also includes two project tasks.*	*No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.*
Tecnology Faculty	*Otomotive Engineering*	*OTO348*	*FUEL CELLS AND BATTERIES*	*English*	*2026–2027 (to be confirmed); Spring / Semester 6*	*4*	*1. Explain the factors affecting battery performance. 2. Describe the battery types used in electric and hybrid vehicles and their electrochemical structure. 3. Explain lithium-ion cell components (electrodes, electrolytes, separators) and the role of the battery management system (BMS). 4. Describe the structure, types, efficiency and power characteristics of fuel cells. 5. Explain hydrogen production, storage and safety.*	*Undergraduate elective, 3 hours of theory per week, no scheduled practical hours; 3 local credits, 4 ECTS. Covers electrochemical energy storage requirements in vehicles; battery components and performance factors; lead-acid batteries; battery types for hybrid and electric vehicles; lithium-ion electrodes, electrolytes and separators; battery management systems and battery pack integration; fuel cell fundamentals, history, types and comparison; hydrogen production, storage and fuel cell vehicles. Teaching uses lectures, demonstrations, question-answer, discussion, case studies, problem solving and project work. Assessment in the supplied course form: midterm 40%, final 60%. The workload also includes two project tasks.*	*No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.*
Tecnology Faculty	*Otomotive Engineering*	*OTO349*	*FUELS AND OILS*	*English*	*2026–2027 (to be confirmed); Fall / Semester 5*	*4*	*1. Explain the properties and application areas of different fuel types. 2. Define the classification and functions of engine oils. 3. Analyse the effects of fuels and oils on engine performance, wear and emissions. 4. Evaluate alternative fuels and their environmental impacts.*	*Undergraduate elective, 3 hours of theory per week, no scheduled practical hours; 3 local credits, 4 ECTS. Covers classification and properties of fuels (gasoline, diesel, LPG, CNG, biodiesel, ethanol, methanol, hydrogen); octane and cetane numbers and fuel test methods; fuel additives, storage and safety; engine oil classification (SAE, API, ACEA), viscosity–temperature behaviour and oil additives; lubrication principles and systems; oil tests (TBN, TAN, particle analysis), ageing and change intervals; e-fuels, synthetic oils and sustainability. Teaching uses lectures, demonstrations, question-answer, discussion, case studies, problem solving, projects and homework. Assessment in the supplied course form: midterm 40%, final 60%.*	*No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.*

Tecnology Faculty	Otomotive Engineering	OTO350	FUELS AND OILS	English	2026–2027 (to be confirmed); Spring / Semester 6	4	1. Explain the properties and application areas of different fuel types. 2. Define the classification and functions of engine oils. 3. Analyse the effects of fuels and oils on engine performance, wear and emissions. 4. Evaluate alternative fuels and their environmental impacts.	Undergraduate elective, 3 hours of theory per week, no scheduled practical hours; 3 local credits, 4 ECTS. Covers classification and properties of fuels (gasoline, diesel, LPG, CNG, biodiesel, ethanol, methanol, hydrogen); octane and cetane numbers and fuel test methods; fuel additives, storage and safety; engine oil classification (SAE, API, ACEA), viscosity–temperature behaviour and oil additives; lubrication principles and systems; oil tests (TBN, TAN, particle analysis), ageing and change intervals; e-fuels, synthetic oils and sustainability. Teaching uses lectures, demonstrations, question-answer, discussion, case studies, problem solving, projects and homework. Assessment in the supplied course form: midterm 40%, final 60%.	No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.
Tecnology Faculty	Otomotive Engineering	OTO425	COMPUTER AIDED MANUFACTURING	English	2026–2027 (to be confirmed); Fall / Semester 7	4	1. Describe the concept of a product with its features and varieties. 2. Apply the conceptual design stages of a product development process and prepare a conceptual design report. 3. Explain production processes and product management. 4. Carry out literature searches and use the findings in product design and production processes.	Undergraduate elective, 2 hours of theory and 1 hour of practice per week; 2.5 local credits, 4 ECTS. Covers engineering design and the design process; identifying opportunities and needs; market analysis and information gathering; conceptual design, product specifications and concept development; creativity management; concept selection and testing; detailed design and computer-aided engineering; cost analysis; prototyping and product testing; project management and product development teams. Teaching uses lectures, demonstrations, question-answer, discussion, case studies, problem solving, computer-aided teaching, homework, group work and project presentations. Assessment in the supplied course form: midterm 40%, final 60%.	No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.
Tecnology Faculty	Otomotive Engineering	OTO427	FINITE ELEMENT METHOD	English	2026–2027 (to be confirmed); Fall / Semester 7	4	1. Explain the role of the finite element method in design and analyse an engineering problem using it. 2. Explain mesh structures and types and how results depend on the mesh. 3. Evaluate finite element analysis results and make design decisions based on them. 4. Model engineering problems in a software environment.	Undergraduate elective, 2 hours of theory and 1 hour of practice per week; 2.5 local credits, 4 ECTS. Covers an introduction to the finite element method and types of analysis; modelling with a finite element program; material and section properties; static analysis; evaluating results with the post-processor; modelling assemblies of multiple parts; data exchange with other programs; other analyses and advanced modelling examples in ANSYS. Teaching uses lectures, demonstrations, problem solving, computer-aided teaching and homework. Assessment in the supplied course form: midterm 40%, final 60%. The workload also includes two homework assignments.	No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.
Tecnology Faculty	Otomotive Engineering	OTO453	ADDITIVE MANUFACTURING METHODS	English	2026–2027 (to be confirmed); Fall / Semester 7	4	1. Explain the development, principles and classification of additive manufacturing technologies and compare them with conventional manufacturing. 2. Select an appropriate additive manufacturing method and material (metal, polymer or ceramic) for a given purpose. 3. Describe how 3D parts are produced with SLA, DLP, SLS/SLM, EBM, FDM, inkjet and LOM methods, including key process parameters. 4. Demonstrate basic knowledge of the software used in additive manufacturing.	Undergraduate elective, 3 hours of theory per week, no scheduled practical hours; 3 local credits, 4 ECTS. Covers the development and classification of additive manufacturing; metal, polymer and ceramic materials; stereolithography (SLA), digital light processing (DLP), selective laser sintering/melting (SLS/SLM), electron beam melting (EBM), fused deposition modelling (FDM), inkjet and laminated object manufacturing (LOM); process parameters; industrial applications, innovations and developments. Teaching uses lectures, demonstrations, question-answer, discussion, case studies, problem solving and computer-aided teaching. Assessment in the supplied course form: midterm 40%, final 60%.	No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.
Tecnology Faculty	Otomotive Engineering	OTO455	ALTERNATIVE ENERGY SOURCES	English	2026–2027 (to be confirmed); Fall / Semester 7	4	1. Define energy, energy types and conversion, work, the first and second laws of thermodynamics, efficiency and usability. 2. Recognise renewable and other energy sources (solar, biomass and vegetable oils, wind, nuclear, fossil and geothermal energy) and their applications. 3. Identify alternative fuels used in gasoline and diesel engines (hydrogen, LPG, natural gas, biogas, ethanol, methanol) and work through sample applications. 4. Explain hybrid engines and fuel cells and work through sample applications. 5. Describe the features of alternative-energy machines such as solar-powered, Stirling, Ericsson and steam engines.	Undergraduate elective, 3 hours of theory per week, no scheduled practical hours; 3 local credits, 4 ECTS. Covers energy types and conversion, thermodynamic laws and efficiency; energy in the world and in Turkey; solar, nuclear, geothermal, biomass, vegetable oil and wind energy; fossil energy sources; alternative fuels for gasoline and diesel engines (LPG, natural gas, biogas, hydrogen, ethanol, methanol); solar cells, hydrogen and fuel cells; solar-powered, Stirling, Ericsson and steam engines; wave and baron energy. Teaching uses lectures, question-answer, discussion, visually supported presentations, case studies and applied examples, plus student research and presentations on current technologies. Assessment in the supplied course form: midterm 40%, final 60%.	No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.
Tecnology Faculty	Otomotive Engineering	OTO457	SYSTEM DYNAMICS	English	2026–2027 (to be confirmed); Fall / Semester 7	4	1. Derive dynamic models of basic engineering systems (mechanical, electrical, electromechanical, fluid and thermal systems). 2. Represent systems using transfer functions, block diagrams and state-space models. 3. Analyse and simulate the response of linear time-invariant systems in the time and frequency domains, including linearisation of nonlinear systems.	Undergraduate elective, 3 hours of theory per week, no scheduled practical hours; 3 local credits, 4 ECTS. Covers an introduction to systems and the Laplace transform; transfer functions, block diagrams and state-space representation; modelling, analysis and simulation of mechanical, electrical/electromechanical, fluid (hydraulic and pneumatic) and thermal systems; analogous systems; linearisation; time- and frequency-domain analysis of linear time-invariant systems. Teaching uses lectures. Assessment in the supplied course form: midterm 40%, final 60%.	No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.
Tecnology Faculty	Elektrik - Elektronik Mühendisliği	SD397	Filter Design	English	Fall / Semester 5	4	1 Analyzes positive real functions.Analyzes positive real functions. 2 Derives circuit transfer functions. 3 Solves problems related to the design of passive RC filters. 4 Solves problems related to the design of passive LC filters. 5 Designs passive filter circuits terminated with 1 ohm. 6 Solves problems requiring the design of first-order active filters. 7 Solves problems regarding the synthesis of second-order active filters using infinite-gain and Sallen-Key circuits. 8 Designs active and passive filters using Butterworth filter approximations. 9 Designs various types of filters by performing filter transformations. 10 Additionally, designs filters suitable for specific problems using MATLAB software.	1 Network Functions 2 Positive Real Functions 3 Synthesis of One-Port LC Networks: Foster and Cauer Networks 4 Synthesis of One-Port LC Networks: Foster and Cauer Networks 5 RC and RL Networks 6 RC and RL Networks 7 Synthesis of Two-Port Passive Networks: Resistively Terminated Ladder LC Networks and the Zero-Shifting Method 8 Midterm Exam 9 Approximation Problem: Butterworth and Chebyshev Functions 10 Approximation Problem: Butterworth and Chebyshev Functions 11 Active Network Synthesis 12 Sensitivity Analysis 13 Filter Design Using MATLAB 14 Filter Design Using MATLAB 15 Final Exam	No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.

Tecnology Faculty	*Electrical and Electronics Engineering*	*SD392*	*Digital Filter Design*	*English*	*Spring / Semester 6*	*4*	*1 Performs Fourier analysis and writes program code to understand digital filters.* *2 Designs digital filters.* *3 Tests the designed filter to understand digital filters.* *4 Uses logical, comparison, and arithmetic operators in the programming language.* *5 Performs matrix operations and plotting functions.* *6 Implements control and loop structures.* *7 Generates signals and performs FFT, Fourier series, and filtering applications.* *8 Acquires and processes digital images.*	*1 General introduction to the programming language and environment* *2 Use of logical, comparison, and arithmetic operators in the programming language.* *3 Matrix operations* *4 Plotting functions and applications.* *5 Control structures and applications.* *6 Loop structures and applications.* *7 Signal generation and applications.* *8 Midterm exam* *9 FFT and applications.* *10 Finite Impulse Response (FIR) filter design* *11 Infinite Impulse Response (IIR) filter design* *12 Image processing and applications.* *13 Fourier series and applications.* *14 Laplace, Simulink, and GUI applications.* *15 Final exam*	*No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.*
Tecnology Faculty	*Electrical and Electronics Engineering*	*SD394*	*Communication Systems*	*English*	*Spring / Semester 6*	*4*	*1 Knows the fundamental concepts related to communication systems.* *2 Can use the fundamental mathematical methods related to communication systems.* *3 Can analyze amplitude modulation and demodulation methods in the time and frequency domains.* *4 Can analyze angle modulation and demodulation methods in the time and frequency domains.* *5 Knows analog communication circuits and their characteristics.* *6 Can analyze the sampling theorem, as well as pulse amplitude, width, and position modulation methods, in the time and frequency domains.*	*1 Purpose of communication, communication system and components, communication channels* *2 Signal propagation modes, mathematical models for communication channels, factors limiting communication, transmission impairments.* *3 Basic Mathematics of Communication* *4 Basic Mathematics of Communication* *5 Double-sideband amplitude modulation/demodulation with/without carrier (DSB-TC, DSB-SC, AM).* *6 Single-sideband amplitude modulation/demodulation (SSB)* *7 Vestigial sideband modulation (VSB) and quadrature amplitude modulation (QAM).* *8 Midterm Exam* *9 Phase and instantaneous frequency, phase and frequency modulation (PM, FM)* *10 Narrowband phase and frequency modulation/demodulation.* *11 Wideband phase and frequency modulation/demodulation,* *12 Amplitude and frequency modulated transmitter-receiver circuits* *13 Frequency-division multiplexing (FDM), phase-locked loop (PLL), television technology.* *14 Digital transmission of analog signals, sampling theorem* *15 Pulse amplitude, width, and position modulation (PAM, PWM, PPM)*	*No formal prerequisite is stated in the supplied course form. Students should follow lectures and complete assigned research tasks.*