COURSE CONTENTS FOR MECHATRONİCS ENGİNEERİNG						
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Origins and Consequences	KHAS 101	Fall	03+00+00	Compulsory	3	5
Course Objectives:	This course aims to introduce the students with a broad outline on fundamental sciences by focusing on a discussion of groundbreaking discoveries, innovations and inventions in various scientific fields. The course also aims to develop the students' curiosity for scientific fields and their connections, help them understand the consequences of scientific developments and the role science and technology play in shaping today's world.					
Course Contents:	The course explores groundbreaking discoveries / innovations / inventions in astronomy, geoscience, biology, chemistry, physics and technology, and provides the students with a background in science and today's world.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
History of Humankind	KHAS 103	Fall	03+00+00	Compulsory	3	5
Course Objectives:	The main objective of this course is to introduce the students with major concepts in humanities and social sciences as they relate to world civilizations and history. It is expected that the students will become familiar with social scientific theories that utilize and build upon these concepts and understand that concepts and ideas change in time and space, and are institutionally framed. The course also aims to help the students develop their capacities for critical thinking and analysis; learn ways of reading (primary) texts and expressing arguments and ideas verbally, visually, and in writing; and develop intellectual responsibility and respect for others.					
Course Contents:	This course focuses on the content and social context of concepts such as civilization, science, history, time, space, myth, religion, individual, society, family, state, nation, race, gender, culture, globalization, which the students will encounter in their four years of university education. Following a quasi-chronology, the course will enable the students to understand the historical context and intellectual conditions that give rise to certain developments. The overarching theme will be how we understand civilization and the implications of different notions of civilization on how we interpret the world around us and how we organize our everyday practices. The course will cover the period from the beginnings of the world, as depicted in scientific, religious, and mythical origin stories to the times of colonialisms and revolutions up until early twentieth century. Throughout the term the students will read primary or secondary texts and watch documentary and/or feature films dealing with history, family, religion, city, and/or nation, and respond to them utilizing the concepts covered in class.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Universal Values and Ethics	KHAS 105	Fall	03+00+00	Compulsory	3	5
Course Objectives:	This transdisciplinary course is designed to help students reflect critically on the ethical implications of their conceptions of life and of their relationship with other human beings, with the society at large, and with the rest of existence. It aims to encourage them to think freely - to be free of prejudice and misinformed preconceptions; to build self-confidence and become responsible individuals who appreciate the rights of other living beings; and to empower them to become active agents in society's development through civic engagement. The course also aims to equip the students with basic research skills and reinforce their command of English by developing their reading, writing, listening, and speaking skills, and to expand students' academic vocabulary both at the receptive and productive level.					
Course Contents:	The course consists of five modules designed to focus on some of the most pressing issues of our times, i.e. diversity, cit-y-zenship, gender, information technologies, and bioethics, all of which involve ethical dilemmas that are hard to resolve and even hard to recognize most of the time. Rather than equipping the students with normative moral values that would supposedly guide them in such situations, the course emphasizes the ability to evaluate issues with empathy, to think and analyze contextually and relationally, and, most importantly, with the ability to see tones of grey in ethical matters, and to recognize that their personal views and choices may have broader implications that go well beyond their immediate consequences.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Design	KHAS 107	Fall	03+00+00	Compulsory	3	5
Course Objectives:	This course aims to introduce the students to the wide world of design and its change-inducing mindset through a variety of perspectives and examples by forming links with the concepts of creativity, innovation, problem-defining and solving, intellectual sensibility, viable improvement and sustainability. The course presents design in an expanded scope including technical/technological, material, spatial, ecological, political, economic, and global perspectives. It presents a rich variety of works in various scales blurring the boundaries between design, arts, architecture, engineering, science, business and many other fields in which design-thinking can be implemented and can exert large-scale impact and positive change. Seeing students as creative individuals and parts of a creative community, the course also aims to foster team work and acute communication (verbal, written and visual) along with the skills of project management, presentation and storytelling.					
Course Contents:	The course comprises of 4 main modules concentrating on different aspects, stages and implementations of design-thinking in relation to various fields, complemented by a following workshop (studio) session of 5 weeks engaging students to work in interdisciplinary teams and in a design project of their own devising which will also be tutored by a respective mentor. 1. Understanding the nature and power of design-thinking and doing: The module will concentrate on the fundamentals, values and purposes vested in design-thinking in general. Students will be introduced to the impact and place of design in everyday life, culture, history and many contemporary fields – all in relation with the concepts and practices of creative-thinking, innovation, human-centered design and social change. 2. Stories of Design: As a more expanded episode to the previous module, students will be introduced various inspirational cases from various fields (architecture, product / UX design, engineering, business, health, non-profit projects etc.) directly by the stories told by the					

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	makers and organizers of these respective examples. 3. Problem-Defining, Field-Research, Analysis and Visualization: The module will be focusing on the initial and vital stages of design-thinking. Students will be introduced to the preliminary preparations and necessary perspectives in setting up a design-project as well as conducting it further. Various tools and modes of research, problem-defining, analysis, ideation and effective visualization will also be introduced through examples and small assignments. 4. Prototyping, Testing and Iteration: The final module, expanding on the concepts and stages introduced in the previous one, will be centered on the methods and means of devising the design work through modelling, testing and further iterative development through its finalization. This and the third module will also be following the main stages in design-thinking, and will include small assignments for each phase in a way that corresponds with the following workshop session which will proceed in a similar, stage-by-stage fashion. PROJECT WORKSHOPS: In this 5-week phase, students will shape and conduct a design project of their own, working in teams and with the mentorship of a tutor, and will experience the design process in a customized fashion resulting a final work that aims to meet the needs of the end-user or the intended social impact. a. Defining problem & needs, market / field / user identification and specifying requirements b. Concept design / Ideation c. Design Specifics & Development d. Modelling / Production e. Testing & Feedback f. Documentation

Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Computational Thinking	KHAS 109	Fall	03+00+00	Compulsory	3	5
Course Objectives:	This course aims to present an applied introduction to algorithmic thinking for complex problem solving tasks. It seeks to build up a wide variety of interdisciplinary problem and conflict-resolution skills and competencies derived from computation, mathematics, logic and design. It introduces a multitude of problem solving skills such as pattern recognition, abstraction, induction-deduction that students will work on in groups, as well as preparing students to use programming interfaces like Python to work with datasets to address popular and exciting riddles and problems. Overall, the course prepares students for the rest of their university life and the problems they may encounter throughout.					
Course Contents:	• Critical Thinking and Logical Reasoning • Deduction and Induction • Computational Thinking and its 4 pillars: Problem Decomposition • Pattern Recognition • Abstraction • Fun with Algorithms • Algorithms and Procedures • Data Collection • Data Analysis • Data Representation / Presentation					

Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Critical Reading and Writing in Turkish I	TLL 101	Fall	02+00+00	Compulsory	2	3
Course Objectives:	This course aims to develop skills to express themselves orally and in writing in daily life and to comprehend argumentative essays in various forms and analyze them critically. This course encourages students to express their thoughts / arguments individually or as a member of a group in accordance with the manners of discussion. In this course students gain the ability to use relevant materials and resources in conducting academic research and the reflex to apply the rules of academic integrity in written and oral productions.					
Course Contents:	Critical Reading and Writing in Turkish I is designed each week as a 2-hour reading and writing workshop in order to improve students' reading and writing skills in Turkish and to develop their critical thinking and ensure to express their thoughts in a proper, comprehensible and fluent Turkish. In the course, students are encouraged to express themselves individually or in a group work, verbally and in written form in daily life, to read and understand critically argumentative essays, to be able to produce arguments and conduct academic research on a particular subject using relevant sources. The course is also designed to raise awareness in terms of academic integrity among the students.					

Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Scientific Discoveries and Engineering	KHAS 102	Spring	03+00+00	Elective	3	5
Course Objectives:	The course aims to help students gain ability to define engineering problems within their context and to develop curiosity for scientific fields and their interconnections. In this course, students also can reflect on the significance of bearing multiple viewpoints in producing, understanding, and utilizing scientific knowledge. Additionally, students learn to take responsibility for professional development and improve their academic reading / writing / presentation / communication skills in English.					
Course Contents:	The goal of this course is to provide students a broad outline of scientific discoveries and engineering, and help them to develop their critical thinking and problem-solving skills. To this purpose, the course explores different disciplines of engineering and provides participants with a broad background of engineering technologies.					

Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**

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Civic Responsibility Project	KHAS 110	Spring	00+02+00	Compulsory	1	2
Course Objectives:	This course introduces students to the concept of social responsibility with theoretical knowledge and universal values. It aims to transform this information into active citizenship skills through civic engagement activities.					
Course Contents:	This course introduces civic engagement and active citizenship concepts within the framework of social responsibility. The course presents basic knowledge and understanding in the field of social responsibility theoretically. Additionally, the course also allows the students to design and implement a project to develop their skills of realizing problems of the society they live in and developing solutions for these problems.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Thinking Mathematically	KHAS 112	Spring	03+00+00	Compulsory	4	6
Course Objectives:	The goal of this course is to cover basic concepts of mathematics that will be of use to the students of any background using a modular teaching model. Students will be able to identify solution strategies for real-life problems and comprehend the need for mathematical tools. Mathematical concepts will be discovered/thought through experiments hence the student will be able to observe the need for mathematics.					
Course Contents:	-Joy of Numbers (Introduction Module) -Uncertainty in Life (Module 1) -Finding Trends in Everyday Life (Module 2) -Rate of Change (Module 3) -Areas and Volumes (Module 4) -Abstract Thinking (Module 5)					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Robotics Start-Up Project	MTE 192	Spring	02+02+00	Compulsory	3	6
Course Objectives:	Introducing students to the basic hardware, software and sensor elements that are used in mechatronics engineering. Students will develop hands-on experience related to such components, while carrying out a project and doing activities during the preparation stage.					
Course Contents:	Physical building of a robot, programming of robot components, designing and creating the circuitry required for communication between software and hardware					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Critical Reading and Writing in Turkish II	TLL 102	Spring	02+00+00	Compulsory	2	3
Course Objectives:	The course aims to define the elements of fiction (novel and short story) such as character, plot, point of view, description, time, space etc. and to interpret and criticize Turkish novels and short stories in an analytical way. Additionally, the course enable students to write critical articles on fiction using secondary sources and to develop their skills on storytelling/depiction/editing with short creative writing studies. The course also aims to explore the various relationships of novel and short story with different genres through concepts such as intertextuality, adaptation and rewriting.					
Course Contents:	The content of the course is based on the genres, novel and short stories. Focusing on the concept of "fiction" through novels and short stories in modern Turkish literature, students will be able to interpret and criticize novels and stories in an analytical way and produce their own critical points of view. In addition, the relationship between novels and short stories with other texts and genres is discussed through concepts such as intertextuality, adaptation and rewriting. Besides, in-class activities are designed in order to encourage the creative writing skills of students.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Applied Engineering Mathematics I	FENS 201	Fall	03+02+00	Compulsory	4	6
Course Objectives:	The aim of this course is to provide the mathematical background (derivatives, integrals, linear systems of equations, linear differential equations) necessary for engineering applications.					
Course Contents:	• Engineering applications of differentiation and integration • First-order ordinary differential equations and their applications • Linear systems of equations • Higher-order ordinary differential equations					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Materials	FENS 203	Fall	03+00+00	Compulsory	3	4
Course Objectives:						
Course Contents:						
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
History of Modern Turkey I	HST 101	Fall	02+00+00	Compulsory	2	2
Course Objectives:	The main objective of this course is to introduce students major themes and events in the history of modern Turkey with a focus on the modernization process during the Ottoman era. Students will become familiar with the major issues in the modernization process of Turkey through a variety of sources, including archival, visual, and fictional ones. It is expected that students will be able to develop critical thinking and historical perspective to analyze current social, political and economic developments.					

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Course Contents:	This course explores the modernization process in the Ottoman Empire and how those transformations were reflected in the making of modern Turkey. Although there is a chronological frame, the course is organized as modules focusing on certain themes. Throughout six modules, modernization of the state apparatus, integration to the global economy, transformation of the cities, modern forms of art and changes in social life will be discussed. Students will become familiar with the political reforms of the late Ottoman period, Ottoman political and intellectual figures of the modern era, changes in social structure with the process of modernization, demographic structure of the cities, urban planning, cultural life and lastly wars which triggered change in various areas. These topics will be covered through the primary and secondary sources.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Technical Drawing	MTE 211	Fall	02+00+02	Compulsory	3	4
Course Objectives:						
Course Contents:						
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Computer Game Design Project	MTE 291	Fall	03+02+00	Compulsory	4	6
Course Objectives:	This course is intended to give students intermediate level programming abilities using C# programming language with the object-oriented programming concepts and design 4 types of computer games. This is a project-oriented class divided into 5 modules of 2-3 weeks each. Each module will consists of classroom discussions and computer laboratory work. At the end of each module students will develop and debug programs, using the concepts taught in that particular module. The students will first learn the Unity game engine, and then apply game concepts while using Game Engine					
Course Contents:	Unity Game Engine, Games as Rules (Game Design), Games as Play (Game Experience), game Mechanics, C#, 2D mobile games, 3D computer games					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Logic Design	MTE 293	Fall	03+00+02	Compulsory	4	8
Course Objectives:	This course aims to introduce Boolean algebra and basic analysis and synthesis techniques for logic circuits in a project-based context. Both combinational and sequential circuits are covered in various design examples.					
Course Contents:	Number systems; Boolean algebra; logic networks and their simplification; logic design techniques with gates and MSI chips; combinational circuits; basic sequential circuits; D/A and A/D conversion; design examples.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Equlibrium of Physical Systems	CIV 102	Spring	02+04+00	Compulsory	4	6
Course Objectives:	Understand mechanisms that keeps physical systems at equilibrium.					
Course Contents:	1. Introduction to basic civil engineering concepts. 2. Force concept, different force types acting around the universe. 3. Understanding vector algebra. 4. Moment concept. 5. Balance concept, forces, and moments at the equilibrium state. 6. Concept of static and concept of stable and the difference between them. 7. Free body diagrams. 8. Basic connection types used in common civil engineering applications. 9. Understanding truss systems 10. Couple moment concept. 11. Distributed load concept, first area integrals. 12. Moment of inertia concept, second area integrals.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Applied Engineering Mathematics II	FENS 202	Spring	03+02+00	Compulsory	4	6
Course Objectives:	The aim of this course is to provide mathematical background on functions of many variables (partial derivatives, gradient fields, optimization; divergence, curl; volüme and surface integrals, special topics on differential equations) necessary for engineering applications.					
Course Contents:	• Functions of many variables, partial derivatives, optimization • Gradient, divergence, and curl and their applications • Surface and volüme integrals and their applications • Advanced topics in differential equations					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
History of Modern Turkey II	HST 102	Spring	02+00+00	Compulsory	2	2
Course Objectives:	The main objective of this course is to introduce the students major themes and events in the history of modern Turkey. Students will learn about different perspectives about the major issues of Turkey through a variety of sources, including archival, visual, and fictional ones. The course aims to help students in situating Turkey in a global context besides realizing the pluralistic nature of the history of Turkey. In the end, the course is intended to make students informed and questioning citizens.					
Course Contents:	This course explores the history of modern Turkey from the early Republican period until today in its political, social, economic, and cultural aspects. Following a module-based structure based on specific themes, the course centers on the ruptures and					

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	continuities in general trends and processes of the history of Turkey. Throughout six modules, the shifts from empire to Republic, a single-party system to a multi-party system, the Cold War to the new global world will be discussed in relation to various social and economic aspects including rural to urban migration, social movements, neoliberalism, political Islam and identity politics. In this regard, the class is planned on three principles: First, it places Turkey in a global context hence emphasizes connections as well as disconnections. Second, it evaluates both the transformations at the state level and how 'ordinary' people are influenced by those transformations. Third, besides secondary guiding sources, primary sources are used to help students relate in a personal way to the past and promote a deeper understanding of history instead of a series of events.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Mechanical System Simulation Project	MTE 294	Spring	05+04+00	Compulsory	7	11
Course Objectives:	The course will cover the topics of Engineering Dynamics for Mechatronics Engineering in a condensed manner to help built fundamental background on the analysis of rigid-body motion in 1D, 2D, and 3D space. Students will study simulation of mechanical systems in motion via MATLAB/SIMULINK and ADAMS.					
Course Contents:	1D, 2D, and 3D kinetics, kinematics, and dynamics of a particle and a rigid-body; impulse, momentum, torque, force, power, energy, coordinate frames and simple rotations between coordinate frames, simple frame rotations, inertia, center of gravity, energy methods, friction, 1D-vibration, modeling approaches with MATLAB/SIMULINK and ADAMS.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Internship I	MTE 299	Spring	00+00+00	Compulsory	0	5
Course Objectives:	The aim of this course is to engage second year engineering students in real-life work and employment conditions to acquire hands-on experience and have the chance to practice with the knowledge and skills gained in the Mechatronics engineering undergraduate program for a total of 40 work days / 8 weeks in professional environment.					
Course Contents:	Responsibilities and workload assigned by the company.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Dynamics of Physical Systems	CIV 263	Fall	03+00+00	Compulsory	3	4
Course Objectives:	Understand the dynamics of particles.					
Course Contents:	• Particle dynamics. • Introduction to rigid body dynamics. • Springs (as a 1D motion) • Work, energy and power • Linear, angular and relative motion • Impulse and momentum • Conservation laws					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Signals and Systems	EEE 307	Fall	02+00+02	Compulsory	3	5
Course Objectives:	This course deals with signals and systems from their theoretical mathematical foundations. By the end of the course, the students are expected to have a deep understanding of the mathematics and practical issues of signals in continuous- and discrete-time, linear time-invariant systems, and their transform-domain representations.					
Course Contents:	This course introduces continuous-time (CT) and discrete-time (DT) signals, signal transforms, and signal processing systems with their properties and practical examples. The contents of this course include signal operations, convolution operation, Fourier, Laplace, and z-transforms, and the active use of MATLAB software in projects.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Software-Hardware Integration Project	EEE 309	Fall	01+00+04	Compulsory	3	8
Course Objectives:	To provide a foundation for concepts and tools for the integration of hardware and software components for the design and development of complex systems.					
Course Contents:	Software and microcontroller based system (e.g. oscilloscope or spectrum analyzer) design and implementation: analog signals; digital signals; sampling theorem; fundamentals of analog-to-digital and digital-to-analog converters; microcontroller-based data acquisition systems; fast Fourier transform; graphical user interface design.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Numerical Methods	FENS 300	Spring	02+02+00	Compulsory	3	5
Course Objectives:	This course aims to introduce students to mathematics, logic and language of numerical methods as used in engineering and basic sciences. Students will learn how numerical methods are applied to important problems in science and engineering.					
Course Contents:	Describe numerical methods and their applications in engineering, error analysis of numerical methods, analytical solutions (Module 1) Numerical methods for solving linear and nonlinear equation systems (Module 2) Approximation methods, interpolation, linear regression, numerical integration (Module 3) Numerical methods for solutions of differential equations (Module 4)					

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Course Name	Code	Semester	T+A+L (hour/week)	Type (C / O)	Local Credit	ECTS
Software Design Project I	MTE 391	Fall	03+00+02	Compulsory	4	6
Course Objectives:						
Course Contents:						

Course Name	Code	Semester	T+A+L (hour/week)	Type (C / O)	Local Credit	ECTS
Probability and Statistics	FENS 200	Fall	02+02+00	Compulsory	3	4
Course Objectives:	The aim of this course is to introduce students to probability and statistical theory and applications and provide some basic information necessary for data analysis in engineering systems.					
Course Contents:	Module 1: Data presentations and analysis, probability concepts and probability axioms, random variables, mathematical averages Module 2: Discrete and continuous probability distributions, probability calculations, common distributions, conditional probability and independence Module 3: Probability distributions, estimation and confidence intervals, hypothesis testing Module 4: Experimental design Module 5: Risk and reliability concepts					

Course Name	Code	Semester	T+A+L (hour/week)	Type (C / O)	Local Credit	ECTS
Economics for Engineers	FENS 310	Spring	03+00+00	Compulsory	3	4
Course Objectives:	The aim of this course is to train engineering students on the principles of economics, principles of macroeconomics, investment analysis tools and methods in order to use them in engineering and business life. The course also aims to train students on topics such as cost accounting, time value of money, decision-making among alternatives, taxation and budgeting.					
Course Contents:	Financial statements and macroeconomics (Module 1) Time value of money, interest rates, current value analysis (Module 2) Annual equity analysis, Rate of return analysis (Module 3) Money flow analysis, depreciation (Module 4) Cost-benefit analysis (Module 5)					

Course Name	Code	Semester	T+A+L (hour/week)	Type (C / O)	Local Credit	ECTS
Machine Elements	MTE 312	Spring	03+00+00	Compulsory	3	5
Course Objectives:						
Course Contents:						

Course Name	Code	Semester	T+A+L (hour/week)	Type (C / O)	Local Credit	ECTS
Software Design Project II	MTE 392	Spring	03+00+02	Compulsory	4	6
Course Objectives:						
Course Contents:						

Course Name	Code	Semester	T+A+L (hour/week)	Type (C / O)	Local Credit	ECTS
System Dynamics and Control Project	MTE 394	Spring	04+02+00	Compulsory	5	8
Course Objectives:	Course Objectives This course aims to introduce control systems, time domain-frequency domain analysis of the systems, stability in the systems, transient responses and design of control systems					
Course Contents:	Course Contents Open-loop systems, Closed-loop systems, Stability of linear Control Systems, Time domain analysis of control systems, Transient Responses, Design of Control Systems, Root locus technique, Frequency Domain Analysis.					

Course Name	Code	Semester	T+A+L (hour/week)	Type (C / O)	Local Credit	ECTS
Internship II	MTE 399	Spring	00+00+00	Compulsory	0	5
Course Objectives:	The aim of this course is to engage second year engineering students in real-life work and employment conditions to acquire hands-on experience and have the chance to practice with the knowledge and skills gained in the Mechatronics engineering undergraduate program for a total of 40 work days / 8 weeks in professional environment.					
Course Contents:	Responsibilities and workload assigned by the company.					

Course Name	Code	Semester	T+A+L (hour/week)	Type (C / O)	Local Credit	ECTS
Engineering Design Project I	FENS 401	Fall	01+02+00	Compulsory	2	6
Course Objectives:	The aim of the course is to give engineering students the basic definitions and nature of engineering problem solving along with the theory and application of the well-known methodologies. The course also covers the project management and related topics that will be very helpful for engineering students.					

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Course Contents:	This course covers the following topics: definition of engineering problems, classification of open- and closed-ended problems, engineering design, conceptual design, embodiment design, detailed design, concurrent engineering, teamwork, human as a social entity in team works, project management, project proposal writing, innovation problem-solving.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Robot Design Project	MTE 491	Fall	04+02+00	Compulsory	5	8
Course Objectives:	This course is to teach the students how to design, analyze, and simulate open-kinematic chains, i.e., robotic arms, up to six degrees of freedom. The kinematics and electromechanical dynamics of the robotic arms will be studied using different analytical and numerical tools while visualizing the rigid-body motion of the joints and links.					
Course Contents:	Forward kinematics and dynamics, inverse kinematics and dynamics, kinematic decoupling, Newton-Euler method, Euler-Lagrange method, DC-motor dynamics, power and work, gears, friction, contact forces, sensors and feedback (contact, proximity, encoder, camera), holonomic and non-holonomic systems, contact detection.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Engineering Design Project II	FENS 400	Spring	00+08+00	Compulsory	4	10
Course Objectives:	In the design project course, students will find realistic solutions to open-ended engineering problems, and will lead to a product or model by using the knowledge gained from their undergraduate education.					
Course Contents:	A design project is the last stage of undergraduate education. An interdisciplinary project with a team of 2-4 students is carried out under the supervision of one or more faculty members. The faculty assignment, the proposal dates and the final report submission along with the defense dates are announced before the semester begins.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Thermodynamics	MTE 411	Fall	03+00+00	Elective	3	5
Course Objectives:	This course is designed to teach fluid dynamics analysis for mechatronics engineers with special focus on mechatronics applications. Upon the completion of the course, students will be able to analyze the flow of mass, momentum, and energy with cycles, conservation laws and exergy analysis in mechatronics systems.					
Course Contents:	Laws of thermodynamics, evaluating properties, entropy, control volume analysis, thermodynamic cycles, power and refrigeration systems					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Computer Aided Manufacturing Project	MTE 412	Fall	03+02+00	Elective	4	8
Course Objectives:	Having knowledge about hardware and software for computer aided manufacturing (CAM) and importance for manufacturing processes. Modeling by using CAM programs and choosing tool and operation parameters. Generating tool path algorithms and obtaining part programs for numerical controlled machine tools by using post processor. Having ability of using CAM programs					
Course Contents:	Hardware and software for Computer Aided Manufacturing (CAM) and their properties, numerical controlled machine tools, manufacturing systems and CAM, modeling with CAD/CAM programs, selection of process parameters and tooling, tool paths and tool paths generation algorithms, machining strategies, post processor and graphical simulation of machining.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Fluid Mechanics	MTE 413	Fall	03+00+00	Elective	3	5
Course Objectives:	This course is designed to teach fluid dynamics analysis for mechatronics engineers with special focus on mechatronics applications. Upon the completion of the course, students will be able to analyze the flows around moving objects with mass, momentum, and energy conservation.					
Course Contents:	Conservation laws, Bernoulli equations, control volume analysis, differential analysis, dimensional analysis, flow over immersed bodies, drag and lift analysis, heat transfer by convection, free and forced flow conditions, low Reynolds flows, hydrodynamic interaction analysis					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Microelectromechanical Systems	MTE 415	Fall	03+00+00	Elective	3	5
Course Objectives:	This course is designed to teach the fundamentals of microelectromechanical systems, micro robotics and micro mechatronics. The subject matter will cover the mechatronic system design, modeling and simulation concepts for micro realm along with additional topics of biomimicry, microscopy, and energy supply.					
Course Contents:	Rigid-body dynamics, fluid dynamics, electromagnetics, structural deformation, piezoelectric effect, and optical manipulation in micro realm, micro robotics, properties of materials used in MEMS manufacturing, MEMS manufacturing techniques, energy supply methods for MEMS, microscopy methods, mathematical modeling of system dynamics and micro motion control.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Real-Time Systems Project	MTE 435	Fall	03+02+00	Elective	4	8
Course Objectives:	To introduce the students to analysis and modelling of real-time systems and to empower them in designing and multi-task scheduling and design of real-time systems, which can collect data and operate in multi-sensor environments.					

Nafia Nur Başürün
MDBF Sekreteri

Mehmet Emre Özdoğan
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Course Contents:	Properties and classification of real-time systems; real-time operating systems; modelling and verifications of real-time systems, synchronisation, interfacing, temporal accuracy; real time scheduling of tasks and feasibility tests; testing, real-time communication.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Robot Control Project	MTE 451	Fall	03+02+00	Elective	4	8
Course Objectives:	To equip students with basic concepts of control of robot manipulators such as kinematics, inverse kinematics, dynamics and control algorithms for robot manipulators.					
Course Contents:	Review of control theory, design methods such as PID control, state feedback, optimal control, manipulator dynamics, inverse kinematics; control of multi-link robot manipulators; applications.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Linear Multivariable Systems	MTE 453	Fall	03+00+00	Elective	3	5
Course Objectives:	This course aims to introduce basic methods for analyzing linear multivariable systems and to apply them via projects.					
Course Contents:	Solutions of linear multivariable systems, transfer function, stability conditions, periodic systems, controllability, observability, Kalman decomposition, controller and observer design					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Servo Systems	MTE 454	Fall	03+00+00	Elective	3	5
Course Objectives:	This course aims to introduce basic concepts about and mathematcal background on translational and rotational motion, transmission elements, load and motor characteristics. Mathematical models of AC, DC and servo motors will be analysed from a control engineering point of view focusing on obtaining time- and frequency-domain models and stability analysis, position and speed control.					
Course Contents:	Properties and classifications of servo motors; transmission systems; torque-speed characteristics and operating points; DC motors, armature control and field control; synchronous motors; position, speed and torque control; drivers and hardware; servo motor applications.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Power Electronics	MTE 455	Fall	03+00+00	Elective	3	5
Course Objectives:	To learn the principles the operation principles of basic power converter topologies, the principles of electromechanical power conversion and the motors used in mechatronic applications, the principles of speed and torque control and the power electronic drives to control these motors.					
Course Contents:	Principles of electromechanical energy conversion; Electromagnetic circuit concept; Power and Torque Concepts; Transformers; DC motors; AC motors; Principles of power electronics and power semiconductors; AC-DC converters (rectifiers); DC-DC converters; DC-AC converters (inverters); Electric drives for DC and AC Motors; Design of feedback controllers for dc motors.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Multi-Agent Systems Project	MTE 456	Fall	03+02+00	Elective	4	8
Course Objectives:	This course introduces the student to the basics of multi-agent systems and their applications. Design of multi agent systems and multi agent societies are covered. Familiarising students with the platforms, where multi-agent system are implemented and simulated, is aimed. 2) To introduce the main issues surrounding the design of intelligent agents; 3) To introduce the main issues surrounding the design of a multi-agent society. 4) To introduce a contemporary platform for implementing agents and multi-agent systems					
Course Contents:	Definitions and applications of agents and objects, expert systems and distributed systems; intelligent agents, reasoning agents, hybrid agents, frameworks for programming agents; cooperative and non-cooperative agent interactions, zero-sum interactions; the Prisoner's dilemma and Axelrod's experiments; cooperative distributed problem solving, group coherence and coordination; interaction protocols.					
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Automation Systems	MTE 457	Fall	03+00+00	Elective	3	5
Course Objectives:						
Course Contents:						
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Nonlinear Systems Analysis	MTE 458	Fall	03+00+00	Elective	3	5
Course Objectives:	This course aims to introduce modern methods for analyzing nonlinear systems and to apply them via projects involving nonlinear dynamic phenomena.					
Course Contents:	Stability of equilibria, stability conditions, bifurcations of equilibria, bifurcation conditions, periodic orbits, Poincare map, XPPAUT programıyla analiz, definition of chaos, routes to chaos, chaos suppression.					

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Course Name	Code	Semester	T+A+L (hour/week)	Type (C / O)	Local Credit	ECTS
Biological Control Systems	MTE 459	Fall	03+00+00	Elective	3	5
Course Objectives:						
Course Contents:						
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Nanotechnology and Nanomaterials	MTE 461	Fall	03+00+00	Elective	3	5
Course Objectives:						
Course Contents:						
Course Name	**Code**	**Semester**	**T+A+L (hour/week)**	**Type (C / O)**	**Local Credit**	**ECTS**
Active and Passive Plating	MTE 463	Fall	03+00+00	Elective	3	5
Course Objectives:						
Course Contents:						

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