**EK 2 - DERS İÇERİKLERİ**

**Üsküdar Üniversitesi**

**Mühendislik ve Doğa Bilimleri Fakültesi**

**Elektrik ve Elektronik Mühendisliği Bölümü (İngilizce)**

**Ders İçerikleri**

**BİRİNCİ SINIF**

**I. YARIYIL**

**MATH 101-** **Calculus –I 4 / AKTS: 6**
Foundations, coordinates and vectors, functions, limits, continuity, derivative, tangent lines, the mean value theorem, graphing, extreme values, optimization problems, linearization and differentials, integration, Riemann sums and definite integrals, the fundamental theorem of calculus, natural logarithm, exponential functions, inverse trigonometric functions, L'Hospital's rule, methods of integration, applications of integrals.

**PHYS 101 - Physics-I 4 / AKTS: 6**

Physics and measurements. Vectors; motion in one and two dimensions; the laws of motion; circular motion and other applications of Newton's Laws; work and energy; conservation of energy; linear momentum and collisions; rotational motion; angular momentum; equilibrium; gravitation.

**CHEM 101-General Chemistry-I 4 / AKTS: 6**

Chemical foundations, atoms, molecules and ions, modern atomic theory, chemical compounds and their nomenclature, stoichiometry of chemical reactions, chemical calculations, reactions in solutions, precipitation, acid-base neutralization and oxidation-reduction (redox) reactions, gases, thermochemistry, periodic table and its properties, properties of solutions, chemical reaction kinetics and principles of chemical equilibrium. Laboratory experiments accompany the lectures.

**ING 101-English-I 3 / AKTS: 3**
Reading texts and exercises. Listening exercises. Translation exercises. Writing essay. Speaking exercises, conversations.

**TURK 101-Türk Dili-I 2 / AKTS: 3**
“Dil” tanımı, dilin sosyal bir unsur olarak millet hayatındaki yeri ve önemi, dil-kültür münasebeti, Türk dilinin dünya dilleri arasındaki yeri, Türk dilinin gelişmesi ve tarihi evreleri, bugünkü durumu ve yayılma alanları, Türkçe’de sesler ve sınıflandırılması, Türkçe’nin ses özellikleri ve ses bilgisi ile ilgili kurallar, hece bilgisi, imla kuralları ve uygulaması, noktalama işaretleri ve uygulaması, Türkçe’nin yapım ekleri ve uygulaması, kompozisyonla ilgili genel bilgiler, kompozisyon yazmada kullanılacak plan ve uygulanması, isim ve fiil çekimleri, kompozisyonda anlatım şekilleri ve uygulanması, zarfların ve edatların kullanılış şekilleri.

**ATA 101-Atatürk İlkeleri ve İnkılap Tarihi-I 2 / AKTS: 3**

Türk İnkılâbının tarihi anlamı ve önemi; Türk inkılâbını hazırlayan koşullar, ortam ve gelişmeleri; Mustafa Kemal Paşa önderliğinde Ulusal Kurtuluş Savaşı; Ulus egemenliğine dayalı tam bağımsız yeni Türk Devleti'nin kuruluşu; Atatürk'ün dahi asker, büyük devlet adamı ve İnkılâpçı kişiliği ile teşkilatçılığı.

**EEE 101 -** **Introduction to Electrical and Electronics Engineering 3 / AKTS: 4**

The contents of the course covers electrical concepts, units, evaluation of basic electronics elements, Explaining of basic theorems, resistance, inductance and capacitance, direct and alternating current circuits, electrical measurements, analog and digital circuit analysis.

**RKUL 101-University Culture 1 / AKTS: 1**

Üniversite öğrencilerini sosyal, akademik, kültürel gelişmelerini sağlayarak hayata hazırlayan, farklı alanlardaki uzmanların seminerler vererek öğrencilerimizin gelişimlerini sağlamayı hedefleyen derstir.

**BİRİNCİ SINIF**

**II. YARIYIL**

**MATH 102-Calculus -II 4 / AKTS: 6**
Sequences and series, Taylor and Maclaurin series, lengths of plane curves, polar coordinates and complex numbers, lines, planes and quadric surfaces in space, functions of several variables, limits and continuity, partial derivatives, differentiability, the chain rule, directional derivatives, extreme values, multiple integrals, integrals in polar, cylindrical and spherical coordinates, line integrals and surface integrals.

**PHYS 102- Physics -II 4 / AKTS: 6**
Topics in Electricity and Magnetism: Electric charges and matter, Coulomb's law, electric fields, electric field calculations, motion of a charged particle in electric field. Gauss's law, electric flux and Gauss's law, applications of Gauss's law. Electric potential and electric potential difference, electric potential energy, electric potential due to point charges and charge distributions. Capacitance and dielectrics, definition and calculations of capacitances, energy stored in capacitors, capacitors with dielectrics. Current and resistance, electric current, resistance, electrical conduction. Direct-current circuits, electromotive force, Kirchhoff's rules, applications. Magnetic fields, definition and properties of Magnetic fields. Magnetic forces on charges and currents, applications of magnetic fields. Sources of magnetic fields, the Biot-Sawart Law, Ampere's law. Faraday's law, Lenz's law, induced electric fields, generators and motors. Inductance, mutual and self inductance, RL circuits, energy in magnetic fields.

**MATH201-Linear Algebra with Engineering Applications 3 / AKTS: 4**

Matrices, row equivalence, invertibility, systems of linear equations, determinants, Cramer's rule, vector spaces, linear dependence and independence, bases, inner product spaces, Gramm-Schmidt orthogonalization process, orthogonal projections, Fourier series, eigenvalues, eigenvectors, exponential matrix, diagonalization and its applications, linear transformations and their matrices. Examples for each subject of this course are performed in Matlab.

**ING 102-English-II 3 / AKTS: 3**
Reading texts about profession, grammar exercises, word activities, translation activities, listening and speaking exercises.

**TURK 102-Türk Dili–II 2 / AKTS: 3**
Cümlenin unsurları, cümle tahlili ve uygulanması, edebiyat ve düşünce dünyası ile ilgili eserlerin okunup incelenmesi ve retorik uygulaması, yazılı kompozisyon türleri ve uygulanması, anlatım ve cümle bozuklukları ve bunların düzenlenmesi, ilmi yazıların hazırlanmasında uyulacak kurallar.

**ATA 102-Atatürk İlkeleri ve İnkılap Tarihi-II 2 / AKTS: 3**

Türk ulusunun bütün kurumları ve değerleriyle çağdaş uygarlığın da üstüne çıkma çabaları, Atatürk İlke ve İnkılâpları; Atatürk düşünce sistemi; Atatürk döneminde Türkiye'nin iç ve dış politikası; İkinci Dünya Savaşı ve Türkiye; Türkiye'de çok partili döneme geçiş.

**EEE 102 – Computer Tools for Electrical and Electronics Engineering 3 / AKTS: 4**
Matlab expressions, constants, variables, arrays. Graph plots. Procedures and functions. Matlab syntax. Graphic User Interface (GUI). Linear algebra using Matlab. PSpice overview, Circuit schematics, schematic rules and analysis types. Modeling with PSpice, mixed analog and digital simulation, measurement in PSpice. Programming in Labview.

**RKUL 102-University Culture 1 / AKTS: 1**

Üniversite öğrencilerini sosyal, akademik, kültürel gelişmelerini sağlayarak hayata hazırlayan, farklı alanlardaki uzmanların seminerler vererek öğrencilerimizin gelişimlerini sağlamayı hedefleyen derstir.

**İKİNCİ SINIF**

**III. YARIYIL**

**EEE 201-Circuit Theory-I 3 / AKTS: 6**
Basic Concepts and Definitions, Nodal and Mesh Equations, Introduction to Operational Amplifiers, Inductance and Capacitance, Sinusoidal Circuit Analysis.

**EEE 203-Engineering Mathematics 3 / AKTS: 5**

Matrix Operations, Eigenvalues and Eigenvectors, Fourier Series, Complex Transcendental Functions, Complex Line Integrals, Fourier Transform, Laplace Transform, z Transform.

**COME 203 -Logic Circuits 4 / AKTS: 5**
Realization of Boolean functions, logic gates. Multivibrators. Coding and debugging techniques. Boolean functions with a single-chip implementation. Flip-flops. Clock mode sequential circuits. Level mode sequential circuits. Counters. MSI integrated circuits. MSI chips, integrated circuit design. Logic circuits, race and hazard.

**EEE 205-** **Probability and Random Variables 3 / AKTS: 5**

Introduction to Statistics, Descriptive Statistics, Probability, Random Variables and Expectation, Discrete Probability Distributions, Continuous Probability Distributions, Distributions of Sampling Statistics, Parameter Estimation, Hypothesis Testing, Simple Linear Regression and Correlation, Analysis of Variance.

**MATH 203-Differential Equations 3 / AKTS: 5**
Differential quations and fundamental properties ,boundary- value problems ,the theorems of existence and unique,seperable equations and equations reducible to this form, homogeneous differential equations , if P and Q are linears, exact differential equations ,the concept of integrating factors and finding multiplies of differential quations , linear and Bernoulli differential equations , Riccati differential equation,solutions with sustitution variable , systems,orthogonal and oblique trajectories , first and high order degrees differential equations Clairaut and Lagrange differential equations, solutions about singular points,envelops, n.order degrees linear linear differential equations with constant coefficients, the method of undetermined coefficients,the short methods ,variation of parameters , Euler differential equation ,diferential equation with variable coefficients .Laplace transformation; solutions using Laplace transformation.

**ING 231 – Professional English I 3 / AKTS: 3**

Teaching English terms and terminologies in order to facilitate follow-up of the literature related to

their course.

**İKİNCİ SINIF**

**IV. YARIYIL**

**EEE 202 – Circuit Theory II 3 / ECTS: 6**
Natural response of electric circuits, Forced and Total Response in RL Circuits, Forced and Total Response in RC Circuits, Natural, Forced and Total Responses of Second Order Circuits, Resonance, Elementary Signals, Laplace Transformation, Inverse Laplace Transformation, Circuit Analysis with Laplace Transforms, Frequency Response and Bode Plots, Self and Mutual Inductances – Transformers, One-and Two-port Networks, Three-Phase Systems

**EEE 204-** **Electromagnetic Field Theory 3 / ECTS: 6**
This course provides in depth coverage of all aspects electromagnetics, with a focus on field and wave generation and propagation. The course will focus on the more practical aspects of E-M theory, with application examples taken from the problems in the textbook as well as from other references. The specific subjects covered will be vectors and fields, electrostatics, electric current flow, magnetic fields, Maxwell’s equations, electromagnetic wave propagation, transmission lines, waveguides, resonators and antennas.

**COME 206-Signals and Systems 3 / ECTS: 6**

Introduction, Time-domain representations of linear time-invariant systems, Fourier representations signals and linear time-invariant systems, applications of Fourier representations to mixed signal classes, application to communication systems, representing signals by using continuous time complex essentials: The Laplace transform, representing signals by using discrete time complex exponentials: the z-transform, application to filters and equalizers, application to linear feedback systems, epilogue.

**MATH 302 -** **Numerical Analysis 3 / ECTS: 5**

Field and space of real numbers, distance and norms in mathematical spaces, matrices, equations with real coefficients; the matrix inversion problem, eigenvalues and eigenvectors; recurrence relations, mathematical induction, and recursive algorithms; error analysis, evaluation and estimation; iterative methods in computational numeric analysis; finding roots of polynomials; numerical integration and differentiation; solving systems of linear algebraic equations, linear differential equations; the idea and concept of computer algebra systems and symbolic computation; computer handling of polynomials and rational functions; Square-free decomposition of polynomials; the extended Euclidean algorithm; Rational functions and partial fractions.

**ING232-Professional English-II 3 / AKTS: 3**

Teaching English terms and terminologies in order to facilitate follow-up of the literature related to their course.

**EEE 282 – Summer Practice-I**

Stajın amacı, elektrik ve elektronik mühendisliği alanındaki çalışma ortamlarını tanımak ve üniversitede edinilen bilgileri böyle bir pratik çalışma ortamında uygulamaktır.

**ÜÇÜNCÜ SINIF**

**V. YARIYIL**

**EEE 301 – Electronics I 3 / AKTS: 6**

Semiconductors, PN junction, diodes, structure and operation principles of BJT, small signal analysis, structure and operation principles of FET.

**EEE 303 – Electric Machines 3 / AKTS: 6**

Electromechanical-Energy-Conversion ; The magnetic, electric, mechanic and electromemagnetics relationships; definations and references signs of the generator, motor and transformer; Elementary motor and generator. DC Machines; Basic structure and operating principles ; electrical and mathematical models; steady-State Operating Characteristics. Synchronous Machines; Basic structure and operating principles; Rotating field, types according to rotor structures and phase numbers, Equivalent circuits, Electrical and mathematical models, Steady-State Operating Characteristics Transformers; Basic structure and operating principles; Ideal and real transformer models, No load and load test for equivalent circuit parameters, Electrical and mathematical models of three-phase transformers, Auto transformers; Voltage and current transformers. Induction Machines; Basic structure and principles; Single-phase and three-phase inducting machines, Equivalent circuits, Steady-State Operating Characteristics, Starting methods, Parameter Determination from No-Load and Blocked-Rotor Tests.

**EEE 305 – Communication Theory 3 / AKTS: 5**

Digital modulation, the receiver and transmitter circuits, communications media, channel modeling, TCM, Turbo coding, channel estimation.

**EEE 307 – Electric Circuits Laboratory 2 / AKTS: 4**

Taking measurements with voltmeter, ammeter and oscilloscope. Practical applications of circuit theory. Resistive circuit analysis. RL and RC circuits frequency responses. Multiple output circuits. Passive and active filters. Three phases fundamentals.

**RPRE 104 – Entrepreneurship and Project Culture 1 / AKTS: 1**

The skills and knowledge which students will gain through this course are; 1. To learn scientific, academic and application oriented entrepreneurship, 2. To develop different perspective and manner of approaching corresponding with entrepreneurship, 3. To perceive and learn entrepreneurship with economical and social aspects, 4. To understand, entrepreneurship and especially economical entrepreneurship phenomenon as a system at a theoretical and practical level, 5. To be able to evaluate entrepreneurship processes and relations between them systematical and make it practicable, 6. To develop knowledge and skills at basic level about “marketing”, “financing”, “business establishment processes”, “applicable legal legislation” etc. which are closely associated with entrepreneurship and especially economical entrepreneurship. 7. To be able turn an oppurtunity into an idea and turn an idea into a business idea and evaluate this process, 8. To be able to create marketing, financial and business management plan and evaluate it, 9. To be able to make a feasibility study at a basic level.

**EEE 3XX – Departmental Elective - I 3 / AKTS: 5**

**ÜÇÜNCÜ SINIF**

**VI. YARIYIL**

**EEE 302-** **Electronics II 3 / AKTS: 6**

Basics of electronic circuits, analysis and design of BJT and MOSFET amplifiers, power amplifiers, feedback, frequency response of amplifiers, OPAMP, oscillators.

**EEE 304-** **Electronic Circuits Laboratory 2 / AKTS: 4**

Learn various applications of diodes, BJT and FET amplifiers.

**EEE 306-** **Control Systems 3 / AKTS: 5**

Introduction to Control Engineering, Review of Complex Variables & Functions, Review of Laplace Transform, Review of Linear Algebra, Linear Differential Equations, Obtaining Transfer Functions (TFs), Block Diagrams, Concept of Feedback and Closed Loop, Basic Control Actions, P-I-D Effects, Concept of Stability, Stability Analysis of the Closed Loop, System by Routh Criterion, State Space Representation and Stability.

**EEE 3XX – Departmental Elective II 3 / AKTS: 5**

**XXXXXX – Social Elective I 3 / AKTS: 5**

**EEE 382 – Summer Practice II**

Stajın amacı, elektrik ve elektronik mühendisliği sektöründeki çalışma ortamlarını tanımak ve üniversitede edinilen bilgileri böyle bir pratik çalışma ortamında uygulamaktır.

**DÖRDÜNCÜ SINIF**

**VII. YARIYIL**

**EEE 491-Graduation Project 2 / AKTS: 9**

It covers developments in the field of engineering and the content may vary depending on the research interest of student and supervisor.

**EEE 4XX-** **Deparmental Elective III 3 / AKTS: 5**

**EEE 4XX-** **Deparmental Elective IV 3 / AKTS: 5**

**XXX 4XX-** **Field Elective I 3 / AKTS: 5**

**XXX 4XX-** **Social Elective II 3 / AKTS: 5**

**DÖRDÜNCÜ SINIF**

**VIII. YARIYIL**

**EEE 492-Graduation Thesis 2 / AKTS: 9**
Complete production and test procedure of the project that designed conceptually in EEE 491.

**EEE 4XX-** **Deparmental Elective V 3 / AKTS: 5**

**EEE 4XX-** **Deparmental Elective VI 3 / AKTS: 5**

**XXX 4XX-** **Foreign Language Elective 2 / AKTS: 3**

**XXX 4XX-** **Field Elective II 3 / AKTS: 5**

**BÖLÜM SEÇMELİ DERSLER**

**High Voltage Techniques**

**Fundamentals of Power Systems**

**Electrical Installations**

**Integrated Circuit Design**

**Communications Laboratory**

**Power Electronics**

**Microprocessors**

**Microcontrollers**

**Illimination Techniques**

**Antennas and Propagation**

**Digital Signal Processing**

**Distribution Systems**

**Power Transmission and Distribution**

**Power Electronics**

**Electromechanical Energy Conversion**

**Renewable Energy Systems**

**Introduction to Robotics**

**Industrial Electronics and Automation**

**Energy Systems**