

Gazi Üniversitesi
Mühendislik Mimarlık Fakültesi
Elektrik-Elektronik Mühendisliği Bölümü
%100 İngilizce Lisans Programı
2018-19 Eğitim Öğretim Döneminden İtibaren Geçerli Ders Planı

Description of the Undergraduate Courses

Courses offered by EEE Program

EEE101 Introduction to Electrical and Electronics Engineering (1+0) 1

General information about the main areas. Historical development and contributing scientists of Electrical and Electronics Engineering (EEE). Tools and methods used in the field. Information on the areas of EEE. Interaction between EEE and other science and engineering branches. Engineering ethics. Knowledge transfer from experienced engineers.

EEE103 Computer Programming (3+2) 4

Introduction to computer software/hardware and programming languages. Variable definitions, operators, decisions, loops. Arrays, strings. Functions and recursive functions. File processing. Pointers and dynamic memory usage. The algorithms for solving fundamental mathematical problems, and implementation of these algorithms by using C++ programming language and a numerical computing environment (MATLAB).

EEE104 Logic Circuit Design (3+0) 3

Introduction to digital concepts. Number systems. Operations and codes. Boolean algebra and logic gates. Boolean function simplification. Combinational logic. Flip-Flop circuits and design of circuits with flip-flops. Counters.

EEE105 Material Science (3+0) 3

Conductors, insulating and semiconductor materials. Resistance and resistivity, conductance and conductivity concepts for materials. Overhead transmission line conductors and underground cables. Calculation of current carrying capacity of conductors and cables. Heating and voltage drop computation in cables. Insulated conductors and pipes used in internal installation. Internal circuits and their installation methods. Fuses, insulators and protection devices. Switches and applications. Lighting materials and armatures, fiber optic materials. Materials used in measurement techniques and electric meters. Advance materials and non-materials. Security concept in electrical installations and protection techniques.

EEE106 Logic Circuit Design Lab. (0+2) 1

Circuit design and practice using logic circuit gates. Half-adder, full adder, multiplexer and flip-flop circuits measurements and simulation studies.

EEE201 Engineering Mathematics (3+0) 3

Orthogonal coordinate systems. Vector and scalar fields. Coordinate transformations of point and vector. Vector algebra. Nabla (∇) operator. Directional derivation and gradient for a scalar function. Divergence and rotational for a vector function. Helmholtz theorem and classification of fields. Line integrals of vector functions; Integral theorem; Divergence theorem; Stokes theorem; Fourier series; Fourier and Inverse Fourier transformations. Laplace and Inverse Laplace transformations. Error analysis in numerical approximations. Taylor series and difference equations. Root approximations methods. Numerical integration methods.

EEE209 Probability and Statistics (3+0) 3

Basic concepts of probability and statistics. Random variables. Functions of random variables. Multivariable distributions and densities. Independent random variables. Correlation, application of statistics to engineering systems.

EEE212 Analog Electronics I (4+0) 4

Basic semiconductor concepts. Physical electronics. Physics of P-N diodes. Bipolar junction transistors (BJTs). Field effect transistors (FETs). Transistor biasing and small signal models. Frequency analysis of amplifiers. Unijunction transistors (UJTs). P-N-P-N switching devices. Negative resistance microwave devices. Lasers. Introduction to electronic circuit analysis using SPICE.

Prerequisites: EEE221

EEE214 Analog Electronics Lab. (0+2) 1

Obtaining diode characteristics. Rectifier, clipper, clamper and regulator circuits. Obtaining BJT and FET characteristics. BJT and FET amplifier circuits.

Prerequisites: EEE221

EEE221 Circuit Theory I (4+0) 4

Circuit concept. Circuit variables and components. Ohmic circuits. Techniques and methods used for DC circuit analysis. Operational amplifiers. Inductance and capacitance. Transient and steady state responses of first and second order circuits.

Prerequisites: MAT102

EEE222 Circuit Theory II (4+0) 4

Sinusoidal steady state analysis. Application of circuit analysis techniques to AC circuits. Phasors. Power and energy in sinusoidal circuits. Application of Laplace transformation to circuit analysis. Filters. Fourier series and transformation. Two-port circuits. Mutual inductance and transformers.

Prerequisites: EEE221

EEE223 Circuit Theory Lab. I (0+2) 1

Measurement of voltage, current and resistance. Node-voltage method and mesh current methods in dc circuits. Thevenin and Norton theorems. Linearity and superposition principles. Oscilloscopes. Measurements with oscilloscopes.

EEE224 Circuit Theory Lab. II (0+2) 1

Frequency variation of capacitive and inductive reactance. Series RC and RL circuits. Parallel RC and RL circuits. Series and parallel RLC circuits. Derivative and integrative RC circuits. Filter circuits. Power and power factor in sinusoidal circuits.

Prerequisites: EEE221E

EEE252 Electromagnetic Field Theory I (4+0) 4

A short review of vector analysis. Electrostatic and magnetostatic phenomena in matter and free space (fundamental postulates of electrostatics and magnetostatics). Laplace and Poisson's equations and solution methods of static electromagnetic fields. Energy, forces, boundary conditions for static electromagnetic fields. Resistance, inductance and capacitance concepts. Magnetic circuits. Electromagnetic properties of materials. Uniqueness theorem. Introduction to time-varying electromagnetic fields.

Prerequisites: EEE201

EEE295 Introduction to Electrical Engineering (3+0) 3 (Service course)

Definitions and units. Basic laws. Circuit analysis methods. Resistive circuits. Inductor and capacitor. Dynamic response. Alternating current circuits. Electrical measurement and

instruments. Transformers. Generators. Motors. Semiconductor electronics. Principles and applications of diode, transistors, thyristors.

EEE301 Seminar (1+0) 1

Seminars presented by experts in the fields on popular topics of Electrical and Electronic Engineering as well as project planning, management, risk management, change management, and work safety.

EEE304 Microprocessors (3+0) 3

Microprocessor based systems. An introduction to the 80x86 microprocessor family. Software Architecture: addressing modes. Data transfer instructions. Arithmetic, logical, bit manipulation, program transfer, and processor control instructions. Software and hardware interrupts. An introduction to the programming. Programming applications. Hardware architecture: hardware details of the 80x88. Memory system design. I/O system design. Building a working 8088 system.

Prerequisites: EEE104

EEE306 Microprocessors Laboratory (0+2) 1

Microprocessor based systems. An introduction to the 80x86 microprocessor family. Software Architecture: addressing modes. Data transfer instructions. Arithmetic, logical, bit manipulation, program transfer, and processor control instructions. Software and hardware interrupts. An introduction to the programming. Programming applications. Hardware architecture: hardware details of the 80x88. Memory system design. I/O system design. Building a working 8088 system.

Prerequisites: EEE104

EEE308 Numerical Analysis (3+0) 3

Introduction to MATLAB for numerical solutions, Error Analysis, Root approximations, Matrices and Determinants, Differential Equations, Linear and Parabolic Regressions, Numerical Integration.

EEE311 Analog Electronics II ((3+0) 3

Multistage amplifiers. Bode plots. DC, RC and transformer coupled amplifiers. Differential pair stages. Current sources. Operational amplifier applications. Power amplifiers. Positive and negative feedback in amplifiers. Integrated circuit power supply regulators. Noise in amplifiers

Prerequisites: EEE212

EEE313 Analog Electronics Laboratory II (0+2) 1

Voltage/Current gain, input/output resistances and cut-off frequency measurements for multi-stage amplifiers, differential amplifiers, constant current sources, parameter measurements of operational amplifiers, positive and negative feedback amplifiers.

Prerequisites: EEE212

EEE321 Signal and Systems (3+0) 3

Introduction to signals and systems, Linear time invariant systems. Fourier series representation of periodic signals. Continuous-time fourier transform. Discrete-time fourier transform. Sampling theorem. Modulation theorem. Laplace transformations. Z-transform.

Prerequisites: EEE222

EEE326 Control Systems I (3+0) 3

Basic concepts. Mathematic models of physical systems. Transfer functions, block diagram analysis, state equations. Transient and steady-state analysis of systems. Details on second order systems. Definition of state-space representations; controllability and observability. Stability analysis. Routh-Hurwitz method, root-locus method. Bode plots and Nyquist analysis. Relative stability and design in frequency domain. Compensator design in frequency domain.

Prerequisites: EEE321

EEE331 Fundamentals of Energy Systems (3+0) 3

Introduction to energy systems. Power calculation in single-phase AA circuits. Reactive power compensation. Modern high voltage capacitors. Introduction to three-phase systems. Phasor analysis in three phase systems. Connection combinations and power analysis in three-phase systems. Single line displays of three phase power systems and power transformers. Power cabling and practical calculation methods. Short circuit calculations in power systems. Fuses, contactors and cutters. Ground. Introduction to touch and step voltage calculations. Stability and Smart Grids in energy systems.

Prerequisites: EEE222

EEE336 Electromechanical Energy Conversion (4+0) 4

Electromagnetic circuits. Electromechanical energy conversion. Single-phase and three-phase transformers. DC motors and generators: principles of operation, speed control. Rotating magnetic fields and three-phase windings. Induction machines: principles of operation, equivalent circuit, speed control. Synchronous machines: equivalent circuit, state characteristics, synchronization. Special electrical machines.

Prerequisites: EEE331

EEE351 Electromagnetic Waves (3+0) 3

Time varying fields. Maxwell's equations in time and frequency domains. Electromagnetic energy and power. Wave equation. Uniform plane waves. Polarization. Reflection transmission and refraction. Introduction to transmission lines.

Prerequisites: EEE252E

EEE392 Project Management (1+0) 1

Engineering design process. Project selection and needs analysis. Requirement specification. Concept generation and evaluation. System design: Functional decomposition and behavioral models. Testing. System Reliability. Teams and teamwork. Project Management. Ethical and Legal Issues. Oral presentation techniques.

EEE401 Electronic Measurements and Instrumentation (3+0) 3

Basic principles of measurement and characteristics (sensitivity, accuracy, linearity, effect, response time, etc.). Design and calibration terms. Measurement errors and error sources. Measurement and measurement methods of circuit elements. Analog measuring. Moving measuring instruments, precision measuring tools and changing the boundaries and dimensions, Alternating current bridge; inductance, capacitance and dissipation factor measurement, Q-meters. Counters and digital measurement, analog-to-digital conversion and converters; Flash, single-and dual-slope voltage-frequency converters, power and energy measurement, trigger circuit and measurement. Instrumentation amplifiers and related concepts.

EEE411 Digital Electronics (3+2) 4

Properties of digital ICs. Operation and design of RTL, DTL, TTL, STTL, LSTTL, ECL, NMOS, CMOS and GaAs digital circuits. CMOS Combinational Logic. NAND, NOR, AND,

OR, AOI, XOR/XNOR. CMOS Tri-state logic gates. CMOS Schmitt trigger Gates. CMOS drivers. Static and Dynamic CMOS. Memory circuits (RAM, ROM). Interface circuits A/D and D/A conversion.

EEE412 Large Scale Full Circuit Design (3+0) 3

Design techniques for rapid implementations of very large-scaled integration (VLSI) circuits. MOS technology and logic. Structure design. Design rules, layout procedures. Circuit simulation. Project to develop and layout circuits.

EEE413 Semiconductor Circuit Technology (3+0) 3

Preparation of semiconductor slices. Insulating film on semiconductors. Photolithography. Dopant impurities and diffusion of dopant impurities. Metallization, interconnection and packaging. Integrated circuits components and their fabrications. Integration of commercial circuits. Future developments in semiconductor micro technology.

EEE414 Optoelectronics (3+0) 3

Mathematical definition of electromagnetic wave propagation. Radiation theory. Energy states of simple elements, relation between radiation wavelength and energy state. Relation between radiation color and wavelength, position of ultraviolet, visible light and infrared wavelengths in spectrum, optical spectrum. Conversion between electric and light. Radiating devices: light emitting diodes (LEDs), lasers, solid-gas-semiconductor laser types, detectors, photoresistor, photodiode, phototransistor, optocoupler. Application circuits of optoelectronics devices, optical receiver and transmitter circuits.

EEE415 Avionics System Design (3+0) 3

Fault Tolerant Avionics Design, Airborne Instrumentation, Avionics Data Buses, Architecture and Integration, Aerospace Software Engineering, System Development and Life Cycle Models, Reliability, Safety Assessment and Certification, Aircraft/Spacecraft Performance, Stability & Control Systems, Integrated Vehicle Health Monitoring (IVHM) and Fault Detection & Isolation and Recovery (FDIR)

EEE419 Communication Electronics (3+0) 3

High and low frequency behaviors of amplifiers. Bode curves, semiconductor circuit elements internal capacity, small signal equivalent circuit and miller theorem. Feedback, negative feedback and negative feedback species to the effects of various performance parameters of the circuit. Stability of negative feedback amplifiers, series and parallel resonant circuits, the circuit quality factor and the equivalence. Oscillators, Barkhausen criteria, crystal, sinus, and blanking LC oscillators. Impulse response of amplifiers, rise time, pulse bending over and tinnitus. Wide-band amplifiers, increasing bandwidth, cascade and differential amplifier. PLL and frequency synthesizers, linear and exponential modulators, working principles and basic circuits. Noise and distortion, noise factor and noise measurements.

EEE421 Digital Signal Processing (3+0) 3

Discrete-time signals and systems. Sampling. Linear time-invariant systems. Z-transform, inverse Z-transform, 2-D Z-transform. The discrete Fourier transform. Digital filter design techniques: IIR and FIR filters. Fast Fourier Transform techniques. Discrete Hilbert Transform. Optimal filtering and estimation.

Prerequisites: EEE321

EEE423 Industrial Control (3+0) 3

Introduction to industrial control. Sensors and transducers. Signal conditioning. Digital signals. Data representation systems. Actuators. System modelling. Dynamic response of systems. Interface systems. PLCs. Industrial communication systems.

EEE424 Discrete-Time Control Systems (3+0) 3

Importance and advantages of discrete time system models in control. Time domain analysis of discrete-time systems. Sampled data systems. Stability; translation of analog design. State space design methods: observer theory, introduction to optimal design methods. Quantization effects.

Prerequisites: EEE421

EEE426 Nonlinear Control Systems (3+0) 3

State-space analysis methods. Isocline Lienard's methods, classification of singularities. Analytic techniques of periodic phenomena. Perturbation method. Stability definitions. Lyapunov's second method. Popov stability criterion. The method of harmonic realization. Describing functions. Dual-input describing functions. Equivalent linearization and oscillations in nonlinear feedback systems.

Prerequisites: EEE326

EEE431 Power Electronics I (3+0) 3

Basic characteristics and operation principles of thyristors and diodes. Single phase and three phase rectifiers. Uncontrolled, semi-controlled and controlled rectifiers. Non-idealities in rectifiers. Harmonics at the input and output of the converters. Input power factor. Transformer utilization and unbalances. AC voltage controllers. Line frequency rectifier applications.

EEE432 Power Electronics II (3+2) 4

Operation principles of DC-DC converters. DC-DC converter topologies. Operation principles and characteristics of high frequency power semiconductor devices. Calculation of switching losses. Snubber and protection circuits. DC-AC converters (inverters). Pulse Width Modulation.

Prerequisites: EEE431

EEE434 Electric Motors and Drives (3+2) 4

DC Motor speed and torque control methods and their applications. Choppers. Four quadrant operation. Induction motor speed and torque control methods. Scalar control techniques. Principles of vector control. Speed control in synchronous motors. Reluctance motors.

Prerequisites: EEE336

EEE441 Communication Systems I (3+2) 4

Communication systems. Representation of signals and systems for communication systems. Random processes. AM/FM/PM continuous-wave modulation. Effects of noise in CW modulation systems

EEE442 Communication Systems II (3+2) 4

Random variables and processes, noise. Sampling process and pulse modulation methods. Baseband pulse transmission. Digital modulation techniques for pass-band transmission. Introduction to information theory and error control coding.

Prerequisites: EEE441

EEE444 Digital Communications (3+0) 3

Characterization of communication signals and systems. Optimum receivers for additive white Gaussian noise channel. Carrier and symbol synchronization. Signal design for band limited channels. Communication through band limited linear filter channels. Adaptive equalization.

EEE446 Introduction to Cryptography (3+0) 3

Elementary number theory. Finite fields and quadratic residues. Classical cryptosystems. Block ciphers. Stream ciphers. Shannon's theory. Public key cryptography. Primality and factoring. Primality tests and prime number generation. Quantum cryptography.

EEE448 Random Processes (3+0) 3

Random processes. The power spectral density of a random process. Multiple random processes. Transmission of random processes through linear systems. Bandpass random processes. Optimum threshold detection. M-ary communication. Introduction to information theory. Error correcting codes.

EEE451 Microwave Technology I (3+2) 4

Review of electromagnetic wave theory. Frequency and time domain analysis of transmission lines. TEM mode transmission lines. Rectangular and circular wave guides. Equivalent circuit analysis of microwave systems. Impedance transformation and matching techniques. Microstrip devices.

EEE452 Microwave Technology II (3+0) 3

Passive reciprocal and nonreciprocal devices. Electromagnetic resonators. Periodic structures and microwave filters. Microstripline structures and coupled lines. Solid state microwave devices.

Prerequisite: EEE451

EEE453 Radio Wave Propagation (3+0) 3

Wave propagation in free space. Spread backed-channel, electromagnetic field attenuation in free space. Electromagnetic communication links; LOS model, reflection, refraction and diffraction. Scattering, Rayleigh's criterion, surface waves. Atmospheric losses. The noise and losses of the communication devices. Earth surface effect in communication links. Effect of the ionosphere in communication. Effect of the troposphere in communications. Noise and interference. Link quality account. Transmission modeling.

Prerequisite: EEE352

EEE454 Antennas (3+2) 4

Antenna parameters. Wire typed antennas. Radiation from aperture antennas. Transmitter and receiver antennas. Antenna arrays. Reflector antennas. Energy transfer between antennas. Ground wave and sky wave propagation. Satellite communications. Introduction to radar systems.

Prerequisite: EEE352

EEE456 Electromagnetic Modelling (3+0) 3

Finite-difference time-domain method. Yee cell. Absorbing boundary conditions. Simulation of wave propagation. Finite element method. High frequency methods. Method of moments. Application of numerical and high frequency methods to antenna and microwave problems.

Prerequisite: EEE352

EEE458 Radio Frequency Electronic Circuits (3+0) 3

Radio frequency active and passive circuit design. Impedance matching for specific bandwidths. Tuned amplifier, filter, mixer, and oscillator analysis. High frequency measurements and equipment.

Prerequisite: EEE451E

EEE461 Introduction to Biomedical Engineering (3+2) 4

Basic concepts of instrumentation. Basic transducers and principles. The origin of biopotentials. Biopotential electrodes. Biopotential amplifiers. ENG, EEEG, EKG, EEG. Physiology and measurement of nervous, circulatory and respiratory systems. Therapeutic and prosthetic devices.

EEE462 Medical Imaging Systems (3+0) 3

2-D signal processing. X-ray systems: operational principles of roentgen tubes. Basic principles of computerized tomography. Nuclear medicine and gamma cameras. Positron Emission Tomography (PET). Mathematical principles of ultrasonography and medical applications. Magnetic resonance imaging systems.

EEE463 Biological Signal Processing (3+0) 3

Biological signals, signal processing in medical electronics. Signals' classification, random signals characteristics, correlation analysis. Sampling, quantization, discrete methods, spectral analysis, time series analysis. Doppler signals the power spectrum analysis. Spectral estimation. Filters used in biological signals: adaptive filters, Kalman filter

EEE464 Biological Signals and Detection Methods (3+2) 4

Biological signals. Operational amplifiers, and biomedical applications: inverter, non-inverting amplifiers. Audience, collector, differential amplifiers, instrumentation amplifier. Comparator. Active peak detector. Logarithmic amplifiers, negative input capacity amplifiers. Integrators, differentiator circuits, active filters. Electrodes and sensors: circuit model of the electrode, the electrode type, cell stimulation electrodes used in. Converters: variable resistor converter, temperature converter. Variable inductance and capacity transducers. Piezoelectric transducers. Electromagnetic transducers.

EEE471 Power System Analysis I (3+0) 3

Introduction to power systems line parameters; inductance and capacitance of transmission lines. Short, medium and long length lines; current and voltage relations. Electrical characteristics of transformers and generators. Per-unit quantities. System modelling. Symmetrical three-phase faults. Selection of circuit breakers.

EEE472 Power System Analysis II (3+0) 3

Symmetrical components. Positive, negative and zero-sequence networks. Unsymmetrical faults on power systems; single line to ground, double line to ground and line to line fault analysis. Matrix analysis of power systems and solutions. Load flow analysis. Stability of power systems.

Prerequisites: EEE471

EEE473 Lighting Techniques (3+2) 4

Light theories. Eye, sensitivity and vision types. Light reflection, absorption and transmission phenomenon. Definition of lighting terms. Lighting methods. Internal lighting systems and calculations. Pre-project preparation fundamentals. Feeder, service mains, column and main-column line formation. Fundamentals of application project preparations in practical indoor

lighting. Low power-factor correction methods in internal installations. Voltage-drop calculation for lighting systems. External lighting calculations. Special methods for internal and external lighting and applications. LED lighting and applications

EEE474 Renewable Energy Systems (3+0) 3

General structure of renewable energy systems. General structure of power converters used in renewable energy systems. Solar power systems and principles. Panel structure and types. Maximum power point tracking algorithms. Connection types of solar inverters. Wind power systems and principles. Wind turbine types, connection types. Maximum power point tracking. Fuel cells and applications. Other renewable energy sources. Electric vehicles.

EEE475 Energy Distribution I (3+0) 3

Properties of electrical energy and energy distribution systems. Line constants and calculation methods. Effect of abnormal voltages on apparatus and machines. Fundamentals of line conductor cross-section determinations. Lines loaded from a point. Energy distribution networks. Lines loaded with point loads and their cross-section calculations. Distributed loads and power densities. Cross-section calculations on compact and distributed load lines. Determination of transformation locations, and calculations of powers. Towers, calculation of side-wing. Forces and determination of tower types. Preparation fundamentals of low voltage energy distribution network projects.

EEE476 Energy Distribution II (3+0) 3

Medium-voltage lines and networks. Norms voltage levels and determination of economic operation voltages. Determination of line conductor cross-section with respect to mechanical strength and thermal properties in medium voltage lines. Calculation of voltage drop in terms of length and width. Economical line conductor cross-section calculation methods. Line failures and line conductor calculation from short-circuit currents. Dual supplied medium-voltage networks and cross-section computation. Energy loss calculations. Further details of distribution system project preparations.

Prerequisites: EEE475

EEE478 High Voltage Techniques (3+2) 4

I-V characteristics of gases. Electron emission processes. Ionization and deionization. Townsend and Streamer breakdown mechanisms. Breakdown in electronegative gases. Corona discharges and losses. Breakdown mechanisms in solid and liquid insulations. Generation of AC, DC and impulse voltages.

EEE481 Computer Architecture (3+2) 4

Instruction set architecture (ISA), RISC and CISC architectures, assembly and machine language, addressing modes, branching and procedures. Computer arithmetic, arithmetic logic unit (ALU) design. Processor design, data path and control implementation, micro programmed control, interrupts. Pipelining, pipelined processor design. Memory hierarchy, caches, virtual memory. I/O devices, memory mapped I/O.

EEE482 Data Structures (3+0) 3

Fundamentals of object oriented programming. Classes, members functions, constructors, operator overloading, inheritance. Data structures: linked lists, stacks, queues, trees, hash tables and graphs. Algorithms and efficiency of algorithms. Sorting and searching algorithms. Event-driven programming.

Prerequisites: EEE104

EEE484 Introduction to Computer Networks (3+2) 4

Lower layers of the ISO-OSI model. Local area network protocols: carrier sense multiple access collision detect (CSMA / CD). Token Ring / IEEE 802.5 and Fiber Distributed Data Interface (FDDI). Ethernet and data link layer. Error detection and correction, Datalink Layer: Medium Access Control (MAC), Logical Link Control (LLC). Routing the internal network connection, internet tools.

EEE485 Introduction to Artificial Intelligence (3+0) 3

Introduction to MATLAB for artificial intelligence, Understanding the basic concepts in artificial intelligence. Artificial neural networks: RBF, ARMA, SOM models. Fuzzy logic controllers and structure. MATLAB implementation of some of the artificial intelligence techniques.

EEE491 Electrical-Electronics Engineering Design I (SE) (3+2) 4

This course provides guidelines for developing an organized method of doing an engineering design project from start to finish. Theoretical and practical research for undergraduate students to acquire designing skills in various branches of electrical and electronics engineering.

Prerequisites: EEE392; Students who may graduate within two semesters are eligible for this course.

EEE492 Electrical-Electronics Engineering Design II (SE) (2+4) 4

Continuation of engineering design I with topics covering statistics, reliability, engineering economics, ethics and completion of a team project with a final report and presentation.

Prerequisites: EEE491

Courses offered by other programs

MATH 101 Mathematics I (4+0) 4

The concepts of function, limit, continuity, derivative and integral.

MATH 102 Mathematics II (4+0) 4

The applications of definite integral, sequences, convergence tests for series and positive series, limits and derivatives of multivariable functions, double integral

MAT198 Linear Algebra (3+0) 3

Matrices; The Algebra of Matrix, Some Special Matrices; Elementary Operations and Its Applications; Determinants Linear Equation Systems and Its Solutions; Vector Spaces; Subspaces; Linear dependence and Linear Independence; Base and Dimension; Base Changes; Eigenvalues and eigenvectors; diagonalization of matrices

MAT201 Differential Equations (4+0) 4

MATH296 Complex Analysis (3+0) 3

FIZ103 Physics I (4+0) 4

Physics and Measurement, Motion in one dimension, Vectors, Motion in two dimensions, Acts of Motion, Circular Motion and Newton's Laws, Work and Kinetic Energy, Potential energy and conservation of energy, Linear momentum and collisions, Rotation of rigid bodies around a fixed axis, Rolling Motion and Angular Momentum, Static Equilibrium and Flexibility, Vibration Motion and Gravity Law

PHYS104 Physics II (4+0) 4

Electric fields, Continuous charge distribution and electric fields, Gauss's Law and applications, Electric potential, Electric Potential of continuous charge distribution, Capacitance and dielectric, Current and resistance, Electromagnetic force, Direct current circuits, Magnetic fields, Magnetic field sources, Electromagnetic induction, Faraday's Law and induction, Alternating Current circuits: AC sources, resistors, capacitors, inductors at ac circuits, ac circuits in series, power, Electromagnetic Waves

FIZ156 Physics Lab. (0+2) 1

Introduction of laboratory and laboratory equipment, Physical measurement and error, Export of Experimental Data to the Table, Graph drawing and using graphs, writing reports, Velocity, Acceleration, Two dimensional motion, Newton's Laws of Motion in the inclined Plane, Collisions, Simple Harmonic Motion

ENG103 Advance English I(3+0) 3

ING 103 is an advanced level integrated-skills based course in the four language skills (reading, writing, listening and speaking) along with the advanced grammar and vocabulary knowledge. With its engaging content and systematic skills work, students will be able to express their ideas and develop their communicative abilities. It also includes a strong focus on study skills encouraging independent learning.

ENG104 Advance English II (3+0) 3

ING 104 is an advanced level integrated-skills based course in the four language skills (reading, writing, listening and speaking) along with the advanced grammar and vocabulary knowledge. With its engaging content and systematic skills work, students will be able to express their ideas and develop their communicative abilities. It also includes a strong focus on study skills encouraging independent learning.

ENG203 Academic English I (3+0) 3

ING 203 aims to equip the students with the skills they need to succeed in their future academic and professional careers. This course is a learner-centered, integrated-skills based course that will develop students in the four skills (reading, writing, listening and speaking) in an academic context. Higher thinking skills tasks will help students to perform at knowledge and comprehension levels. It will also help them to synthesize and evaluate information, ideas and judgments. The variety of texts and perspectives presented through themes in and outside the class will facilitate their critical thinking process and thus enable students to become active and autonomous learners.

ENG204 Academic English II (3+0) 3

ING 204 aims to equip the students with the skills they need to succeed in their future academic and professional careers. This course is a learner-centered, integrated-skills based course that will develop students in the four skills (reading, writing, listening and speaking) in an academic context. Higher thinking skills tasks will help students to perform at knowledge and comprehension levels. It will also help them to synthesize and evaluate information, ideas and judgments. The variety of texts and perspectives presented through themes in and outside the class will facilitate their critical thinking process and thus enable students to become active and autonomous learners.

TAR101 History of Turkish Revolution and Atatürk's Principles- I (2+0) 2

Basic Concepts of History of Revolution, World and Ottoman Empire at the Beginning of the 20th Century, The Last Period of the Ottoman State, The First World War, The Preparatory Period of the National Struggle.

TAR102 History of Turkish Revolution and Atatürk's Principles- II (2+0) 2

Beginning of the National Struggle, the War of Turkish Independence, the establishment of the Republic of Turkey, reforms, Ataturk's principles of Turkish foreign policy, the current historical events which up today from Ataturk's death.

TÜR101 Turkish I (2+0) 2**TÜR102 Turkish II (2+0) 2****ISG401 Occupational Health and Safety-I I (2+0) 2****ISG402 Occupational Health and Safety-II (2+0) 2**