EEM101 Introduction to Electrical and Electronics Engineering (3 + 0) 5
History and content of electrical and electronics engineering. Basic electric and electronics components, voltage and current. Ohm and Kirchoff’s laws. Magnetism and electromagnetism, electric machineries and systems, control systems, telecommunications and computer networks, biomedical systems.

EEM181 Basic Computer Technology and Applications (1 + 2) 3
Introduction to computer technology(Definition, historical development, types of computers, computer hardware(motherboard, processor, memory, hard disk, video card, sound card, network card, modem, cd/dvd drive/writer, floppy disk, keyboard, mouse, monitor, speakers, microphone, printer, scanner, plotter)), Software (software types, operating systems, application software, programming languages), Operating systems, Windows 2000 operating system, Office programs and applications, word processors (Microsoft Word, and applications), data and graphics processors (Microsoft Excel, and applications)

MAT181 Mathematics I (4 + 0) 6
The basic rules of mathematics and functions. Development of mathematical model and improvement of the problem solving capabilities. Functions, graphical functions, trigonometric functions and their applications, inequalities, equations with multiple unknowns, logarithm, coordinate axes, complex numbers, concept of limit, derivative and integral, curve drawing.

MAT183 Linear Algebra (2 + 0) 3
Elementary row operations and matrices, its application in linear equations, matrix algebra, special types of matrices, elementary matrices, elementary column operations and equal matrices, 2x2, 3x3 determinants, nxn determinants, properties of determinants, method for finding inverse of matrix , linear dependence, linear independence, concept of base. Scalar and vector products. Linear transformations, Eigenvalues and eigenvectors. Quadratic forms.

FIZ183 Physics I (3 + 0) 4
**FIZ191 Physics Laboratory I (0 + 3) 1**

**KIM193 Chemistry (3 + 0) 4**

**TUR181 Turkish Language I (2 + 0) 2**
Historical progress of Turkish, the lands of Turkish, the research fields on Turkish, the symbols and sounds characteristics of Turkish, the fundamentals of Turkish speaking.

**YDL183 Foreign Language I (2+0) 2**
Fundamentals of English grammar, adjectives, adverbs, verbs.

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**SPRING SEMESTER (II)**

**EEM106 Material Science and Technology (2 + 0) 4**
The requirement of engineering for the material science and position of material science. Mechanical properties of the material. Structure of atoms. Interatomic force between atoms (atomic bonds). Classification of materials in terms of interatomic force between atoms. The electrical properties of materials, semiconductors, dielectric properties, magnetic properties, optical properties, thermal properties.

**EEM114 Probability (2+0) 4**
Set definitions and operations, probability introduced through sets and relative frequency, joint and conditional probability, random variables, distribution function, density function, Gaussian random variable, conditional distribution and density functions, operations on random variable, expectation, multi random variables, operations on multi random variables.

**MAT182 Mathematics II (4 + 0) 6**

**EEM182 Introduction to Programming (2+2) 4**

FIZ184 Physics II (3 + 0) 4

EEM186 Computer-Aided Technical Drawing (2 + 2) 3
Introduction to computer aided drawing. geometric configuration. Orthographic drawing. three-dimensional drawing. Principles of dimensioning. sectioning technique and related applications.

FIZ192 Physics Laboratory II (0 + 3) 1

TUR182 Turkish Language II (2 + 0) 2
Turkish literature, sentences, conversation about Turkish.

YDL184 Foreign Language II (2+0) 2
Advanced English grammar.

SECOND YEAR CURRICULUM

FALL SEMESTER (III)

EEM203 Circuit Analysis I (4 + 0) 6
Circuit variables, circuits components, circuit analysis techniques, inductance, capacitance and mutual inductance, Natural and Step Responses of first order RL and RC Circuits, Natural and Step Responses of Series and parallel RLC Circuits, operational amplifier circuits.

EEM207 Electric Circuits Laboratory I (0 + 3) 2
Introduction to measurement instruments, series and parallel circuits, mixed connected circuits, node-voltage and mesh current applications, Thevenin and Norton equivalent circuits and maximum power transfer application, superposition application, natural and step

**EEM209 Electronic Devices (2 + 0) 4**
Conduction, Conduction in semiconductors, Diode, Bipolar junction transistor, MOS Transistor, Semiconductor switching devices in power electronics, Current-voltage characteristics of semiconductor devices, Diode applications.

**EEM211 C Programming (3 + 0) 5**
Introduction to programming, Algorithms, Flow charts, Data types, Constants, Operators, Basic data input-output, Control structures, Arrays, Pointers, Functions, User-defined functions, Structures and unions, Disc files, Preprocessors, Conditional compiling.

**EEM285 English in Engineering (3 + 0) 3**
Technical readings and writings, relative clauses, describing functions and purposes, time clauses, cause and effect, reason and result connectives.

**EEM287 Engineering Mathematics I (3 + 0) 5**

**AİT281 Atatürk Principles and Revolutions History I (2 + 0) 2**
Atatürk Revolutions and Principles in Modern history of Turkish Republic.

**NON-TECHNICAL ELECTIVES**

**EEM291 Frontiers in Electrical Engineering (2 + 0) 3**
Biographies of famous scientists having studies in Physics, Electrics, Electronics and Electromagnetism.

**EEM293 Alternative Energy Sources (2 + 0) 3**
Power and energy definitions, Taxonomy of energy resources, Coal, Petroleum, Natural gas, Nuclear power, Solar power, Wind power, Geothermal energy, Tidal energy, Wave energy, Bio-mass energy.

**SPRING SEMESTER (IV)**

**EEM202 Electromagnetic Field Theory (4 + 0) 5**
Steady electric current, Ohm's law, the concept of the EMF, Kirchhoff's voltage and current laws, boundary conditions for steady current, resistance calculations, static magnetic field, vector magnetic potential, Biot-Savart law, magnets and magnetization, magnetic field intensity, relative magnetic permeability and magnetic materials, reluctance and its usage in
magnetic circuits, boundary conditions of static magnetic fields, Faraday's law, inductance and inductors, magnetic energy, force and torque.

**EEM204 Circuit Analysis II (4 + 0) 5**
Sinusoidal steady state analysis of AC circuits, sinusoidal steady-state power calculations, balanced three phase circuit, Laplace transform, applications of Laplace transform in circuit analysis, analysis of frequency selective circuits.

**EEM208 Electric Circuits Laboratory II (0 + 3) 2**
Current, voltage and frequency readings by using oscilloscope, series impedance circuits, AC responses of RL and RC and RLC circuits, parallel impedance circuits, 3-phase circuits, passive filter applications.

**EEM210 Fundamentals of Signals and Systems (3 + 2) 5**
Continuous and discrete signals in time and frequency domains. Continuous and discrete linear system analysis in time and frequency domains. Convolution and Transfer Functions. Introduction to sampling theory. Fourier series. Laplace and z transforms.

**EEM220 Summer Practice I (0+0)4**
The content of this training mainly includes atelier work such as soldering, PCB drawings, use of measurement instruments and running electrical devices. Moreover, the design and the test of electrical and electronics systems can be conducted.

**EEM288 Engineering Mathematics II (3 + 0) 4**

**AİT282 Atatürk Principles and Revolutions History II (2 + 0) 2**
Atatürk Revolutions and Principles in Modern history of Turkish Republic.

**NON-TECHNICAL ELECTIVES**

**EEM292 Electronic Hobby (2 + 0) 3**
Electronic hobby. Design approaches and thinking like a designer. Personal and group activities. Hobby subject decision and design.

**EEM294 Chess (2 + 0) 3**
History, Board sequencing, Basic movements, Game openings, Preparation to game endings, Tactics and strategy, Management of the game ending.
EEM301 Electronics I (3 + 0) 6
Types of semiconductor diode, Power Supply, Voltage Folders, Common emitter circuits, common base circuits, common collector circuits, transistors polarization. Amplifiers with transistor, multi-layer amplifiers, the A-B-AB-C Class power amplifiers, field effect transistors (JFET), Metal oxide FETs (MOSFET, MESFET), polarization of FETs, FET amplifiers, small signal equivalent circuits, digital processing blocks, and basic definitions.

EEM303 Elektric Machines I (3 + 0) 5

EEM307 Numerical Analysis (3 + 0) 5

EEM309 Electronics Laboratory I (0 + 3) 3
Supply voltage circuits. DC characteristics of BJT's, FETs and MOSFETs. Amplifiers. Operational amplifier circuits and linear applications of operational amplifiers. Logic gates and flip-flops. Non-linear applications of operational amplifiers. Clipping and clamping circuits.

EEM321 Electric Machines Laboratory I (0 + 3) 3

TECHNICAL ELECTIVES

EEM311 Circuit Synthesis (3 + 0) 5
EEM317 Telecommunications I (3 + 0) 5
Elements of communication systems, communication channels and their characteristics, basic operations on signals, classification of signals, Fourier Series, Fourier Transform, Amplitude Modulation, and its types, implementation of AM modulators and demodulators, angle modulation, signal multiplexing, AM and FM radio broadcasts.

NON-TECHNICAL ELECTIVES

EEM381 Energy Consume and Environment (2 + 0) 3

EEM383 Engineering Economics (2 + 0) 3
Opportunity costs, Market, Demand, Lodgment, Balance, Duty cycles, Unemployment, Inflation, Consumption and saving, Investment, Total demand, Total lodgment, Profit, Off-the-books curves, Flexibilities, Benefit, Expenditure and capital, Staple structures, Perfect competition, Monopoly, Oligopoly

EEM385 Linux (2 + 0) 3
Historical background, Installation, Introduction, File and directory structure, Internet and network, Software installation, Services and processes, Users, File and directory permissions, Administration, Troubleshooting

SPRING SEMESTER (VI)

EEM302 Electronics II (3 + 0) 5
Operational amplifiers (OPAMP), High-frequency models of BJT and FET, Frequency response of amplifiers, Effects of bypass and coupling capacitors, Miller theorem, Gain graph of transistor-based amplifiers, Band-width in multi-stage amplifiers, Compansation with RC and LC, Base compansation, Emitter compansation, Serial and parallel compansation, Feedback in amplifier circuits, Stability with feedback, Oscillators.

EEM304 Electric Machines II (3 + 0) 5
One-and three-phase synchronous machines. Rotary converters; construction and working style.

**EEM306 Electronics Laboratory II (0 + 3) 2**
Voltage amplifiers, Feedback and stability in transistorized amplifiers, Power amplifiers, Frequency and pulse response of BJT amplifiers, Broad-band amplifiers, Analog integrated circuits building blocks, Low-frequency oscillators, Active filters, PLL applications.

**EEM308 Logic Circuits (3 + 2) 5**

**EEM310 Electric Machines Laboratory II (0 + 3) 2**

**EEM312 Control Systems I (3 + 0) 4**

**EEM320 Summer Practice II (0+0)4**
In this training, students are expected to work on PCB design, calibration and quality test and production of electrical and electronics systems, besides on the preparation of their reports. Moreover, engineering administration practices are expected.

**NON-TECHNICAL ELECTIVES**

**EEM390 Human Resources and Management (2 + 0) 3**

**EEM392 Business Administration (2 + 0) 3**
FOURTH YEAR CURRICULUM

FALL SEMESTER (VII)

**EEM419 Microprocessors ( 3 + 2 ) 6**
Microcomputer design using a microprocessor. Central processing, Input/Output and Memory Units. Parallel and serial communication applications. Timers. Counters. Interrupts, and applications. ADC and DAC applications.

**TECHNICAL ELECTIVES**

**EEM411 Digital Signal Processing ( 3 + 0 ) 5**

**EEM415 Electronics in Medicine ( 3 + 0 ) 5**

**EEM417 Optoelectronics I ( 3 + 0 ) 5**

**EEM427 Telecommunications II ( 3 + 0 ) 5**
Probability and random process, analog/digital conversion, digital modulation in additive white Gaussian noise (awgn) baseband channels, digital transmission through bandlimited awgn channels, digital information transmission via carrier modulations, selected topics in digital communications.

**EEM433 Antennas and Propagation I ( 3 + 0 ) 5**
Review of electromagnetic propagation, antennas parameter, linear antennas, radiation pattern and impedance.

**EEM441 Electromagnetic Wave Theory (3 + 0 ) 5**
Plane electromagnetic waves. Wave movement in insulator and conductor environments. Transmission lines and wave guides.

**EEM445 Advanced Programming (3 + 0 ) 5**
Fundamentals. Integrated development environment softwares, Programming fundamentals, Object-oriented programming, Exception management, Delegates and Events, Processes and Applications, Reflections and properties, Collections, Input – Output management, Object serialization, Threads, Asenkron programming model, Data security, Authorities, Database applications.

**EEM447 Microwave Techniques (3 + 0 ) 5**

**EEM449 Illumination Techniques (3 + 0 ) 5**

**EEM451 Nonlinear Control Systems (3 + 0 ) 5**

**EEM455 High Frequency Techniques (3 + 0 ) 5**

**EEM459 Power Electronics (3 + 0 ) 5**
Basic concepts, Semiconductor power diodes, power transistors, Thyristors, Triacs, MOSFET, IGBT, Power elements comparison, AC-DC converters (rectifiers), AC-AC converters
(Choppers), DC-DC converters, DC-AC converters (inverters), control and protection schemes, the PWM technique, Uninterruptible power supplies, Microprocessed control mechanisms.

**EEM469 Electric Plnats (3 + 0) 5**

**EEM471 Computer Networks (3 + 0) 5**
Fundamentals of computer networks, OSI layers in networks, protocols, error detection and correction, local area network technologies, bridges, routers.

**EEM477 Maintenance in Electric Plants and Safety (3 + 0) 5**

**TECHNICAL ELECTIVE LABORATORIES**

**EEM481 Telecommunications Laboratory (0 + 3) 4**
Filter applications, A/D and D/A conversions, AM modulation/demodulation applications, PM and FM modulation/demodulation applications, pulse modulation/demodulation (PCM, DM, PPM, PAM) applications, ASK, PSK and FSK modulation/demodulation applications.

**EEM483 Digital Signal Processing Laboratory (0 + 3) 4**
Digital signal processing filter application, FIR and IIR filters, Analog/Digital and Digital/Analog converter application, voice and control applications.

**EEM485 Power Electronics Laboratory (0 + 3) 4**
Rectifiers, Characteristics of circuit elements in Power electronics, Oscillating circuits, Timers, PWM, Convertors, Microprocessor-based control, Power supplies.
SPRING SEMESTER (VIII)

EEM402 Graduation Project (0 + 2) 10
The independent study which is conducted under the supervision of a faculty member: the designing or implementation of the system, software or performing a specific function in an electrical or electronic circuit and/or analysing with the help of computer and/or theoretical approaches to the problem of an engineering, preparing of a project report which is approved by consultant and presented to consultant.

TECHNICAL ELECTIVES

EEM410 Electronic Measurements and Instrumentation (3 + 0) 5

EEM416 Biomedical Systems (3 + 0) 5
Cell physiology (Neuron, synapsis, neuron models), Bioelectric potential sources and theories, Bioelectric electrodes and instrumentation, Circulation system, Respiratory system, Phonocardiography, Patient care systems and monitors, Introduction to principles of computer-aided tomography and medical imaging systems.

EEM418 Optoelectronics II (3 + 0) 5

EEM420 Image Processing (3 + 0) 5
Fundamentals of image processing, intensity transformation, filtering, image reconstruction, color image processing, image compression and segmentation.

EEM424 System Programming (3 + 0) 5
Use of function descriptors, Recursive functions, Interrupts, Handles, Low-level disk operations, Investigation of file systems in Dos – Windows and Unix operating systems and designing useful tools for disk operations, Algorithm analysis, Data structures: Linked lists,
stack and queues, hash tables, Debugging and code organization, Video and keyboard functions design, Processes in operating systems, Computer communications, Serial and parallel ports, Coprocessor programming.

EEM430 Energy Distribution Systems (3 + 0) 5

EEM434 Antennas and Propagation II (3 + 0) 5

EEM438 Fiberoptic Communications (3 + 0) 5

EEM446 Programmable Logic Controllers (3 + 0) 5
PLC history, Basic structure and components, PLC hardware, PLC choice, Fundamentals of PLC programming, Bitwise operators, Timers, Counters, Comparators, Arithmetic operators, Programming using ladder diagram and coding, Logic circuit design methods, Program control commands, Industrial applications.

EEM452 Digital Control Systems (3 + 0) 5

EEM458 High Voltage Techniques (3 + 0) 5

EEM460 Photovoltaic Energy Conversions (3 + 0) 5
Solar energy measurement, The structure of photovoltaic battery and Energy conversion efficiency, Photovoltaic panel fabrication, Photovoltaic energy systems and applications, Environmental effects and cost calculation.
**EEM462 Industrial Applications of Power Electronics (3 + 0) 5**
Introduction, Heating with electricity, Voltage regulation, AC engine speed control using chopper, Industrial rectifiers, Electrolysis plants, DC engine speed control, Uninterruptible power supply, Invertor-based AC engine speed control, Power electronics in power generation.

**EEM464 Communication Electronics (3 + 0) 5**
Introduction to communication electronics, signal generation, PLL circuits, amplitude modulator and demodulator circuits, angle modulator and demodulator circuits, digital communication circuits and modems.

**EEM468 Wireless communications (3 + 0) 5**
Wireless communication standards, cellular designs, large-scale path-loss, small-scale paths loss (fading), modulation techniques for wireless communications, multiple access techniques, spread spectrum techniques, multi-carrier systems.

**EEM482 Exterier Illumination (3 + 0) 5**

**EEM484 Power Transmission Lines (3 + 0) 5**
The characteristics of energy transmission lines. Static and dynamics compulsion of energy lines. Isolators. Loading effects. Various states equations. Resistance.