NEAR EAST UNIVERSITY

DEPARTMENT OF Electrical and Electronic Engineering

Course Structure Diagram with Course Credits

2021-2022

Courses list with Near East University credits and ECTS

UNDERGRADUATE CURRICULUM (B.Sc.)

Basic Departmental Courses	Departmental Courses	Departmental Elective Courses	Non-Departmental Elective Courses

	COURSE CODE	COURSE NAME	CREDİT	ECTS	PREREQUİSİTE	CLASS HOURS	LAB	PRACTICAL	LEARNİNG SESSİONS			
									PS	C	R	T
1. YEAR / 1. SEMESTER	CHM101	General Chemistry	4	5	*	4	2	0	0	2	2	1
	ECC 101	Computer Programming	3	5	*	3	2	0	2	1	1	2
	ENG101	English I	3	4	*	0	0	0	0	1	1	1
	MTH 101	Calculus I	4	6	*	4	0	0	2	1	1	0
	PHY101	General Physics I	4	6	*	4	2	0	2	1	1	0
	YİT101	Turkish for Foreign Students I (Foreign Students)	2	2	*	2	0	0	0	2	0	1
	AİT 101	Atatürk's Principles & Turkish Reform I (Türk & Öğrenciler)	2	2	*	0	0	0	0	2	0	1
	TUR 101	Türk Dili I (Türk & Öğrenciler)	2	2	*	0	0	0	0	2	0	1
	AİT 103	Principles Of Ataturk and The History Of Turkish Revolution I (Foreign Students)	2	2	*	0	0	0	0	2	0	1

1. YEAR / 2. SEMESTER	ENG102	English II		3	6	ENG 101	0	0	0	0	1	1	1
	MTH102	Mathematics II		4	6	MTH 101	4	0	0	2	1	1	0
	MTH 113	Linear Algebra		3	6	MTH 101	3	0	0	1	1	1	0
	PHY102	General Physics II		4	6	PHY 101	4	2	0	2	1	1	0
	TDE 102	Technical Drawing and Elect. App.		3	5	*	3	0	0	0	2	0	1
	EE 100	Introduction to Electrical & Electronic Eng.		1	3	*	2	0	0	1	1	1	0

2. YEAR / 1. SEMESTER	ECC 216	Circuit Theory I		4	5	PHY 102 MTH 101	4	2	0	2	1	1	0
	EE 210	Computer Applications		3	6	ECC 101	3	0	0	2	1	1	2
	EE 241	Electrical Materials		3	4	CHM 101	3	0	0	0	1	1	1
	ENG 201	English Communication Skills		3	6	ENG 102	3	0	0	1	1	1	0
	MTH 201	Differential Equations		4	6	MTH 102	4	0	0	2	1	1	0
	NTE	Non-technical Elective		3	6	*	3	0	0	-	-	-	-

2. YEAR / 2. SEMESTER	EE 202	Circuit Theory II		4	5	ECC 216	4	2	0	2	1	1	0
	EE 216	Electromagnetic Theory		3	5	PHY 102 MTH 102	3	0	0	2	1	1	2
	EE 220	Electrical Measurements		3	5	ECC 216	3	2	0	2	1	1	2
	ECC 218	Electronics I		4	6	ECC 216 EE 241	4	2	0	2	1	1	0
	MTH 241	Complex Calculus		3	5	MTH 102	3	0	0	2	1	1	2
	EE 200	Summer Training I		0	6	*	0	0	0	0	0	0	0

3. YEAR / 1. SEMESTER	ECC 001	Logic Circuit Design	4	6	ECC 218	3	2	0	2	1	1	2
	EE 321	Electronics II	4	6	ECC 218	4	2	0	2	1	1	0
	EE 331	Electromechanical Energy Conversion I	4	5	EE 202 EE 216	4	2	0	2	1	1	0
	ECC 008	Signals and Systems	4	7	EE 202	4	2	0	2	1	1	0
	MTH 251	Probability and Random Variables	3	6	MTH 102	3	0	0	1	1	1	0
3. YEAR / 2. SEMESTER	ECC 301	Microprocessors	4	6	ECC 001	4	2	0	2	1	1	2
	EE 324	Linear Control Systems	3	5	MTH 201 MTH 113	3	0	0	2	1	1	2
	EE 346	Communication Systems	4	6	ECC 008	4	2	0	2	1	1	2
	MTH 323	Numerical Analysis	3	6	MTH 201	3	0	0	1	1	1	0
	EE 332	Electromechanical Energy Conversion II	3	5	EE 331	4	2	0	2	1	1	0
	EE 300	Summer Training II	0	6	EE 200	0	0	0	0	0	0	0
4. YEAR / 1. SEMESTER	RNTE	Restricted Non-Technical Elective	3	5	*	3	-	-	-	-	-	-
	EE 4xx	Technical Elective	3	5	*	3	-	-	-	-	-	-
	EE 4xx	Technical Elective	3	5	*	3	-	-	-	-	-	-
	EE 4xx	Technical Elective	3	5	*	3	-	-	-	-	-	-
	EE 4xx	Technical Elective	3	5	*	3	-	-	-	-	-	-
	EE 401	Engineering Design I	4	5	*	3	-	-	-	-	-	-

4. YEAR / 2. SEMESTER	EE 402	Engineering Design II		4	5	EE 401	-	-	-	-	-	-	-
	EE 4xx	Technical Elective		3	5	*	3	-	-	-	-	-	-
	EE 4xx	Technical Elective		3	5	*	3	-	-	-	-	-	-
	EE 4xx	Technical Elective		3	5	*	3	-	-	-	-	-	-
	EE 4xx	Technical Elective		3	5	*	3	-	-	-	-	-	-
	YİT102	Turkish for Foreign Students II (Foreign Students)		2	2	YİT 101	0	0	0	0	2	0	1
	TUR 102	Türk Dili II (Türk & Öğrenciler)		2	2	TUR 101	0	0	0	0	2	0	1
	AİT 102	Atatürks Principles & Turkish Reform II (Türk &Öğrenciler)		2	2	AİT 101	0	0	0	0	2	0	1
	AİT 104	Principles of Ataturk and the History of Turkish Revolution II (Foreign Students)		2	2	AİT 103	0	0	0	0	2	0	1

Technical Elective Courses

COURSE CODE	COURSE NAME	CREDİT	ECTS	PREREQUİSİTE	CLASS HOURS	LAB	PRACTICAL	LEARNİNG SESSİONS			
								PS	C	R	T
	Telecommunications Major										
EE 411	Telecommunications	3	5	EE 346	3	2	0	2	1	1	0
EE 412	Radar Systems	3	5	ECC 008 MTH 251	3	0	0	2	1	1	2
EE 416	Computer Networking	3	5	ECC 008	3	0	0	2	1	1	2
EE 425	Satellite Communication Systems	3	5	EE 346	3	0	0	2	1	1	0
EE 427	Information Theory and Coding	3	5	ECC 008 MTH 251	3	0	0	2	1	1	2
EE 428	Communication Electronics	3	5	EE 346	3	0	0	2	1	1	2
EE 429	Mobile Communication Systems	3	5	EE 346	3	0	0	2	1	1	0
EE 430	Wireless and Personnel Communications Systems	3	5	EE 346	3	0	0	2	1	1	0
EE 461	Digital Signal Processing	3	5	ECC 008	3	0	0	2	1	1	0
EE 463	Machine Learning in Computer Vision	3	5	ECC 008	3	2	0	2	1	1	2
EE 469	Electromagnetic Wave Propagation and Antennas	3	5	EE 346	3	0	0	2	1	1	2
EE 494	Introduction to Computer Vision	3	5	*	3	0	0	2	1	1	2

	Control Major											
EE 420	Intelligent Control Systems	3	5	EE 210	3	2	0	2	1	1	2
EE 424	Process Control Instrumentation Technology	3	5	EE 324	3	0	0	2	1	1	2
EE 435	Mechatronics	3	5	EE 324	3	0	0	2	1	1	0
EE 451	Digital Electronics	3	5	ECC 001	3	0	0	2	1	1	0
EE 454	Digital Control Systems	3	5	EE 324	3	0	0	2	1	1	0
ECC 437	Robotic Systems	3	5	EE 324	3	0	0	2	1	1	2
EE 470	Programmable Logic Controllers	3	5	ECC 001	3	2	0	2	1	1	2
EE 495	Optimal and Adaptive Control	3	5	*	3	2	0	2	1	1	2
	Power Major											
EE 433	Power Electronics	3	5	EE 321 EE 331	3	2	0	2	1	1	0
EE 471	Power System Analysis I	3	5	EE 331	3	0	0	2	1	1	2
EE 472	Power System Analysis II	3	5	EE 471	3	0	0	2	1	1	2
EE 473	Power System Protection	3	5	EE 471	3	0	0	2	1	1	0
EE 474	Static Power Conversion	3	5	EE 433	3	0	0	2	1	1	2
EE 475	High Voltage Techniques I	3	5	EE 331	3	2	0	2	1	1	2
EE 476	High Voltage Techniques II	3	5	EE 475	3	2	0	2	1	1	0
EE 478	Distribution System Techniques	3	5	EE 471	3	0	0	2	1	1	0
EE 492	Illumination Engineering	3	5	EE 331	3	0	0	2	1	1	0

Restricted Non-Technical Elective Courses

COURSE CODE	COURSE NAME	CREDİT	ECTS	PREREQUİSİTE	CLASS HOURS	LAB	PRACTICAL	LEARNİNG SESSİONS			
								PS	C	R	T
ECC426	Economics for Engineers	3	5	*	3	0	0	0	2	2	0
ECC427	Management for Engineers	3	5	*	3	0	0	0	2	2	0

GRADUATE CURRICULUM (M.Sc.)

First Year

First Year, Fall Semester (9/9 credits, 30/30 ECTS)				
Course Code	**Course Name**	**Credit**	**ECTS**	**Prerequisite**
EE 5xx	Elective Course	3	10	Graduate Standing
EE 5xx	Elective Course	3	10	Graduate Standing
EE 5xx	Elective Course	3	10	Graduate Standing

First Year, Spring Semester (9/18 credits, 30/60 ECTS)				
Course Code	**Course Name**	**Credit**	**ECTS**	**Prerequisite**
EE 5xx	Elective Course	3	10	Graduate Standing
EE 5xx	Elective Course	3	10	Graduate Standing
EE 5xx	Elective Course	3	10	Graduate Standing

Second Year

Second Year, Fall Semester (3/21 credits, 10/70 ECTS)				
Course Code	**Course Name**	**Credit**	**ECTS**	**Prerequisite**
EE 5xx	Elective Course	3	10	Graduate Standing

Second Year, Spring Semester (0/21 credits, 56/126 ECTS)				
Course Code	**Course Name**	**Credit**	**ECTS**	**Prerequisite**
EE 500	Master's Thesis	-	50	**
EE 535	Master's Seminar	-	6	***

** Research leading to M.Sc. thesis, carried out between the student and a faculty member. Students register to this course in the semesters the research is in progress. Student can register to this course starting after the second semester.

*** M.Sc. students present a topic, under the guidance of a faculty member, to a group of students and faculty members. Presentation must reflect the preliminary results of student's research work or a literature survey on a topic assigned by the instructor. Student performance is evaluated according to the style of presentation and depth of understanding. At the time of seminar, student must be registered to the course EE 500, master's thesis.

ELECTIVE COURSES

EE 501 – Linear System Theory
EE 502 – Random Variables and Stochastic Processes
EE 503 – Advanced Digital Signal Processing
EE 504 – Wireless and Personal Communication System
EE 505 – Information Theory and Coding
EE 506 – Advanced Data Communications
EE 507 – Computer Networks and Internet
EE 508 – Artificial Neural Networks
EE 509 – Speech Processing
EE 510 – Image Processing
EE 511 – Artificial Inteligence
EE 512 – Electromagnetic Wave Propagation

EE 513 – Operation and Maintenance of Power Systems
EE 514 – Radar Systems
EE 515 – VLSI Design
EE 516 – Integrated Sensors and Sensing Systems
EE 517 – Process Control Instrumentation Technology
EE 518 – Optimal and Adaptive Control
EE 519 – Fuzzy Systems
EE 520 – Optimization
EE 521 – Estimation Theory
EE 522 – Intelligent Control
EE 523 – Robotics Systems
EE 524 – Advanced Static Power Conversion
EE 525 – Theory and Design of Electrical Machines
EE 526 – Power Electronics
EE 527 – Advanced High Voltage Techniques
EE 528 – Advanced Symmetrical Components and Rotating Field Theory
EE 529 – Data Communication and Networking
EE 530 – Mechatronics
EE 531 – Flexible AC Transmission Systems
EE 532 – Pattern Recognition
EE 533 – Electricity Outages and Load Management

EE 538 – Telecommunication Networks
EE 540 – Expert Systems
EE 541 – Advanced Symmetrical Components and Rotating Field Theory
EE 572 – HighVoltage Insulation Coordination

COURSE OBJECTIVES AND CONTENTS:

NEAR EAST UNIVERSITY

DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING

MODULE DESCRIPTIONS

Undergraduate Courses

FIRST YEAR

CHM 101 General Chemistry, 4 credits, 5 ECTS
Objectives of the Course:
Develop fundamental principles of theoretical and applied chemistry, Develop scientific inquiry,complexity, critical thinking, mathematical and quantitative reasoning. Explain phenomena observed in the natural world. Develop basic laboratory skills

Course Description
Matter and measurement; atoms, molecules and ions; mass relations in chemistry, stoichiometry; gases; electronic structure and the periodic table; covalent bonding; thermochemistry; acids and bases.

ECC 101 Computer Programming, 3 Credits, 5 ECTS
Objectives of the Course:
To familiarize the students with computers and computing fundamentals.To be able to analyze anddesign a solution to a given problem. To enable the students to write structured programs using C programming Language.

Course Description
Algorithm development. Elements of C. Structure of a C program, data types, constants, input and output of integer numbers, real numbers. Variables, expressions and assignments. Input and output functions. Control Structures. Selection- If statement, multiple selection- switch statement. Iteration- while, do-while, for operators. User-defined functions, arrays and subscripted variables, single and multi dimensional arrays. Array and functions. Pointers, pointers and strings. Structures, creating structures. Structure as function argument. Subprograms. Files. File operations.Application programs will be developed in a laboratory environment using the C language.

ENG 101 English I, 3 Credits, 4 ECTS
Objectives of the Course:
To develop students' language skills and capacity to conduct writing task through the vocabulary, listening and speaking skills.To develop their level of knowledge, communicative capacity, and ability to analyze and reflect on the language. To give learners the language they need for real-life, hands-on task like explaining a process or analyzing risk and to put into practice the academic skills that they will need to use during their educations.

Course Descriptions.
This course offers intermediate levels include wide range of grammatical structures and vocabulary of English in order to built onto the foundation established at the Preparatory School. This course aims to bring the students to a level that will enable them fulfill the requirements of main courses of their departments. Students will be encouraged to read a variety of texts as well as chapters from textbooks so that they can pursue their undergraduate studies at the university without major difficulty. ENG 101 is designed to improve the students' presentation ability. Students are expected to do an oral presentation. At the end of the course they submitted their written projects.

MTH 101 Calculus I, 4 Credits, 6 ECTS
Objectives of the Course:
Learn more about your academic program, Learn about limits, derivatives. Study integrals, definite integrals. To introduce the basic properties of determinants and some of their applications

Course Description:
Limits and continuity. Derivatives. Rules of differentiation. Higher order derivatives. Chain rule. Related rates. Rolle's and the mean value theorem. Critical Points. Asymptotes. Curve sketching. Integrals. Fundamental Theorem. Techniques of integration. Definite integrals. Application to geometry and science. Indeterminate forms. L'Hospital's Rule.

PHY 101 General Physics I, 4 Credits, 6 ECTS

Objectives of the Course:

Be able to know the basic laws of mechanics.To apply those laws for solving problems. To be able tous his/her knowledge in the fields of other sciences and/or engineering. Understanding how physics approach and solve problems in mechanics.

Course Description

A basic physics course which study mechanic phenomenas. . Topics include the description of motion, forces, gravitation, work, and energy, momentum, rotational motion, and Static equilibrium. Laboratory work is an important component of the course.

ENG 102 English II, 3 Credits, 6 ECTS

Objectives of the Course:

to develop the students' capacity to conduct writing task through the vocabulary, listening and speaking skills ; to reinforce and consolidate the language and skills that the students have learnedfrom earlier courses ; to develop their level of knowledge, communicative capacity, and ability to analyze and reflect on the language; to develop students' language skills to prepare them for their future professional life

Course Descriptions:

This course offers the students a wide range of grammatical structures and key language and vocabulary of English in the technical, industrial, and scientific sectors at intermediate level for everyday communication at work. This course aims to bring the students to a level that will enable them to fulfill the requirements of the main courses of their departments. The ability to evaluate, analyze and syn the size information in written discourse will be high lighted. Documentation in writing will be introduced at the beginning of the course, in order to solidly establish the skill by the end. Students will learn the discourse patterns and structures to be used in differentes say types that they need for real life, hands-on tasks like explaining process, organizing schedules, reporting or progress,or analyzing risk.

MTH 102 Calculus II, 4 Credits, 6 ECTS

Course Descriptions:

Sequences and Infinite Series; The integral test, comparison test,geometric series , ratio test,alternating series.Power series,Taylor series. Parametric equations and Polar coordinates. Functions of several variables,limits,continuity,partial derivatives,chain rule,extrema of functions of several variables.Multible integrals:Double integrals,Area,volume,double integral in polar coordinates,surface area,triple integrals,spherical and cylindrical coordinates.

MTH 113 Linear Algebra, 3 Credits, 6 ECTS

Objectives of the Course:

To provide a student with methods for solving systems of linear equations .To introduce the basic properties of determinants and some of their applications. To show that the notion of a finite dimensional, real vector space is not as remote as it may have seemed when first introduced . To deal with magnitude and direction in inner product spaces .To study linear transformations. To consider eigenvalues and eigenvectors and solve the diagonalization problem for symmetric matrices

Course Description

System of linear equations: elementary row operations, echelon forms, Gaussian elimination method. Matrices: elementary matrices, invertible matrices. Determinants: adjoint and inverse matrices, Crammer's rule. Vector spaces: linear independents, basis, dimension. Linear mapping. Inner product spaces: Gram-Schmit ortogonalization. Eigenvalues and eigenvectors, Cayley-Hamilton theorem, diagonalization.

PHY 102 General Physics II, 4 Credits, 6 ECTS

Objectives of the Course:

Be able to know the basic laws of electricity and magnetism. To apply those laws for solving problems. To be able to use his/her knowledge in the fields of other sciences and/or engineering. Understanding how physics approach and solve problems in electricity and magnetism.

Course Description:

A basic physics course which study electric and magnetic phenomenas. Topics include electricity, magnetism, and direct current circuits. Laboratory work is an important component of the course.

TDE 102 Technical Drawing and Electrical Applications, 3 Credits, 5 ECTS

Course Description:

Working with CAD and creating 2D manufacturing drawings, screw threads and threaded fasteners, keys and keyways, limits and fits and their applications to mass production, economics of Limits and Fits, geometrical tolerances and applications, gears and shafts, spring and spring calculations, brief introduction to 3D.

EE 100 Introduction to Electrical Engineering, 1 Credits, 3 ECTS

Objectives of the Course:

To provide the students with the essential knowledge of elements of electrical engineering and prepare him for the next steps in his study.To prepare students for different notions of electrical engineering To provide basic understanding of electric circuits and their analysis.

Course Description:

This course aims to introduce basic notions of electrical engineering for the students of the first year of electrical engineering. The basic formulas of electrical engineering and definitions of the electrical current and voltage. The differences between DC and AC signals are also introduced in this course. It offers the student an opportunity to have basic idea about concepts of electrical engineering and prepares him for higher level courses.

SECOND YEAR

ECC 216 Circuit Theory I , 4 Credits, 5 ECTS

Objectives of the Course:

Introduce students the fundamentals of circuit theory

Course Description

This course studies the System of units. Charge, current, voltage and power. Types of circuits and circuit elements. Ohm's law. Kirchhoff's law. Analysis methods, Inductance and capacitance. The unit-step forcing function. The natural and forced response of the first-order and second-order circuits.

EE 210 Computer Applications 3 Credits, 6 ECTS

Objectives of the Course:

Provide the students with a basic knowledge of MATLAB as a programming and simulation environment. Provide students with tools of problems analysis and solving using MATLAB Provide students with basic understanding of simulation and electrical systems representation

Course Description

This course provides the students with the important tools for programming using MATLAB environment, it covers the basic concepts of programming in MATLAB using repetitive and conditional structures, the operations of vectors and matrices in MATLAB. The Solution of different numerical analysis problems using MATLAB. The design of User interfaces and communication abilities of MATLAB. An introduction of simulation of different electrical power and control systems. The use of multisim as an electronic simulation tool.

EE 241 Electrical Materials, 3 Credits, 4 ECTS

Objectives of the Course: The primary purpose of this course is to provide an introduction to the interrelation of the structure, properties and processing of electrical and electronic materials, with an emphasis on the first two.

Course Description

The course covers followings; introduction to quantum mechanics; crystal structures, energy levels in

crystals; quantum physics of metals, electron transport in metals; semiconductors; impurities; carrier transport in semiconductors; generation and recombination of minority carriers, the p-n junction diode, light sensitive materials; photodiodes; light-emitting diodes, the bipolar junction and field effect transistors and characteristics of dielectric materials and devices; magnetic fields and characteristics of magnetic materials.

ENG 201 English Communication Skills, 3 Credits, 6 ECTS
Objectives of the Course:
Reading: to develop the skill of reading for information from a wide variety of authentic Engineeringtexts. These include longer specialist reading texts to provide challenging reading for students already proficient in this field, and gain the ability to read and understand vacancy announcements and write an appropriate cover letter/letter of intent, CV to deliver a academic presentation in English.

Speaking: to develop the ability to participate in exchanges of information and opinions in the context of IT and Engineering, provide explanations of features of Mechanical, Computer, Electronics, Biomedical, Food and Automotive Engineering. To develop communication skills for the job market which is becoming increasingly common to have give presentation in English.

Writing: to write instructions, descriptions and explanations about topics in Engineering. Write a cover letter and interview winning C.V.

Language : to consolidate and extend the student's understanding and use of structures and function common to Engineering at intermediate and advanced levels. Through the chosen texts they can learnalso the vocabulary and expression that need when giving oral presentation. Giving a presentation in a foreign language is real challenge, even for those who have a good knowledge of the language.

Course Description
To reinforces and consolidates the language and 4 skills that students have learned from earlier courses, as well as developing their level of knowledge, communicative capacity, and ability to analyse and reflect on language. Course on upper -intermediate AND ADVANCED levels include interesting and up-to-date topics, encouraging students to recognize the importance of acquiring a foreign language in a modern context, prepare them to for their future professional life.

MTH 201 Differential Equations 4 Credits, 6 ECTS
Objectives of the Course:
Introducing first, second and higher order differential equations, and the methods of solving these equations. Emphasizing the important of differential equations and its engineering application. Introducing the Laplace transform and its applications in solving differential equations and other engineering applications. Introducing the series method in solving differential equations.

Course Description
Ordinary and partial differential equations. Explicit solutions, Implicit Solution. First-order differential equations, separable, homogenous differential equations, exact differential equations. Ordinary linear differential equations. Bernoulli differential equations. Cauchy-differential equations. High-order ordinary differential equations. Introduction to Laplace transforms. Introduction to series method for solving differential equations

EE 202 Circuit Theory II, 4 Credits, 5 ECTS
Objectives of the Course:
Continues to introduce students the fundamentals of circuit theory

Course Description
The sinusoidal steady-state analysis; the phasor, the passive circuit elements in frequency domain. Phasor diagrams. Circuit Analysis Methods Instantaneous power. Average power. The effective (RMS) value. Apparent power and power factor. Complex power and power factor correction. Polyphase circuits. Circuit analysis in the s-domain. Magnetically coupled circuits. Two-port networks.

EE 216 Electromagnetic Theory, 3 Credits, 5 ECTS
Objectives of the Course:

- To provide a student with the necessary tools for the critical evaluation of existing and future electromagnetic phenomena
- To teach the concepts and principles of constructions of electromagnetics

To enable a student to evaluate and choose a electromagnetic tools to match the problem

Course Description

Electromagnetic Spectrum, Vector Analysis, Coordinate Systems, Force Between the Point Sources, Coulomb Law , Electric Field Strength (E), Electric Field of Several Point Charges, Charge Distribution, Charge Density, Continuous Charge Distribution, Electric Scalar Potential (V), Electric Field Lines, Equpotential Countours, Field Lines, Electric Potential of Charge Distribution, The Electric Feild as the Gradient of the Electric Potential, Electric Flux, Electric Flux Through Closed Surface, Charged One Shell, Capasitors and Capasitance, Moving Particles in the Electric Field, Dielectrics, Permittivite,Electric Dipol, Electric Dipol Moment, Polarization, Boundary Conditions, Boundary of Two Dielectrics Capacitors with Dielectrics, Energy of the Capacitor, Diverjans Theorem, Laplacien Operator, Poisson Equation, Laplace Equation, Static Magnetic Fields of Stable Electric Currents, Force on the Wire that is Carrying Currents Inside the Magnetic Fields, Magnetik Field of Current Carrying Element (Biot Savart Law), Force Between the Two Linear Parallel Conductors , Magnetic Flux, Magnetic Flux Density, Magnetic Flux Through Closed Surface (Gauss Law), Torq on the Ring, Magnetic Moment, Solenoid Inductance, Inductances of Simple Geometries, Ampere Law and H, Amper Law Applied to Conductive Medium and Maxwell Equation, Conductors and Charged Particles Moving Inside the Static Magnetic Fields, Rotary Motor, Magnetic Leviation (Maglev), Hall-Effect Generator, Moving Conductor Inside the Static Magnetic Field, Electric and Magnetic Fields Changing with Time, Conductors Moving Inside the Magnetic Field, General Situation of the Induction.

EE 220 Electrical Measurements, 3 Credits, 5 ECTS

Objectives of the Course: The students will be familiar with various measuring instruments used to detect electrical quantities.

Course Description

Measurement and errors, systems of units of measurements. Standards of measurements. Electromechanical indicating instruments. Bridge circuits. Comparison measurements. Oscilloscopes. The basics of digital instruments. Data converters. Intelligent instruments. Measurement transducers.

ECC 218 Electronics I, 4 Credits, 6 ECTS

Objectives of the Course:

- Provide students with knowledge of semiconductors and their applications
- Explain the diodes and their applications
- Provide the knowledge of BJTs, their applications and analysis
- Explain the different applications and importance of BJT in electronics

Course Description

Understanding the basics of semiconductor technology and elements. Identify and explain diodes and their applications, switching and rectification of AC signals. understanding different clippers and clampers circuits. Understanding the theory of Bipolar Junction Transistor operation, CB, CE and CC configurations. Studying BJT bias circuits. FET operation and biasing. Applying small signal BJT and FET analysis using re- and h-parameters. Studying amplifier frequency response.

MTH 241 Complex Calculus, 3 Credits, 5 ECTS

Course Description

Complex numbers. Rectangular and Polar forms. Analytic functions. Elementary functions. Integrals. series. Residues and poles. Mapping and elementary functions

THIRD YEAR

ECC 001 Logic Circuit Design, 4 Credits, 6 ECTS

Objectives of the Course:

To develop a thorough understanding on combinational digital circuit design using logic gates. To develop a thorough understanding on sequential digital circuit design using flip flops. Simplify logic functions using Boolean algebra methods. Simplify logic functions using Karnaugh maps. Design of digital building blocks such as adders, multiplexers and decoders. Analysis of number systems

Course Description

Topics include number systems, Boolean algebra, truth table, minterms, maxterms, don't cares, Karnaugh maps, multi-level gate circuits, combinational circuit design, gate delays, timing diagrams, hazards, multiplexers, decoders, programmable logic devices, latches, flip-flops, registers, counters, analysis of clocked sequential circuits, Mealy machine, Moore machine, derivation of state graphs and tables.

EE 321 Electronics II, 4 Credits, 6 ECTS

Objectives of the Course:

- To provide a general background of semiconductors to the students.
- To provide physical and electrical properties of basic electronic devices; diodes, transistors, operational amplifiers
- To provide the analysis of basic diode, transistor and operational amplifier circuits
- To provide the analysis of instrumentation amplifiers

Course Description

This course is designed for electrical & electronics engineering undergraduate students. The purpose of this course is to provide amplifier and instrumentation background on technical aspects. Field effect transistors, Multi stage amplifiers, Methods of coupling, Differential amplifiers, Operational amplifiers, Summing amplifiers, Integrators, Differentiators, Voltage Comporators, Instrumentation amplifiers, Oscillators, Active Filters.

EE 331 Electromechanical Energy Conversion I, 4 Credits, 5 ECTS

Objectives of the Course:

Introduces students to the fundamentals of electrical machinery

Course Description

Electromagnetic circuits; properties of ferromagnetic materials. Single-phase and three-phase transformers. Short and open circuit tests, Equivalent circuits of the transformers, Efficiency, Per Unit

System. Principles of electromechanical energy conversion:. DC machines: Theory, generators, motors, speed control

ECC 008 Signals and Systems, 4 Credits, 7 ECTS

Objectives of the Course:

Teaching the basic of Signals and Systems. To understand mathematical descriptions and representations of continuous and discreet time signals and systems.To develop input-output relationships for Linear Time Invariant Systems (LTIS). To understand the impulse response of a system and the convolution operator.To teach analysis of the signals in time domain, z domain and frequency domain. To teach Fourier and Laplace Transform analysis for continuous-time LTIS. To teach z-Transform analysis for discrete time systems. To understand sampling theory; To teach the basic of filtering, the basic of feedback concepts. To provide a modeling of the systems in time domain, z domain and frequency domain using software programs

Course Description

The following main topics are covered: Classifications of signals, basic operations on signals, elementary signals, properties of systems, impulse response, convolution, step response, systems described by differential and difference equations, frequency response, Fourier series and transform, Fourier analysis of discrete-time signals and systems, properties of Fourier representations, Fourier representations for mixed signal classes, sampling, reconstruction, z-Transform

MTH 251 Probability and Random Variables, 3 Credits, 6 ECTS

Objectives of the Course:

Understanding the concept of data analysis. Understanding the concept of probability and the conceptof random variables. Understanding the difference between discrete and continuous random variables.Understanding the concepts of expectation, variance and standard deviation. Understanding theconcepts of probability mass functions and cumulative distribution function for discrete, continuousand joint distributions. Understanding and learning the different types of discrete and continuous distributions.

Course Description

Probability and counting, permutation and combination. Some probability laws, Axioms of probability. Random variables and discrete distributions. Continuous distributions. Joint distributions.

Mathematical Expectation, Some Discrete Probability Distributions, Some Continuous Probability Distributions.

ECC 301 Microprocessors, 4 Credits, 6 ECTS

Objectives of the Course:

Teaching the microprocessor as a programmable digital system element. To illustrate some basic concepts of microprocessors through the use of assembly language programming. To give the principles of hardware design; To provide an understanding of a microprocessor based system as a combination of hardware and software subsystems and their interactions

Course Description

Introduction to microprocessors. Architecture of microprocessors and instruction sets. Interrupts. Memories. Parallel and serial input/output programming. Microprocessor based system design. Microprocessors applications.

EE 324 Linear Control Systems, 4 Credits, 5 ECTS

Course Description

Develop a thorough understanding on basic of modern control systems engineering such as the fundamental concepts of a Control System, Laplace transfer to find input-output relationship of control systems. The mathematical modelling of the electrical, liquid-level and mechanical systems, transfer functions and block diagram of control systems, analysis of stability and errors of a control system.

EE 346 Communication Systems, 4 Credits, 6 ECTS

Objectives of the Course:

This course is an introduction to the basic principles underlying the design and analysis of analog communication systems.

Course Description

Topics include Fourier representation of signals and systems, amplitude modulation, angle modulation, random signals and noise, and noise in analog communications

MTH 323 Numerical Analysis, 3 Credits, 6 ECTS

Objectives of the Course:

The main purpose of the course is to introduce the students into fundamentals of numerical analysis that are mainly used in engineering. The course is focused on techniques of mathematical analysis that can be used in computer algorithms, etc.

Course Description:

Taylor Series Approximations. Numerical Differentiation. Propagation of Errors. Bisection Method. The False Position Method. Simple One-Point Iteration. Newton-Raphson Method. Secant Method. Newton Raphson Method for Nonlinear Equations. LU Crout Decomposition. Gauss-Seidel Method. Optimization. Newton's Method. Multivariate Unconstrained Optimization. Steepest Ascent Method. Constrained Optimization. Linear Programming. The Simplex Method. Linear Regression. Least

Squares. Newton's Interpolating Polynomials. Lagrange Interpolating Polynomials. Newton Cotes Integration Formula. Trapezoidal Rules. Simpson Rules. Euler's Method. Heun's Method

EE 332 Electromechanical Energy Conversion II, 4 Credits, 5 ECTS
Objectives of the Course:
Continues to introduce students the fundamentals of electrical machinery

Course Description:
Electromagnetic fields created by AC electric machine windings: pulsating and rotating magnetic fields, emf induced in a winding. Induction machines: equivalent circuit, steady-state analysis, speed control. Synchronous machines: equivalent circuit, steady-state analysis, stability. Single-phase induction machines. Special electrical machines.

FOURTH YEAR

EE 401 Engineering Design-I, 4 Credits, 5 ECTS
Objectives of the Course:

- To provide design experience to the students through individual and teamwork and familiarize them with the project management methodology
- To provide the ability to understand and redefine a given engineering problem, and the ability to develop a conceptual design
- To provide students the ability to communicate effectively

Course description:
This course is organizedto provide the fundamentals of project design, presentation and management. Also engineering economics, ethics and design experience through an engineering project is provided through the course.

EE 402 Engineering Design-II, 4 Credits, 5 ECTS
Objectives of the Course:

- To provide design experience to the students through individual and teamwork and improve their knowledge on the project management methodology.
- To provide students with the experience of realization of a product from conceptual design to working model
- To provide students the ability to communicate effectively

Course description:
This course is a continuation of EE401 Engineering Design I with topics covering completion of an

engineering project with a final report, oral presentation to a jury and poster presentation at an "Engineering Day" event.

EE 411 Telecommunications, 3 Credits, 5 ECTS
Objectives of the Course:

- To explain analog to digital conversion
- To explain the details of digital transmission and reception
- To teach the basics of effects of noise on digital communications To describe various applications of digital communications

Course description:
Topics include pulse modulation, baseband data transmission, digital bandpass modulation techniques, random signals and noise, and noise in digital communications

EE 412 Radar Systems, 3 Credits, 5 ECTS
Course description:
General design principles and performance evaluation of pulsed radars. Statistical detection theory and radar cross-section of targets. CW, FM and Doppler radars. Target tracking radars. Radar receiver design. High power microwave generation and amplification; Radar antennas. Detection of radar signals in noise and waveform design. Propagation of radar waves.

EE 416 Computer Networking, 3 Credits, 5 ECTS
Objectives of the Course:

- Build an understanding of the fundamental concepts of computer networking.
- Familiarize the student with the basic taxonomy and terminology of the computer Networking area.
- Introduce the student to advanced networking concepts, preparing the student for Entry Advanced courses in computer networking.
- Allow the student to gain expertise in some specific areas of networking such as the design and maintenance of individual networks.

Course description:
This course is to provide students with an overview of the concepts and fundamentals of data communication and computer networks. Topics to be covered include: data communication concepts and techniques in a layered network architecture, communications switching and routing, types of communication, network congestion, network topologies, network configuration and management, network model components, layered network models (OSI reference model, TCP/IP networking architecture) and their protocols, various types of networks (LAN, MAN, WAN and Wireless networks) and their protocols.

EE 425 Satellite Communication Systems, 3 Credits, 5 ECTS
Objectives of the Course:
This course covers the basic techniques for the design and analysis of satellite communication systems.

Course description:
Topics include orbits and trajectories, characteristics of satellites, frequency spectrum allocations, flexibility, reliability and quality issues, transmitting and receiving stations, link budget analysis, modulation and multiple access, transmission distortion and impairments.

EE 427 Information Theory and Coding, 3 Credits, 5 ECTS
Objectives of the Course:

- To provide students a basic understanding of entropy and information
- To teach students basics of coding theory
- To give an inside into the fundamentals and applications of modern error-correcting codes

Course description:
Topics include entropy and information, information channels, source coding, fundamentals of channel coding, cyclic codes and convolutional codes.

EE 428 Communication Electronics, 3 Credits, 5 ECTS
Course description:
Analog communication circuits: amplifiers, filters, oscillators, VCO, PLL circuits. Digital communication circuits: encoders, decoders. Modulators and demodulators.

EE 429 Mobile Communication Systems, 3 Credits, 5 ECTS
Course description:
Introduction to cellular mobile systems; Elements of cellular radio system design; Specifications ofAnalog Systems; Cell coverage and propagation; Cochannel interference; Frequency managementand channel assignment; Hand-offs and Dropped calls; Switching and Traffic; System evaluations;Digital cellular systems; Intelligent cell and intelligent network.

EE 430 Wireless and Personnel Communications Systems, 3 Credits, 5 ECTS
Course description:
Cellular communication concepts. Roaming. Cells splitting. Access technology. Architecture ofmobile switching center. Mobile and base stations call processing. Authentication. Encryption andinformation security in mobile systems. North American, Japanese and European cellular systems.Iridium-66 and globstar-48 systems.

ECC 411 Digital Signal Processing, 3 Credits, 5 ECTS
Objectives of the Course:
Introduces students to the fundamentals of Digital Signal Processing

Course Description:
Discrete-time signals and systems. Realization of discrete-time systems. Analog I/O interface for real time DSP systems. Discrete transforms. FIR and IIR filters. Synthesis of filters.

EE 463 Machine Learning in Computer Vision, 3 Credits, 5 ECTS
Course Description:
The course content includes the descriptions of fundamental digital image processing, computer vision and meachine learning techiques. In image processing, several topics are described such as digital image representation, histogram equalization, edge detection, frequency domain processing, the fast wavelet transforms and color image processing. Camera models and camera calibration are also given. Finally, machine learning techines are explained in detail. These techiques are support vector machines, support vector regressions, neural networks, random forests. Furthermore, deep learning methods, AlexNet, GoogleNet, RestNet and DenseNet, are also explained during the course. Computer Vision and Machine Learning, Fundamentals of Digital Image Representation, Histogram Equalization, Edge Detection, Frequency Domain Processing , The Fast Wavelet Transforms, Color Transformation, Camera Models, Camera Calibration, Support Vector Machines, Support Vector Regressions, Neural Networks, Deep Learning Methods: AlexNet, GoogleNet, RestNet and DenseNet.

EE 469 Electromagnetic Wave Propagation and Antennas, 3 Credits, 5 ECTS
Course description:
Maxwell's equations and coordinate systems. Wave equations. Green's functions, radiation. Ideal dipole. Doppler effect. Basic antenna performance parameters. Line sources and wire antenna. Broadband antenna. Array theory. Aperture theory. Frequency independent antennas. Antenna measurements.

EE 420 Intelligent Control Systems, 3 Credits, 5 ECTS
Course Description
Introduction to Soft Computing, Fuzzy Sets and Fuzzy Information Processing,Structures of Fuzzy

Control Systems and Fuzzy Inference Systems, Typical and Special Fuzzy Controllers Basics of Neural Networks, Architectures, Dynamics, Neuro-Fuzzy Systems

EE 424 Process Control Instrumentation Technology, 3 Credits, 5 ECTS
Course description:
Process control characteristics. Analog and digital signals conditioning. Thermal, mechanical, optical sensors and design considerations. Final control. Discrete-state process control. Controller principles. Controllers. Control loop characteristics. Industrial control networks. Servomotor technology in motion control systems. Robots.

EE 435 Mechatronics, 3 Credits, 5 ECTS
Course description:
Introduction to Mechatronics and measurement systems. Sensors and transducers: Sensors andtransducers, Performance terminology, Examples of sensors, Selection of sensors. Signal conditioning: Signal conditioning, The operational amplifiers for analog signal processing,Protection, Filtering, Digital circuits and systems. Measurement systems: Designing measurementsystems, Data presentation systems, Measurement systems, Testing and calibration. Mechanicalactuation systems: Mechanical systems, Kinematic chains, Cams, Gear trains, Ratchet mechanisms,Belt and chain drives. Electrical actuation systems: Electrical systems, Switches, Solenoids, Motors,Stepping motors. Basic system models: Mathematical models, Mechanical system building blocks,Electrical system building blocks, Fluid system building blocks, Thermal system building blocks.Simulation of simple mechanical systems by electrical elements (circuits). Design andmechatronics: Designing, Mechanisms, Examples of designs.

EE 451 Digital Electronics, 3 Credits, 5 ECTS
Course description:
Introduction to ICs. Logic families. Small- and large-scale integrations. Decoders, multiplexers,memories. Programmable logic devices. Digital-to-analog and analog-to-digital converters.

EE 454 Digital Control Systems, 3 Credits, 5 ECTS
Course description:
Introduction to sampled data systems. Discrete modelling of systems. Z-transforms. Second orderdiscrete systems. Stability. Root-locus in the z-plane, Bode diagrams in the z-plane, Nyquistdiagrams in the z-plane. Compensation techniques. PID-controllers.

ECC 437 Robotic Systems, 3 Credits, 5 ECTS
Course description: Components and subsystems: vehicles, manipulator arms, wrists, actuators, sensors, user interface,controllers. Classifications of robots. Coordinate transformations. Dynamic

model of robots.Kinematics: manipulator position, manipulator motion. Sensors, measurement and perception.Computer vision for robotics. Hardware and software considerations.

EE 470 Programmable Logic Controllers, 3 Credits, 5 ECTS
Objectives of the Course:
Introduction to programmable logic controllers

Course Description:
Conventional relay system, contact logic, PLC Structure, operating system, Ladder and Statement list programming \ releasing basic logic functions by PLC, PLC communication, applications.

EE433 Power Electronics, 3 Credits, 5 ECTS
Objectives of the Course:
Introducing electronic applications for the transformation and control of electrical power. Teaching the operational principles and analysis of various power converters.

Course Description:
Power semiconductor devices: power diodes and transistors, thyristors, GTOs, power MOSFETs. Drive circuits and switching characteristics. AC-DC Converters: single-phase half-wave converters, two-phase mid-point converters, single- and three-phase bridge converters, three-phase mid-point converters. Line-current harmonics. Firing control of rectifiers. DC choppers: single- and two-thyristor choppers. Inverters: single- and three-phase square-wave inverters, voltage control of inverters, PWM inverters.

EE471 Power System Analysis I, 3 Credits, 5 ECTS
Objectives of the Course:
Introduction to transmission lines and power system modeling

Course Description:
General structure of electric power systems. Electrical characteristics of transmission lines, transformers and generators: series impedance and capacitance of transmission lines, current-voltage relations on a transmission line for short, medium and long lengths. System modelling of synchronous machines, transformers, transmission lines and loads. Representation of power systems. Per unit analysis of power systems. Power circle diagram. Travelling waves, reflections. Symmetrical three-phase faults. Symmetrical components. Unsymmetrical components.

EE 472 Power System Analysis II, 3 Credits, 5 ECTS
Objectives of the Course:

- To teach Symmetrical Components for analyzing unbalanced voltage and currentphasors
- To analyze Unbalanced Faults on Unloaded Generators
- To teach Unsymmetrical Fault Analysis on Power Systems.
- To study Load Flow on Power Systems.

Course Description:
Symmetrical components. Positive, negative and zero-sequence networks of power systems. Unsymmetrical faults on power systems; single line to ground, double line to ground and line to line fault analysis. Faults through impedances . Faulty operation of Circuit Breakers. Basic Load Flow Equations. Load flow analysis.

EE 473 Power System Protection, 3 Credits, 5 ECTS
Objectives of the Course:

- To teach Basic concepts of protection for power systems
- To give information on Over-current, differential and impedance protection systems
- To study Generator , Transformer and Line Protection

Course Description:
Basic Concepts of Power System Protection Systems are studied. Topics are : Principles of Power System Protection. Current and Voltage Transformers. Over-current , differential and impedance protection systems. Transformer, generator and line protections

EE 474 StaticPower Conversion, 3 Credits, 5 ECTS
Course description:
Power switches. Power converters. VTA method. Midpoint and bridge rectifiers. Introduction toforced commutated circuits. Centretap inverter. Voltage-fed inverters. Current-fed inverters. DC-DCswitching converters. Series and parallel operation of switching elements.

EE 475 High Voltage Techniques I, 3 Credits, 5 ECTS
Objectives of the Course:

- To teach the basic concepts of breakdown mechanisms in insulating materials
- To investigate pre-breakdown phenomena in gaseous insulation and partial discharges
- To teach Townsends and Streamer breakdown mechanisms
- To study breakdown in solid and liquid insulation.

Course Description
Breakdown mechanisms in insulating materials are studied. Topics are; I-V characteristics of gases. Electron emission processes. Ionization and deionization. Townsend and Streamer breakdown mechanisms. Breakdown in electronegative gases. Corona discharges and loses. Breakdown mechanisms in solid and liquid insulations

EE 476 High Voltage Techniques II, 3 Credits, 5 ECTS
Objectives of the Course:

- To give the basic information on internal and external over-voltages developed on the power system.
- To teach High A.C ,DC and Impulse voltage generation techniques
- To teach measurements of high voltages

Course Description
To give information on high voltage insulation tests required in practice

Insulation overvoltage-tests are studied . Topics include: generation of high, direct, alternating, and impulse voltages. Voltage multiplier circuits. Resistive, capacitive and mixed high-voltage dividers. Sphere gaps and high voltage measurement techniques.

EE 478 Distribution System Techniques, 3 Credits, 5 ECTS
Course description:
Basic considerations. Load characteristics and forecasting methods. Distribution substations. Operational characteristics of cables and transformers. System voltage regulation. Power factorcorrection. Fuse gear, switch gear, current and voltage transformers. Over current and thermalprotection. Earthing methods. Economics of distribution systems.

EE 492 Illumination Engineering, 3 Credits, 5 ECTS
Objectives of the Course:
Concepts of illumination engineering

Course Description
Basic concepts and laws of illumination, types of lamps, interior and external illumination calculations, installation calculations for cable cross sections and the voltage drop, calculating the circuit breaker values and designing the electrical board, symbols and planning.

EE 494, Introduction to Computer Vision, 3 Credits, 5 ECTS
Course Description
Introduction to MATLAB and Language Fundementals, Image formation, Basic operators and filters, Classical Hough Transform and Polar Hough Transform, and Practical examples in MATLAB, Circle detection using Hough Transform, Least Squares Fitting, Random sample consensus (RANSAC), Feature Detection and Matching, Segmentation, Structure From motion, Image Stitching, Stereo Correspondence

EE 495 Optimal and Adaptive Control, 3 Credits, 5 ECTS
Course Description

Control system design, robust control, gain scheduling, direct and indirect adaptive control, model reference adaptive control, adaptive pole placement control, design of parameters, design of online parameter estimators, stability, robust adaptive law, optimal control, optimal algorithms, intelligent control

ECC 426 Engineering Economy, 3 Credits, 5 ECTS
Objectives of the Course:
Discuss principles and economic analysis of decision making. Discuss cost concepts, make-versus purchase studies; Analyze principles of money-time relationships. Work on cash flow analysis. Analyze application of money-time relations. Analyze supply and demand relations. Analyze price and demand relations.Analyze breakeven point analysis and effects of inflation on money-time relationships

Course Description
Principles and economic analysis of engineering decision making. Cost concept. Economic environment. Price and demand relations. Competition. Make-versus-purchase studies. Principles and applications of money-time relationships. Depreciation. Money and banking. Price changes and inflation. Business and company finance

ECC 427 Management for Engineers, 3 Credits, 5 ECTS
Objectives of the Course:
Discuss principles of management, Discuss functions of managers, Discuss organization and environment, Discuss marketing, production and personnel management, Discuss marketing control,Discuss accounting and financial reports, Discuss budgeting and overall control,

Course Description
Principles of management. Functions of managers. Organisation and the environment. Marketing management. Production management. Personnel management. Managerial control. Accounting and financial reports. Budgetting and overall control.

AİT 101 Atatürk İlkeleri Ve İnkılap Tarihi I, 2 Kredi, 2 AKTS
Ders Tanımı
İnkılap Tarihi ilgili kavramlar ve kaynakların açıklanması. Osmanlı Devleti'nin yıkılışını ve Türk İnkılâbını hazırlayan sebeplere toplu bir bakış (İç sebepler, Dış sebepler, Osmanlı Devleti'nin jeopolitik ve ekonomik durumu) 19. yüzyılda Osmanlı Devleti'nde yenileşme hareketleri (Tanzimat, Islahat ve I. Meşrutiyet dönemleri) Birinci Dünya Savaşı öncesi askeri ve siyasi gelişmeler (Osmanlı Devleti'nin Dağılması sürecinde meydana gelen iç ve dış olaylar (Kırım Savaşı, 1877-78 Osmanlı-Rus Savaşı, Makedonya meselesi, 31 Mart olayı, Girit ve Bosna- Hersek'in elden çıkışı, Trablusgarp Savaşı, Balkan Savaşları) Osmanlı Devleti'nin son dönemindeki fikir akımları (Osmanlıcılık, İslamcılık, Türkçülük, Batıcılık, Adem-i Merkeziyetçilik, Sosyalizm) ve II. Meşrutiyetin sürecinde Osmanlı Devleti Birinci Dünya Savaşı,(Savaşın çıkışı, Osmanlı Devleti'nin savaşa dâhil oluşu, cepheler ve savaşın sonu),Osmanlı Devletini Paylaşma Projeleri ile Mondros Mütarekesi Milli Mücadele Dönemi askeri ve siyasi gelişmeler İşgallerin başlaması, Azınlıkların Faaliyetleri ve ayrılıkçı cemiyetler, milli cemiyetler Mustafa Kemal Paşanın İstanbul'daki faaliyetleri, Mustafa Kemal Paşanın Samsun'a çıkması. Amasya Genelgesi, Erzurum,Batı Anadolu ve Sivas Kongreleri. Son Osmanlı Mebusan Meclisi'nin toplanması, İstanbul'un işgal edilmesi. T.B.M.M.'nin toplanması ve niteliği. T.B.M.M.'nin açılmasından sonraki askeri ve siyasi gelişmeler. T.B.M.M.'nin açılmasından sonraki askeri ve siyasi gelişmeler. Mudanya Mütarekesi

AİT 102 Atatürk İlkeleri Ve İnkılap Tarihi II, 2 Kredi, 2 AKTS
Ders Tanımı
Lozan Barış Konferansı ve sonuçları,Türk İnkılap Hareketleri. Siyasi Alanda Yapılan İnkılaplar (Saltanatın kaldırılması, Ankara'nın başkent oluşu, Cumhuriyetin ilanı ve Halifeliğin kaldırılması). Çok Partili Rejim Denemeleri ve Sonuçları. (Terakki perver Cumhuriyet Partisi, Serbest Cumhuriyet Partisi, Şeyh Sait isyanı,Menemen Olayı, Atatürk'e karşı suikast girişimi) Hukuk Alanında Yapılan İnkılaplar. Eğitim ve Kültür alanında gerçekleştirilen inkılâplar (Tevhid-i Tedrisat kanunu, Latin harflerinin kabulü, Millet mektepleri, Türk Tarih ve Dil kurumlarının kurulması ve faaliyetleri, Türk tarih tezi, güneş-dil teorisi, 1933 Üniversite reformu, Halkevleri), Sağlık alanındaki gelişmeler, Sosyal Alanda Yapılan İnkılaplar. Ekonomi ve Sağlık Alanında Yapılan İnkılaplar. Atatürk Dönemi Türk Dış Politikası. (1923-1932 dönemi) Atatürk Dönemi Türk Dış Politikası. (1932-1938 dönemi) Atatürkçü

Düşünce Sistemi'nin tanımı, kapsamı, Atatürk İlkeleri (Cumhuriyetçilik, Milliyetçilik Halkçılık) Atatürkçü Düşünce Sistemi'nin tanımı, kapsamı, Atatürk İlkeleri(Devletçilik, Laiklik, İnkılapçılık) Atatürk'ten sonraki Türkiye (İnönü'nün Cumhurbaşkanlığı, II. Dünya Savaşı ve Türkiye, Demokrat Parti'nin kuruluşu ve çok partili hayata geçiş)

TUR 101 Türk Dili I, 2 Kredi, 2 AKTS

Ders Tanımı

Sözlü anlatım ve konuşmanın insan hayatındaki önemi, Konuşma becerilerinin geliştirilmesi, Doğru telaffuzda dikkat edilmesi gereken hususlar. Konuşma ile ilgili Temel Kavramlar; Konuşma, Ses, Boğumlanma, Sıklık,Tonlama, Ezgi, Vurgu, Duraklama, Tını, Pes ve Tiz ses. Doğru, Güzel ve Etkili Konuşmanın Temel İlkeleri; Açıklık, Doğallık,İnandırıcılık, İlginçlik, Konuşmacının bilgi ve donanımı, Ön çalışma, Konuşmayı destekleyen yardımcı unsurlar. Konuşma bozuklukları ve giderilmesi; Kişilik ve davranışla ilgili konuşma bozuklukları, Söyleyişle ilgili konuşma yanlışlıkları, Bilmemekten kaynaklanan konuşma yanlışlıkları, Başarılı bir konuşma için gerekli unsurlar. Beden dili kullanımının önemi, Konuşmacının beden dili özellikleri, Bazı beden dili sinyalleri ve bunların anlamları. Dinleme nedir? Dinlediğini anlama, dinlemeyi belirleyen etkenler, Dinlediğini anlama becerisini kazandırma. Hazırlıksız Konuşmalar; Telefonda konuşma, Özür dileme, Kutlama, Sohbet etmek, Adres sorma, Tanışma tanıştırılma,Yer yön tarifi. Hazırlıklı konuşmalar; Konunun belirlenmesi, Konuşma planının çıkarılması, Konuşmanın denenmesi, Sunum sırasında yapılması gerekenler. Tartışma Konuşmaları; Açık oturum, Sempozyum, Panel, Forum, Münazara. Topluluk Konuşmaları; Nutuk, Konferans, Seminer, Kurultay. İletişim ve Anlama, Etkili Dinleme, Not Alma Yöntem ve Teknikleri, Sese Dayalı Dil Yanlışları

TUR 102 Türk Dili II, 2 Kredi, 2 AKTS

Ders Tanımı

Sözlü anlatım ve konuşmanın insan hayatındaki önemi, Konuşma becerilerinin geliştirilmesi, Doğru telaffuzda dikkat edilmesi gereken hususlar. Konuşma ile ilgili Temel Kavramlar; Konuşma, Ses, Boğumlanma, Sıklık, Tonlama, Ezgi, Vurgu, Duraklama, Tını, Pes ve Tiz ses. Doğru, Güzel ve Etkili Konuşmanın Temel İlkeleri; Açıklık, Doğallık,İnandırıcılık, İlginçlik, Konuşmacının bilgi ve donanımı, Ön çalışma, Konuşmayı destekleyen yardımcı unsurlar. Konuşma bozuklukları ve giderilmesi; Kişilik ve davranışla ilgili konuşma bozuklukları, Söyleyişle ilgili konuşma yanlışlıkları, Bilmemekten kaynaklanan konuşma yanlışlıkları, Başarılı bir konuşma için gerekli unsurlar. Beden dili kullanımının önemi, Konuşmacının beden dili özellikleri, Bazı beden dili sinyalleri ve bunların anlamları. Dinleme nedir? Dinlediğini anlama, dinlemeyi belirleyen etkenler, Dinlediğini anlama becerisini kazandırma. Hazırlıksız Konuşmalar; Telefonda konuşma, Özür dileme, Kutlama, Sohbet etmek, Adres sorma, Tanışma tanıştırılma,Yer yön tarifi. Hazırlıklı konuşmalar; Konunun belirlenmesi, Konuşma planının çıkarılması, Konuşmanın denenmesi, Sunum sırasında yapılması gerekenler. Tartışma Konuşmaları; Açık oturum, Sempozyum, Panel, Forum, Münazara. Topluluk Konuşmaları; Nutuk, Konferans, Seminer, Kurultay. İletişim ve Anlama, Etkili Dinleme, Not Alma Yöntem ve Teknikleri, Sese Dayalı Dil Yanlışları

YİT 101 Yabancılar İçin Türkçe I, 2 Credits , 2 ECTS

Course Description

Türkçenin temel kuralları, ses bilgisi(sesler, alfabe okuma kuralları), kelime bilgisi (Kelimelerin yapı olarak tanınması, kelimeler arası ilişkiler), cümle bilgisi(cümle kuruluşları, genel yapı ve cümle türleri), okuma –yazma(okuma kuralları ve yazı teknikleri, yazım kuralları, konuşma ve yazı dilinin kavranması, yazım kuralları.), okuma –anlama (okuduğunu anlama teknikleri, metinleri üzerinde uygulamalar), dinleme(dinlediğini anlama, dinlediğini not alarak gerekli yorumu yapma, öğrencilerin kendi mesleklerine uygun metinler üzerinde uygulamalar), konuşma(konuşma tekniklerini öğrenme, belirli vurgu, tonlama gibi şekillerin öğrenilmesi uygun metinler üzerinde uygulamalar), Uluslararası dil düzeyine göre A1 başlatılmıştır.

YİT 102 Yabancılar İçin Türkçe II, 2 Credits , 2 ECTS

Course Description

Türkçenin kelime bilgisi (Kelimelerin yapı olarak tanınması, kelimeler arası ilişkiler), cümle bilgisi(cümle kuruluşları, genel yapı ve cümle türleri), okuma –yazma(okuma kuralları ve yazı teknikleri, yazım kuralları, konuşma ve yazı dilinin kavranması, yazım kuralları.), okuma –anlama (okuduğunu anlama teknikleri, metinleri üzerinde uygulamalar), dinleme(dinlediğini anlama, dinlediğini not alarak gerekli yorumu yapma, öğrencilerin kendi mesleklerine uygun metinler üzerinde uygulamalar), konuşma(konuşma tekniklerini öğrenme, belirli vurgu, tonlama gibi şekillerin öğrenilmesi uygun metinler üzerinde uygulamalar)Uluslararası düzeye göre A1 devam etmektedir.

AİT 103 Principles of Ataturk and the History of Turkish Revolution I, 2 Credits , 2 ECTS

Course Description

Beside discussing the definition of the term " Revolution" by giving some examples such as French and Russian Revolutions, this course mainly focuses on the historical process that laid the basis of the foundation of Modern Turkey.In this context, after presenting a concise political history of the Ottoman Empire and its state mechanism, the political, social and economical developments between the Sultan Selim III Period (1789-1808) and the proclamation of Republic of Turkey by Mustafa Kemal Ataturk in 1923, are examined.

AİT 104 Principles of Ataturk and the History of Turkish Revolution II, 2 Credits , 2 ECTS
Course Description
The political, social, economical and cultural transformation in the Republic of Turkey; The six principles of Atatürk and Kemalizm; Turkish Foreign Policy during the Atatürk period.

Graduate Courses

EE 501 - Linear System Theory 3 Credits
Mathematical modeling of linear systems. Time invariant systems. Lyapunov theory. Decomposition of Kalman. Controllability and observability of composite systems. Controller and observer design. Pole–placement design. Problems using Matlab.

EE 502 - Random Variables and Stochastic Processes 3 Credits
Stochastic properties of random signals. Stationary and nonstationary process. Ergodic process. Corellation function and spectrum of random signals. Guassian process. Noise calculations. Markov chains. Linear and Kalman filtering. Problems using Matlab

EE 503 - Advanced Digital Signal Processing 3 Credits
Digital processing of the continuous time signals. Discrete Fourier transforms. Fast-Fourier transform. FIR and IIR filters design. Limit cycles. Adaptive filtering. Adaptive digital filters in communication. Adaptive line enhancement and equalization. Adaptive delta and differential pulse code modulations. Problems using Matlab.

EE 504 - Wireless and Personal Communication Systems 3 Credits
Cellular communication concepts. Roaming. Cells splitting. Access technology. FDMA, TDMA and CDMA. Radio interface. Spread spectrum techniques. Up-link and down-link. Architecture of mobile switching center. Mobile and base stations call processing. Authentication. Encryption and information security. North American, Japanese and European cellular systems. Iridium-66 and globstar-48 systems. Laboratory experiments

EE 505 - Information Theory and Coding 3 Credits
Entropy. Markov source. Information channels. Mutual information. Channel capacity. Fundamentals of channel coding. Hamming distance and minimum distance. Maximum likelihood decoding rule. Rings and fields. Linear codes. Syndrome decoding of linear codes. Low-density parity-check codes. Convolutional codes. The Viterbi algorithm. Turbo codes. Cyclic codes. Encoding and decoding of cyclic codes.

EE 506 – Advanced Data Communications 3 Credits
Introduction to data communications. Equalizing. Carrier and bit synchronization. Error detection and correction standards.Data compression. Integrated switched digital network ISDN.Architecture. Protocols.Broadband ISDN. Frame relay. Protocol, services, congestion cvontrol.Asynchronous transfer mode ATM. Protocols, trafic and congestion control.

EE 507 - Computer Networks and Internet 3 Credits
Paket transmission. LAN topology. Hardware addressing and frame type identification. Fiber modems, repeaters, bridgers, and switches. WAN technology and routing.Network performane characteristics. Protocols and layering. Internetworking. Architecture and protocols. TCP/IP protocols. Encapsulation, fragmentation and reassembling. Error reporting mechanism. Packet loss and adaptive retransmission. Reliable transport servises. File transfer and remote file access. WWW pages and browsing. GGI technology. Network security and encryption techniques.

EE 508 - Artificial Neural Networks 3 Credits
Lectures will cover: Introduction to machine intelligence, biological neurons and computer models of neuron, supervised and unsupervised learning, Kohonen's self-organizing maps (SOM), learning algorithms and topologies of Perceptrons and Backprogation networks, applications of ANN, Input/output data coding, examples of designing neural networks for classification, neurocomputing for pattern recognition. Assignments are an important part of the course and will provide experience in technical writing and practical knowledge of designing a working neural network. Software simulation of ANN can be done using C-language or MATLAB.

EE 509 - Speech Processing 3 Credits
Speech modeling. Speech acquisition, sampling and quantising techniques. Speech analysis. Speech coding. Linear predictive code. Adaptive predictive coding. Adaptive quantizer. LMS algorithm. Speech interpolation. Speech compression. Speech and speaker recognitions. Speech enhancement. Problems using Matlab. Laboratory Experiments.

EE 510 - Image Processing 3 Credits
Image modeling. Two-dimensional signal analysis. Image processing techniques. Image enhancement. Image compression. Image manipulations. Image recognition. Region extractions and edge detections. Problems using C++ and Matlab. Laboratory Experiments.

EE 511 - Artificial Inteligence 3 Credits
Main characteristics of artificial intelligence systems (AIS). Classifications. Knowledge representations and acquisitions. Inference engine. Searching mechanism. Expert systems. Parallel and distributed AIS. Uncertainty knowledge and decision making. Learning, neural network. AIS application in control and communication systems. Problems using Prolog, C++ and Matlab.

EE 512 - Electromagnetic Wave Propagation 3 Credits
Fundamental concepts and theorems. Maxwell equation and electromagnetic waves. Wave transformations. Classifications of waves. Guided waves. Ground wave propagation. Tropospheric and iono-spheric propagations. Measurement and modeling of environmental noise.

EE 514 - Radar Systems 3 Credits
General design principles and performance evaluation of pulsed radars. Statistical detection theory and radar cross-section of targets. CW, FM and Doppler radars. Target tracking radars. Radar receiver design. High power microwave generation and amplification; Radar antennas. Detection of radar signals in noise and waveform design. Propagation of radar wave

EE 515 - VLSI Design 3 Credits
Practical considerations. Technology. Device modeling. Circuit simulation. Basic integrated circuit building blocks. Amplifiers. Operational amplifiers. Digital circuits. Analog systems: analog signal processing, digital-to-analog converters, analog-to-digital converters, filters. Analog signal processing circuits: modulators, multipliers, oscillators, phase-locked loops. Structured digital circuits and systems. Laboratory Experiments.

EE 516 - Integrated Sensors and Sensing Systems 3 Credits
Fundamental principles, operation, and design of integrated solid-state sensors and sensing systems. Sensor technology, micromachining and wafer bonding. Microstructures for the measurement of visible and infrared radiation, pressure acceleration, temperature, gas purity, and ion concentrations. Merged process technologies for sensors and circuits. Data acquisition circuits and advanced sensing systems. Microactuators and integrated microsystems

EE 517 - Process Control Instrumentation Technology 3 Credits
Process control characteristics. Analog and digital signals conditioning. Thermal, mechanical, optical

sensors and design considerations. Final control. Discrete-state process control. Controller principles. Controllers. Control loop characteristics. Industrial control networks. Servomotor technology in motion control systems. Robots.

EE 518 - Optimal and Adaptive Control 3 Credits
Optimal control problems. Calculus of variations. Pontryagin's maximum principle. Linear quadratic regulator. Riccati equation. Parametric and non parametric identifications. Optimal estimation. Kalman filters. Adaptive control. Model reference and self-tuning adaptive control.

EE 519 - Fuzzy Systems 3 Credits
Fuzzy sets. Representation and properties of fuzzy sets. Fuzzy relations and functions. Fuzzy arithmetic. Fuzzy modeling. Decision making in fuzzy conditions. Fuzzy control systems. Design examples. Computer simulations of fuzzy systems. Problems using C++ and Matlab.

EE 520 - Optimization 3 Credits
Mathematical preliminaries on functions of several variables. Convexity and convex functions. Unconstrained minimization problems. Computational algorithms. Newton and quasi-Newton methods. Constrained minimization problems and Kuhn-Tucker theory. Fundamental theorems of linear optimization. Simplex algorithm.

EE 521 - Estimation Theory 3 Credits
Review of probability and stochastic processes. Gauss-Markov process and stochastic differential equations. Bayesian estimation theory. Maximum likelihood, linear minimum variance and Least-mean square estimations. Properties of estimators; error analysis. State estimation for linear systems. Kalman and Wiener filters. Smoothing and prediction. Nonlinear estimation. Realizations of filters.

EE 522 - Intelligent Control 3 Credits
Uncertainty models and information representation: types of uncertainties and uncertainty measures. Intelligent control methodologies: learning control, fuzzy control, neurocontrol.

EE 523 - Robotics Systems 3 Credits
Evolution of robots, elements of robotic systems, mathematics of manipulators. Homogeneous transformations, end effectors position and orientation. Kinematics of robotic systems. Manipulator dynamics. Tree-structured manipulators. Multiple manipulators. Leading robot hands. Hand gross motion control. Obstacle avoidance techniques. Collision free wrist path planning. Hand preshape analysis. Grasp planning. Contact analysis. Hand fine motion control. Manipulability and stability of robotic systems.

EE 524 - Advanced Static Power Conversion 3 Credits
Overloaded modes of operation of rectifiers, characteristics. Reactive power and harmonics in ac-dc converters, cascade use of converters. Commutation techniques in inverters; McMurray circuit and its modified forms. Voltage control and harmonic elimination. ASCII inverters. Chopper structures. Improving the performance and optimization of circuit elements.

EE 525 - Theory and Design of Electrical Machines 3 Credits
Generalized machine concept. Matrix equation of electrical machines. Measurement of machine parameters. Steady state, transient, balanced and unbalanced operations. Approximate models of electrical machines. Induction machine. Classification, design principles, electric and magnetic loading, determination of dimensions, selection of slot numbers, reduction of parasitic torques, windings, calculation of parameters. Synchronous machine design. Transformer design.

EE 526 - Power Electronics 3 Credits
Advanced power electronic converters, techniques for modeling switching circuits, resonant and multi-level converters, Pulse-Width-Modulation (PWM) techniques, soft switching methods, low-voltage high-current design, Multi-phase, controlled and uncontrolled rectifiers and inverters with various operating techniques and their design and control, Includes extensive computer-aided circuit simulation and power supply control.

EE 527 - Advanced High Voltage Techniques 3 Credits
Insulation principles in HV equipment. Mechanism of lightning discharges and over voltages generated in HV systems. Mechanism of corona discharges and corona loss calculations. Electromagnetic interference generated by HV systems. Pollution flashover problem of HV insulators. Construction and operational principles of over voltage limiting devices, high voltage insulators, bushings and circuit breakers. Insulation design of high voltage transformers, cables and capacitors. Testing of HV equipment.

EE 528 - Advanced Microprocessor 3 Credits
Introduction to microprocessors, 8-bit microprocessor architecture, 8085 and Z80 instruction sets, microprocessor programming examples,16-bit microprocessor architecture, 8086 instruction set, programming examples, microprocessor interfacing techniques, memory, input-output, and interrupts.

EE 529 – Data Communication and Networking 3 Credits
Basics of data communications, and computer networks, ISO/OSI basic reference model. Physical, data link, network and transport layers. Routing, flow control, congestion control. Internetworking. TCP/IP suite of protocols. Higher layer protocols. Contemporary network architectures.

EE 530 – Mechatronics 3 Credits
Introduction to Mechatronics systems. Electric circuits and components. Microcontroller programming and interfacing. Data Acqusition, Quantising theory, A-D converters, D-A converters. Sensors and Actuators. Mechatronic systems-control architectures and case studies.

EE 531 – Flexible AC Transmission Systems 3 Credits
Power Transmission control, FACTS solutions. Transient stability control CSC, SSSC, SVC and STATCOM. Protection for EHV transmission lines with FACTS devices. FACTS development and applications.

EE 532 – Pattern Recognition 3 Credits
Introduction to pattern recognition, definitions and approaches. Statistical Pattern Classification: Decision Theoretic approach: Template Matching (Convolution, Correlation and OCR), Feature Analysis (Stroke Analysis and Geometric Features Analysis), Linear and Nonlinear Decision surface approach. Probabilistic Approach: Bayes Classifier and Gaussian distribution. Syntactic Pattern Classification: Parsing, Pattern Grammar Analysis and Representation, Language analogy grammar and Picture description grammar. Neural Networks Pattern Classification: Neural networks in brief, Activation functions and Topologies. Training strategies (algorithms) and examples of Intelligent Pattern Recognition. Assignments will be given to design an Intelligent Pattern Recognition System. This is an important part of the course and will provide experience in technical writing and practical knowledge. Software simulation of your IPRS can be done using C-language or MATLAB.

EE 533 – Electricity Outages and Load Management 3 Credits
Review of fundamental power system operation, Load (Demand) Management, Load sensitivity analysis for avoiding outages(How loads affect the security margin to voltage collapse,How loads affect the power flows on each line to avoid cascading line outages), Regulated and Deregulated environments for the electricity sector, Electricity Markets

EE 535 – Master of Science Seminar 3 Credits

EE 538 – Telecommunication Networks 3 Credits
Proper design and operation of efficient communication networks is becoming more important as the digital telecommunication services of today are constantly growing. This course provides an

introduction to communication networks. Specific topics to be covered include layered network architectures, error recovery and retransmission (ARQ), medium access control, routing and addressing, resource allocation and quality of service (QoS).

EE 540 – Expert Systems 3 Credits
The evaluation of artificial intelligence systems. Decision making. Expert System (ES) characteristics. Architecture of ES. Hybrid ES. Knowledge representation in ES. Representation of knowledge by Object-attribute value triplets, Semantic networks, Frames, Logic programming, Neural networks, Production rules. Inference engine, forward and backward chaining mechanisms. Knowledge acquisition. Uncertainty, fuzzy ES. ES shells. Application of ES for solving different problems.

EE 541 – Advanced Symmetrical Components and Rotating Field Theory 3 Credits
Unbalanced voltage. Current Systems. Unbalanced impedances. Rotating field with space and time harmonics. Induced emf between clip rings. Induced emf between stationary and rotating brushes

EE 572 – HighVoltage Insulation Coordination 3 Credits
Introduction and general philosophies of Insulation Coordination. Generation of over-voltages; lightning surges and switching surges. Propagation of surges; reflaction and refraction. Bewley-Lattice analysis of travelling surges. Protection against over voltages and protective devices.