

School	School of Engineering		
Major	Communication Engineering		
Major Requirements			
Code	Title	Credits	Description
CENG495	Senior Project	3	This project is a requirement for graduation with the B.S. in Engineering degree. Proposed by the supervising faculty, projects are geared towards integrating several topics covered in the curriculum. Students will have the opportunity to exercise research, experimentation, implementation and technical writing skills. Students typically work in teams; each team agrees on a project with the supervisor. The project scope must be adjusted to match at least a 3 credit load per team member. The project concludes with a demonstration, a presentation and a technical report all of which are appraised by a committee of faculty members.
CENG355	Advanced Digital Logic Design	3	A detailed study of modern digital design principles and techniques. Topics include: investigated utilizing advanced programmable logic devices (e.g. CPLD, FPGA), device development using Hardware Description Language (e.g. VHDL, Verilog), timing. Practical experience and additional insight will be gained in the design and development of practical solutions to modern problems.
CENG415	Communication Networks	3	This course constitutes an introduction to fundamental concepts in the design and implementation of computer communication networks, their protocols and applications (FTP, SMTP, HTTP, etc.). Topics include: overview of network architectures and topologies, applications, reliable data transfer, transport, congestion and flow control, routing, and data link protocols, addressing, local area networks. The course offers also an overview of advanced topics such as wireless networks, and network management. Examples will be drawn primarily from the Internet (e.g., TCP, UDP, and IP) protocol suite.
CENG400	Computer Organization and Design	3	This course introduces fundamental concepts in computer organization and digital logic design, Topics include computer arithmetic, MIPS processor design, ALU design, data path and controls, pipelining, interrupts and exceptions, memory management and cache.
CENG380	Microprocessors and Microcontrollers	3	This course introduces students to the principles of Microcontroller design and applications. Students will be introduced to the PIC microcontroller architecture, specifically the PIC 18F family. Moreover, the course introduces programming using assembly language and C. Topics introduced will include: Looping, branching, arithmetic and logical operations, timer, interrupts, Parallel I/O.
CENG352L	Digital Logic Circuits Lab	1	This lab introduces experiments concerning designing, simulating and testing digital logic circuits, which uses Combinational Logic Design; Decoders and Encoders, Multiplexers, signed number notations and arithmetic; binary addition/subtraction circuits; PLA, PAL, theory of sequential circuits; timing diagrams; analysis and synthesis of D, JK, and T flip flop based sequential circuit; Design with D and JK flip-flops. The objective of this course is to cover experimentally all experiments on Com3lab boards (70017 & 70018) that are related to the topics above. After that, each group of two students should have the tools to build combinatory circuits, where those circuits will be given as small projects where each group should write down the design and complete the implementation.

CENG300	Fundamentals of Digital Logic Design	3	This course is an introductory to logic design for students in computer and electrical engineering. The course stresses fundamentals and a large number of design problems. Topics include Boolean algebra: theory of logic functions; mapping techniques and function minimization; logic equivalent circuits and gate transformations; base conversion number notations and arithmetic; binary addition/subtraction circuits, decoder, encoder, comparator, Multiplexer and demultiplexer. Introduction to sequential circuits: Latches and flip-flops, state table and state equations, analysis of sequential circuits, Moore and Mealy state Machine.
EENG385	Signals and Systems	3	Signal and system modeling concepts; system modeling and analysis in time domain; the Fourier series; the Fourier transform and its applications; the Laplace transformation and its applications; analysis and design of analog filters, MATLAB for analog signal processing.
EENG467L	Analog Communication Systems Lab	1	This course introduces the principles of communication systems including spectral density of deterministic and random analog signals, thermal noise and white noise model, amplitude and angle modulation, generation and detection schemes, effects of noise, and digital transmission through the additive white Gaussian noise channel. In addition, the course will cover some programming applications in Matlab/Simulink.
EENG447	Analog Communication Systems	3	This course provides a thorough understanding of the principles of analog communication systems for undergraduate students in electrical and computer communications engineering. The course covers basic background material on linear systems and noiseless modulation, spectral density and correlation of deterministic and random analog signals, thermal noise and white noise models, linear and angle modulation, interference, feedback demodulators, and noise effects in modulation systems. In addition, the course introduces programming applications in Matlab/Simulink.
EENG388	Electromagnetic Fields and Waves	3	This is an introductory course in Electromagnetics covering Vector analysis, Electrostatics, Magnetostatics, Maxwell's equations and Plane Wave Propagation.
CENG420	Web Programming and Technologies	3	" The course focuses on the design and development of web based applications using a number of currently popular tools and technologies. Moreover, the use of database as data repositories for multitier web applications is further explored. Topics examined include: introduction to HTML and CSS, client-side scripting (JavaScript and DOM), server-side scripting, database connectivity, session tracking, HTTP headers and their use, security and privacy risks."
EENG350L	Electronic Circuits I Lab	1	The topics covered by this Lab course are amplifier characteristics, Diode Characteristics & Circuit Applications, Zener Diode Characteristics & Circuit Applications. Also, MOSFET and BJT Characteristics and Amplifiers will be covered. Spice simulation and breadboard implementation will be used.
EENG350	Electronic Circuits I	3	Electrical signals and amplifier models. Semiconductors. P-N Junction: current-voltage characteristics. Diode models. Diode circuit applications. Metal Oxide Semiconductor Field-Effect Transistor (MOSFET): structure, current-voltage characteristics, DC biasing, small-signal model, MOSFET amplifiers. Bipolar junction transistor (BJT): structure, current-voltage characteristics, DC biasing, small-signal model, BJT amplifiers.
EENG301L	Electric Circuits Lab	1	The Electric Circuits Lab introduces the students to circuit simulation tools, DC circuit analysis techniques such as nodal, mesh, Thevenin, Norton, & superposition, and transient circuit analysis of RC, RL, & RLC circuits.

EENG300	Electric Circuits II	3	Introduce techniques of AC circuit analysis, containing ideal and dependent sources. Covers sinusoidal steady state power calculations, balanced three phase circuits, frequency selective circuits and two-port circuits in addition to Operational amplifiers (Op-amps).
CENG435	Mobile Application Development	3	This course focuses on the development of advanced mobile applications using Android platform. Students will be introduced to the Android environment will learn the necessary skills for creating, simulating and deploying Android applications. The topics include: Android platform installation, Android Manifest, user interfaces, data persistency, content providers, geo-locations, networking, messaging, messaging, services and deployment. Students are also exposed to business models and current trends in mobile application development.
CENG375	Introduction to Database Systems	3	This course offers students an introduction to the design and programming of database systems. In particular, it covers the ER (Entity-Relationship) approach to data modelling, the relational model of database management systems (RDBMS) and the use of relational algebra and query languages such as SQL to create, modify_query the database. The role of relational algebra and the use of SQL in a programming environments, such as Java and/or PHP are briefly introduced. This course will also touch upon data normalization and the role of transaction management.
EENG250	Electric Circuits I	3	Introduce techniques of DC circuit analysis (Node, Mesh, Superposition, & Source Transformation) containing ideal and dependent sources. Covers real power calculations, perform equivalent resistive circuits. Introduce concept of Thevinin and Norton equivalent circuits, basic concept of mutual inductance, and determine the transient responses of RL, RC, parallel and series RLC. Prerequisites: ENGL051. Co-requisites: MATH210
CENG310L	Software Applications and Design Lab	1	Computer Applications and Design Lab
CENG460L	Linux Lab	1	This course introduces the student to Linux environment. In addition to basic usage, students are introduced to shell scripting and administration.
CENG455L	Communication Networks Lab	1	Based on student theoretical knowledge in communication networks, this lab is designed to help them start practical experiences in Internet networking. Students will be introduced to packet tracer network simulator with which they will be able to build, configure, and manipulate a LAN, MAN and WAN networks. Moreover, students will be introduced to the major concepts of how to configure a real LAN network by running switches, routers, IPv4 and IPv6. Furthermore, basic client/server applications would be introduced and implemented.
CENG400L	Microcontroller Applications Lab	1	This lab introduces projects concerning Microcontrollers architecture , instruction sets, and applications. Introduction to programmable PIC18F4550. Serial/Parallel Bus Interfacing with PIC. Assembly/C Language. ISIS Proteus Software: simulation. MPLAB Software: Editing, compiling, simulating and programming. C18 Compiler. Writing code programs. The functions: Timer, PWM, LCD, RTC, MCP, A/D, D/A, seven segment display. The main objective of this laboratory is to cover experimentally all the applications on the Microcontroller. It is an integral part of the preceding course, and it reinforces and complements the material covered in the course. It is designed for you to not only learn about the basic architecture of a Microcontroller, how to program them and show up their results, but in doing so; you will also use them in performing your undergraduate and graduate senior projects that allow you to have a good career.
Core Requirements			
Code	Title	Credits	Description

MATH310	Probability & Statistics for Scientists & Engineers	3	The concept of probability and its properties, descriptive statistics, discrete and continuous random variables, expected value, distribution functions, the central limit theorem, random sampling and sampling distributions, Hypothesis testing. Prerequisite: MATH 170
IENG300	Engineering Project Management	3	This course covers the fundamentals of project management for engineering professionals. It reviews the project management framework in organizations and covers in-depth the tools and techniques used in initiating, planning, executing, monitoring, controlling and concluding a project to achieve the set goals within schedule and budget targets. Real life engineering project examples are used to demonstrate the application of project management concepts to engineering projects. The course is aligned with the Project Management Institute's (PMI's) Project Management Body of Knowledge (PMBOK) and helps learners to prepare for PMI certification exams. Prerequisites: ENGL201.
CSCI300	Intermediate Programming with Objects	3	The course emphasizes the principles of Object Oriented Programming using the Java Programming Language. It starts by an introduction to creating applications using Java. Then the course introduces how to define classes and declare objects and discusses the main topics related to object oriented programming (constructors, methods, dependency, aggregation, inheritance, and polymorphism). Finally, the course introduces exception handling as well as writing to and reading from files.
MATH210	Calculus II	3	The course material includes hyperbolic functions and their inverses and their derivatives integration techniques, improper integrals, sequences, infinite series, power series, Taylor and Maclaurin series and application of power series. The mathematical software Maple will be introduced and used in support of the comprehension of the material. Prerequisites: MATH160
MENG250	Mechanics I (Statics)	3	This course treats only rigid-body mechanics and forms a suitable basis for the design and analysis of many types of structural, mechanical, _electrical devices encountered in engineering. As the course name suggests, this course deals with the equilibrium of bodies that are either at rest _move with constant velocity. Therefore, this Statics course provides the students with the principles that treats the Statics of particles and rigid bodies, trusses, frames, machines; centroids, centers of gravity; and friction. Prerequisites: ENGL051. Co-requisites: MATH210.
MENG225	Engineering Drawing & CAD	3	This course consists in two parts: 2 D and 3D. It can be defined as a tool in order to generate accurate drawings due to scales in 2 D and in 3 D. It focuses on drawings related to engineering. Drawings may be _descriptive_, describing an object _a tool, _they may represent the first step of design (Design of tools and machines).
CSCI250	Introduction to Programming	3	This course introduces the basic concepts and principles of structured programming in Java. It starts by an introduction to Java showing its syntax and the structure of a program in Java then teaches simple data types, control structures, methods, arrays, and strings.
CSCI250L	Introduction to Programming Lab	1	This course is a co-requisite for the Introduction to Programming course (CSCI250). The students apply in the lab the fundamentals of programming, explained in CSCI250, by solving lab exercises. The objective of the lab is to implement programming problems using basic data types, selection and repetition structures, methods and arrays.

MATH220	Calculus III	3	This text covers basic topics on infinite series, lines and planes in space, cylinders and quadric surfaces, functions of several variables, limits and continuity, Partial derivatives, chain rule, directional derivatives, Gradient vector, tangent planes, double and triple integrals, areas, moments, center of mass, volumes, double integrals in polar forms, triple integrals in cylindrical and spherical coordinates, line integrals, vector fields Green's theorem, surface integrals, Stokes theorem, and the divergence theorem. Students are required to solve extensive number of problems and computer assignment using the mathematical software package Maple.
MATH225	Linear Algebra with Applications	3	Introduction to the systems of linear equations and matrices, Gaussian eliminations, matrix operations, inverses, types of matrices, determinants and their applications, vector spaces, subspaces, linear independence, basis and dimension, rank and nullity, inner product spaces and orthogonal bases, eigenvalues and eigenvectors, applications from other disciplines such as physics, computer science, and economics.
MATH270	Ordinary Differential Equations	3	First-order equations, linear and non-linear differential, linearization, numerical and qualitative analysis, second-order equations, existence-uniqueness theorem, series solutions, Bessel's and Legendre's functions, Laplace transforms, systems of differential equations, applications and modeling of real phenomena. Prerequisite: MATH 220.
PHYS220	Physics for Engineers	3	Electricity, Electric Field and Electric Potential, Magnetism, Biot-Savart Law, Ampere's Law, Faraday's Law, Fluid Mechanics, Wave Motion, Sound Waves, Superposition and Standing Waves, Temperature, Heat, Laws of Thermodynamics.

General Education Requirements

Code	Title	Credits	Description
ARAB200	Arabic Language and Literature	3	This course is a comprehensive review of Arabic Grammar, Syntax, major literature and poetry styles, formal and business letters.
CULT200	Introduction to Arab - Islamic Civilization	3	The purpose of this course is to acquaint students with the history and achievements of the Islamic civilization. Themes will include patterns of the political and spiritual leadership; cultural, artistic, and intellectual accomplishments Prerequisites: ENGL051, ENGL101, ENGL151.
ENGL201	Composition and Research Skills	3	This course focuses on the development of writing skills appropriate to specific academic and professional purposes; the analysis and practice of various methods of organization and rhetorical patterns used in formal expository and persuasive writing; the refinement of critical reading strategies and library research techniques; and the completion of an academically acceptable library research paper. Prerequisites: ENGL150, ENGL151.
ENGL251	Communication Skills	3	The objectives of this course are to improve students' writing skills for academic purposes by developing effective use of grammatical structures; analytical and critical reading skills; a sensitivity to rhetorical situation, style, and level of diction in academic reading and writing; and competence in using various methods of organization used in formal writing.