School	
Major	Bachelor of Science in Communications Engineering

Major Requirements			
Code	**Title**	**Credits**	**Description**
CENG495	Senior Project	3	This course integrates the knowledge acquired in the various courses of the undergraduate curriculum to an open-ended design effort and applies the knowledge gained to the solution of a contemporary engineering problem. Students improve oral and written communication skills, gain familiarity with available technical literature, and experience the life cycle of a design project within a group environment. Many projects include practice in the use of computers and relevant support software while solving a design problem. Students work together as a team to accomplish common goals and be able to participate in regional and national competitions.
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. This course covers all the materials required in CCNA1 CISCO exam. After finishing the course, students will be ready to do the theoretical exam and also the skills exam based on the lab sessions given during the semester on packet tracer.
CENG400	Computer Organization and Design	3	This course introduces fundamental concepts in computer organization and digital logic design, including computer arithmetic, MIPS processor design including ALU, data path and controls, pipelining and pipeline hazards, interrupts and exceptions, memory hierarchy, caches, and virtual memory
CENG380	Microprocessors and Microcontrollers	3	This course introduces students to the principles of Microcontroller design and applications. Students will be introduced to the AVR microcontroller architecture. Moreover, the course introduces programming using AVR assembly language and the C programming language. Topics introduced will include: Hardware Architecture, looping, branching, arithmetic and logical operations, timer, interrupts, Parallel I/O and interfacing. .
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's; 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 that are related to the topics above. After that, each group of two students should have the tools to build combinatory circuits as small project which allow him to submit the design and complete it by simulation and implementation.
EENG385	Signals and Systems	3	This course introduces signals and systems, their types and properties, and their relation in the time and frequency domains. It covers signal and system modeling concepts, system modeling and analysis of LTI systems in time domain, the Fourier series, the Fourier transform and its applications, and the Laplace transformation and its applications.

EENG467L	Analog Communication Systems Lab	1	• This lab introduces experiments concerning the design and simulation of a complete analog communication system using LabVIEW. The objectives of this course are to: reinforce and complement the material covered in the course. The lab includes designing the modulators and demodulators of different analog modulation schemes such as AM, DSB, SSB and FM. Each scheme is studied in both time and frequency domain to obtain power and performance characteristics. The lab concludes with real time testing using NI USRP2901 to study the complexity-performance of each modulation schemes system.
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.
EENG388	Electromagnetic Fields and Waves	3	This is a comprehensive undergraduate course on electromagnetic fields and waves, discussing general Electro-magnetic Theory and covering the following topics: Vector analysis: Vectors in different coordinate systems, including Divergence, Gradient and Curl operators. The Electrostatic topics include: Coulomb's Law, Gauss's Law, Joule's Law and Electric Forces and Electric Potential. The Magneto-statics include: Biot-Savart's Law, Ampere's Law and Magnetic Forces and Torques. Finally, in Dynamic fields, the topics include Maxwell’s equations, Faraday's Law 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. Also to be explored is the use of databases as data repositories for multitier web applications. Topics to be examined include: introduction to HTML and CSS, client-side scripting (JavaScript and DOM) and JQuery, server-side scripting with PHP and AJAX, database connectivity, session tracking, HTTP headers and their use, security and privacy risks
EENG350	Electronic Circuits I	3	This course includes the following topics: Semiconductors, P-N Junction: current-voltage characteristics, Diode models, Diode circuit applications. Bipolar junction transistor (BJT): structure, current-voltage characteristics, DC biasing, small-signal model, BJT amplifiers. Metal Oxide Semiconductor Field-Effect Transistor (MOSFET): structure, current-voltage characteristics, DC biasing, small-signal model, MOSFET amplifiers.
EENG301L	Electric Circuits Lab	1	This lab introduces experiments concerning designing, building, and testing DC and AC electric circuits which use resistors, capacitors, inductors, transformers, and OP-AMP. The objectives of this course are to: reinforce and complement the material covered in the course. It enhances the technical abilities of the students by engaging them in experiments that involve most common electric lab equipment such as multimeter, function generator, DC source and oscilloscopes. Also, this lab offers the ability to test electric circuits using schematics software (LTspice). The lab concludes with designing applications on Filters and OP-AMP.
EENG300	Electric Circuits II	3	This course introduces the techniques of AC circuit analysis, containing ideal and dependent sources. It also covers sinusoidal steady state power calculations, balanced three phase circuits and frequency selective circuits.

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 and learn the necessary skills for creating, simulating and deploying Android applications. The topics include: Android platform installation, AndoidManifest, user interfaces, data persistency, geo-locations, media handling, networking, 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 and query the database. Besides, it introduces the linking of database management systems to programming environments such as java programming language. This course will also touch upon data normalization and the role of transaction management, as well as creating triggers, assertionz
EENG250	Electric Circuits I	3	The course provides an introduction to Electrical and Electronics Engineering. The course has been designed to introduce fundamental principles of circuit theory commonly used in engineering research and science applications, the Concepts of voltage, current, power, resistance capacitance and inductance. Circuit analysis techniques such as Kirchhoff's Laws, node voltages, and mesh currents. Thevenin's and Norton's equivalent circuits, in addition to special circuits with op-amp and the response of 1st order RL and RC circuits.
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 and a WAN network. Moreover, students will be introduced to the major concepts of how to configure a real LAN network by running switches, routers, IPv4/IPv6 . Furthermore, basic client/server applications would be introduced and implemented. In addition, students will learn how to filter a network traffic using standard or extended access lists and how logically separate networks using virtual local area networks (VLAN). Quizzes are based on a review questions after each experiments. These questions are CCNA2 based questions
CENG400L	Microcontroller Applications Lab	1	This lab covers the programming and hardware application of ARDUINO microcontrollers' projects. This course contains an introduction to ARDUINO Atmega328P programming, Serial/Parallel bus interfacing with ARDUINO, using C languages in programming, using ISIS Proteus software for simulation, using ATMEL 7.0 software in editing, compiling, simulating and programming. The main objective of this laboratory is to cover experimentally all the applications on ARDUINO microchip Microcontroller. It is an integral part of the CENG380-Microprocessors and Microcontrollers and it reinforces and complements the material covered in this course.
CENG250	Digital Logic I	3	This course introduces the concepts of digital logic operations and design. The course teaches fundamentals of digital logic design through the use of 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, decoder, encoder, comparator, multiplexer and de-multiplexer circuits in combinational systems.

CENG325	Software Applications and Design	3	The objective of this course is to introduce students to various topics in designing and developing computer applications using an object-oriented programming language. Students completing this course will be exposed to the concept, design, implementation, and testing of object-oriented programs. Furthermore, topics such as Graphical user interface, Tracing, debugging, and creating executable along with the UML (Unified Modeling Language) will be thoroughly covered. Students will be introduced briefly on the concept of socket programming.
CENG335	Digital Logic II	3	This course is an extension of Digital Logic I. The course introduces the student to sequential circuit concepts and building blocks, such as: Latches and flip-flops, state tables and state equations, the Moore and Mealy state Machine. The course focuses on well known problems solved by the application of digital logic design methods and components. This course also introduces the student to hardware programming languages.
EENG350L	Electronic Circuits I Lab	1	This lab introduces experiments concerning designing, building, and testing electronic circuits which use diodes, BJTs, and MOSFETs. The objectives of this lab are to: reinforce and complement the material covered in the course. It introduces experiments related to the design, implementation, and test the characteristics of different types of diodes and verifies practically some of its applications. Moreover, BJT and MOSFET characteristics as well as their different types of amplifier configurations are going to be modeled, implemented and tested.
CENG430L	Linux Lab	1	This lab course teaches scripting for the Raspberry Pi platform. Both Linux and Python scripting are introduced with the focus on Linux scripting for the Raspberry Pi. Topics covered in the lab include automation, interfacing and networking.
CENG450L	Scripting Languages Lab	1	This course teaches students popular scientific scritping languages that are used in Engineering - especially computer and communications engineering.

Core Requirements			
Code	**Title**	**Credits**	**Description**
MATH310	Probability & Statistics for Scientists & Engineers	3	The course is intended to provide you with the basic probabilistic and statistical concepts with related computational and analytic skills for three main purposes: 1) To become an integrated part of the student scientific education. 2) To give the student an adequate ability for comprehending and interpreting many non-deterministic situations. 3) To appreciate the wide range of applications of such concepts to real-life situations.
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	This is the second course in the Calculus sequence. The course material includes logarithmic, exponential, and trigonometric functions, their inverses and their derivatives, integration techniques, improper integrals, sequences, infinite series, tests of convergence, alternating series, power series, polar coordinates and its application.
CSCI250	Introduction to Programming	3	This course introduces the basic concepts and principles of structured programming in Java. It starts with 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. In this lab, students solve programming problems by using primary data types, selection and repetition structures, methods and arrays. This lab is an opportunity for the students to have direct help when needed from the instructor, but it is not sufficient for practice; students should practice with more exercises on their own.
MATH220	Calculus III	3	The course consists of two parts: Multivariable calculus and vector calculus. The multivariable calculus is the extension of calculus in one variable to calculus in more than one variable: (quadric surfaces, partial differentiation, multiple integration). Vector calculus applies calculus to the concept of vector fields.
MATH225	Linear Algebra with Applications	3	This course provides an introduction to linear algebra topics. Emphasis is placed on the development of abstract concepts and applications for vectors, systems of equations, matrices, determinants, vector spaces, multi-dimensional linear transformations, eigenvectors, eigenvalues, diagonalization and orthogonality. The concepts of linear algebra are extremely useful in physics, economics and social sciences, natural sciences, and engineering.
MATH270	Ordinary Differential Equations	3	This course provides an introduction to ordinary differential equations and their applications. The contents of this course include first order equations, separable, exact, and linear equations, second and higher order differential equations, systems of differential equations, series solutions, and Laplace transformation.
PHYS220	Physics for Engineers	3	This course is designed to provide an overview of calculus based introductory physics, which is a requirement for all undergraduate engineering students. It offers an introduction to mechanical oscillations and mechanical waves, exploring different wave phenomena such as interference of mechanical waves, reflection and refraction of light, in addition to image formation.
ENGG200	Introduction to Engineering	3	Introduction to Engineering is a first-year course designed to help students explore the world of engineering by introducing them to what engineers do, the fundamental principles that form the basis of their work, and how they apply that knowledge within a structured design process. The course gives the student an opportunity to apply those concepts by developing a prototype system as part of a team. The course also enables the student to develop technical presentation skills.
ENGG300	Engineering Economics	3	This course covers the fundamentals of Engineering Economics for engineering professionals to match engineering practice today. It recognizes the role of the engineer as a decision maker who has to make and defend sensible decisions. It emphasizes on the analytical consideration of money and its impact on decision making as well as on other factors such as environmental and social factors and tasks. By the end of the course students will be equipped with basic analytical skills for solving problems of an economic nature real-world example.
ENGG450	Engineering Ethics and Professional Practice	3	Engineering Ethics and Professional Practice is a complete study course on the role of ethics in engineering in their historical, philosophical and professional contexts. The course examines the impact of ethical theories and their application to issues encountered in the engineering profession, such as employee rights, whistleblowing, safety, risk and liability, professional responsibility to consumers and employers, conflicts of interest, codes of ethics, legal obligations, environmental and social responsibility. Through the use of real and hypothetical case studies, the course focuses on developing analysis techniques and applying them to ethical problems through independent critical thinking and moral sensitivity.

General Education Requirements			
Code	**Title**	**Credits**	**Description**

ARAB200	Arabic Language and Literature	3	ØªØªØ£Ù□Ù□ Ù□Ø§Ø¯Ø© Ø§Ù□Ù□ØºØ© Ø§Ù□Ø¹Ø±Ø¨Ù□Ø© Ù□Ø¢Ø¯Ø§Ø¨Ù□Ø§ Ù□ØºÙ□Ø± Ø§Ù□Ù□ØªØ®ØµØµÙ□Ù□ Ù□Ù□ Ø«Ù□Ø§Ø«Ø© Ø£Ù□Ø³Ø§Ù□Ø□ Ø£ØØ¯Ù□Ø§ Ù□ØªÙ□Ø§Ù□Ù□ Ø¯Ø±Ù□Ø³Ø§Ù□ Ø£Ø³Ø§Ø³Ù□Ø© Ù□Ù□ Ø§Ù□Ù□ØÙ□ Ù□Ø§Ù□ØµØ±Ù□ Ù□Ø§Ù□Ø¨Ù□Ø§ØºØ©. Ù□Ø§Ù□Ø«Ø§Ù□Ù□ Ù□ØªÙ□Ø§Ù□Ù□ Ù□Ø¨ØØ« Ù□Ù□ Ø§Ù□Ø£Ø¯Ø¨ Ù□Ø§Ù□ØªØÙ□Ù□Ù□. Ø£Ù□Ø§ Ø§Ù□Ù□Ø³Ù□ Ø§Ù□Ø«Ø§Ù□Ø« Ù□Ù□Ø¹Ø§Ù□Ø¬ Ø¨Ø¹Ø¶ ØªÙ□Ù□Ù□Ø§Øª Ø§Ù□ØªØ¹Ø¨Ù□Ø± Ù□Ø§Ù□ØªÙ□Ø§ØµÙ□.
CULT200	Introduction to Arab - Islamic Civilization	3	ØªÙ□Ù□Ø«Ù□Ù□ Ø§Ù□ØØ¶Ø§Ø±Ø© Ø§Ù□Ø¹Ø±Ø¨Ù□Ø© Ø§Ù□Ø¥Ø³Ù□Ø§Ù□Ù□Ø© Ù□Ø§ØØ¯Ø© Ù□Ù□ Ø£Ù□Ù□ Ø§Ù□Ø-Ø¶Ø§Ø±Ø§Øª Ù□Ù□ Ø§Ù□ØªØ§Ø±Ù□Ø® Ø¨Ù□Ø§ Ø£Ù□Ø¬Ø²ØªÙ□ Ù□Ù□ Ø¥Ø¨Ø¯Ø§Ø¹Ø§Øª Ø¹Ù□Ù□Ù□Ø© Ù□Ø«Ù□Ø§Ù□Ù□Ø© Ù□ØØ¶Ø§Ø±Ù□Ø© ØªØ±Ù□Øª Ø£Ø«Ø±Ù□Ø§ Ø§Ù□Ø¹Ø¸Ù□Ù□ Ù□Ù□ ØªØ§Ø±Ù□Ø® Ø§Ù□Ø¨Ø´Ø±Ù□Ø©. ØªÙ□Ø´Ù□Ù□Ù□ Ù□Ø°Ù□ Ø§Ù□Ù□Ø§Ø¯Ø© Ø§Ù□Ø¯Ø±Ø§Ø³Ù□Ø© Ù□Ù□Ø¯Ù□Ø©Ù□ Ø£Ø³Ø§Ø³Ù□Ø© Ù□Ù□ØªØ¹Ø±Ù□ Ù□Ù□ Ø¹Ø±Ø¨Ù□ Ø¹Ù□Ù□ ØªØ§Ø±Ù□Ø® Ø-Ø¶Ø§Ø±ØªÙ□Ø□ Ù□Ø§ Ù□Ù□Ù□ØªØ®Ø± Ø¨Ù□Ø§ Ù□ØØ³Ø¨Ø□ Ø¨Ù□Ù□Ù□Ø¬Ø¹Ù□ Ù□Ù□Ù□Ø§ ØØ§Ù□Ø²Ù□Ø§ Ù□Ø³ØªÙ□Ù□Ø¶ Ø¨Ù□Ù□Ø§Ø¨Ù□Ù□Ù□Ø§ØªÙ□ Ù□Ù□Ø¯Ø±Ø§ØªÙ□ Ø§Ù□Ø¹Ù□Ù□Ù□Ø© Ø§Ù□Ù□Ø§Ù□Ù□Ø© Ù□Ø¥Ø¹Ø§Ø¯Ø© Ø§Ù□Ø§Ø³ØªÙ□Ù□Ø§Ø¶ Ø§Ù□Ø-Ø¶Ø§Ø±Ù□. Ù□ØªØØ±Ù□ Ø§Ù□Ù□Ø§Ø¶Ù□ Ù□Ù□Ù□Ø§ Ø¯Ù□Ù□Ø´Ø¹Ù□Ø±Ù□ Ù□Ø§Ø¹Ù□ Ù□Ù□Ù□Ø§Ø□ Ø¹Ù□Ù□ Ø£Ù□Ù□ Ù□Ø°Ø§ Ø§Ù□Ù□Ù□Ù□Ø±Ù□Ø± Ø§Ù□Ø¯Ø±Ø§Ø³Ù□ Ù□ØØ§Ù□Ù□ Ø£Ù□Ù□Ù□Ø³ØªØ«Ù□Ø± Ø§Ù□Ù□Ø¹Ù□ Ø§Ù□ØØ¶Ø§Ø±Ù□ Ù□Ø§Ù□Ø«Ù□Ø§Ù□Ù□Ø¹Ù□Ø¯ Ø§Ù□Ø·Ù□Ø§Ø¨ Ø§Ù□Ø¹Ø±Ø¨Ø□ Ù□Ù□Ø³ØªÙ□Ù□Ø¯ Ù□Ù□Ù□Ø°Ø§ Ø§Ù□Ù□Ø®Ø²Ù□Ù□ Ù□Ù□ØµÙ□Ø¹ Ø£Ù□Ù□Ù□Ù□Ø§ Ø¬Ø¯Ù□Ø¯Ù□Ø§ Ù□Ù□Ù□Ø³ØªÙ□Ø¨Ù□.
ENGL201	Composition and Research Skills	3	This course builds upon the skills acquired in pre-requisite courses mainly ENGL 151 to further develop students’ critical thinking and academic writing competencies. Students will read and respond to a variety of texts from different disciplines and produce a research paper using analytical and critical skills in response to texts.
ENGL251	Communication Skills	3	Workplace Occupational Writing is an advanced interdisciplinary writing course emphasizing workplace and technical communication and editing appropriate to diverse professions. It incorporates practice and study of selected types of discourse employed in professional writing situations, preparing students for different systems of writing in their professional lives. Examples from the writing of workplace professionals are analyzed and used as models to demonstrate the transition from academic to professional writing.