جامعة حائل
University of Ha'il

كلية علوم و هندسة الحاسب الآلي
College of Computer Science and Engineering

COMPUTER ENGINEERING
ACADEMIC PROGRAM GUIDE

2022

Contents

Introduction

Computer engineering is a branch of engineering that combines elements of computer science and electrical engineering to develop computer hardware and software systems. It involves the design, development, testing, and application of computer systems and technology, including microprocessors, computer architectures, computer networks, and computer languages.

In the Kingdom of Saudi Arabia, the need for professionals in computer technology has grown dramatically during the last decades. This would certainly imply that additional educational institutions—especially high-quality ones—are required to generate these professionals, which include graduates who seek employment in the field or enroll in graduate programs. Hail University's Computer Engineering program adequately satisfies these requirements by providing a solid foundation for further study in this interesting rapidly evolving discipline.

There are numerous opportunities for computer engineers in various industries, given the rapid growth and evolution of technology. Additionally, computer engineers can explore various entrepreneurial opportunities, such as starting their own tech firms or consulting services, providing expertise to small businesses, or creating apps and plugins for various industries. The possibilities are endless, and computer engineers have the opportunity to shape the future of technology and contribute to societal advancements in countless ways

Program vision

University of Hail Vision:

Local and regional leadership in spreading knowledge, research excellence, and sustainable community partnership.

College of Computer Science and Engineering Vision:

The College of Computer Science and Engineering strives for excellence in education and learning fields, scientific research, and social services in Computer Science, Software Engineering, and Computer Engineering regionally and nationally.

Computer Engineering Program Vision:

Academic and research excellence and social partnership in computer engineering and its applications at the national and regional levels.

Program mission

University of Hail Mission:

Provide academic programs to prepare qualified graduates for the labor market and produce scientific research that serves the community by applying the highest quality standards and utilize the university's human and technical resources to reach the society of knowledge.

College of Computer Science and Engineering Mission:

The College of Computer Science and Engineering is committed to graduate distinguished students to fulfill labor market needs and local community through providing educational environment attracting qualified personnel and utilizing the best technology aligned with Saudi society values.

Computer Engineering Program Mission:

Preparing scientifically distinguished computer engineers by providing a supportive environment for students' education in the field of Computer Engineering and producing innovative scientific research to keep pace with the digital transformation developments and the optimal use of resources and technology in increasing the community members' awareness of modern technical developments.

Program objectives.

The Computer Engineering program objectives are set to:

1. Preparing scientifically distinguished Computer engineers.
2. Producing innovative scientific research to keep pace with digital transformation developments.
3. Improving the community members' awareness of modern technical developments.
4. Applying ethical and professional standards related to the computer engineering and Information Technology Industry.

Organization chart of program

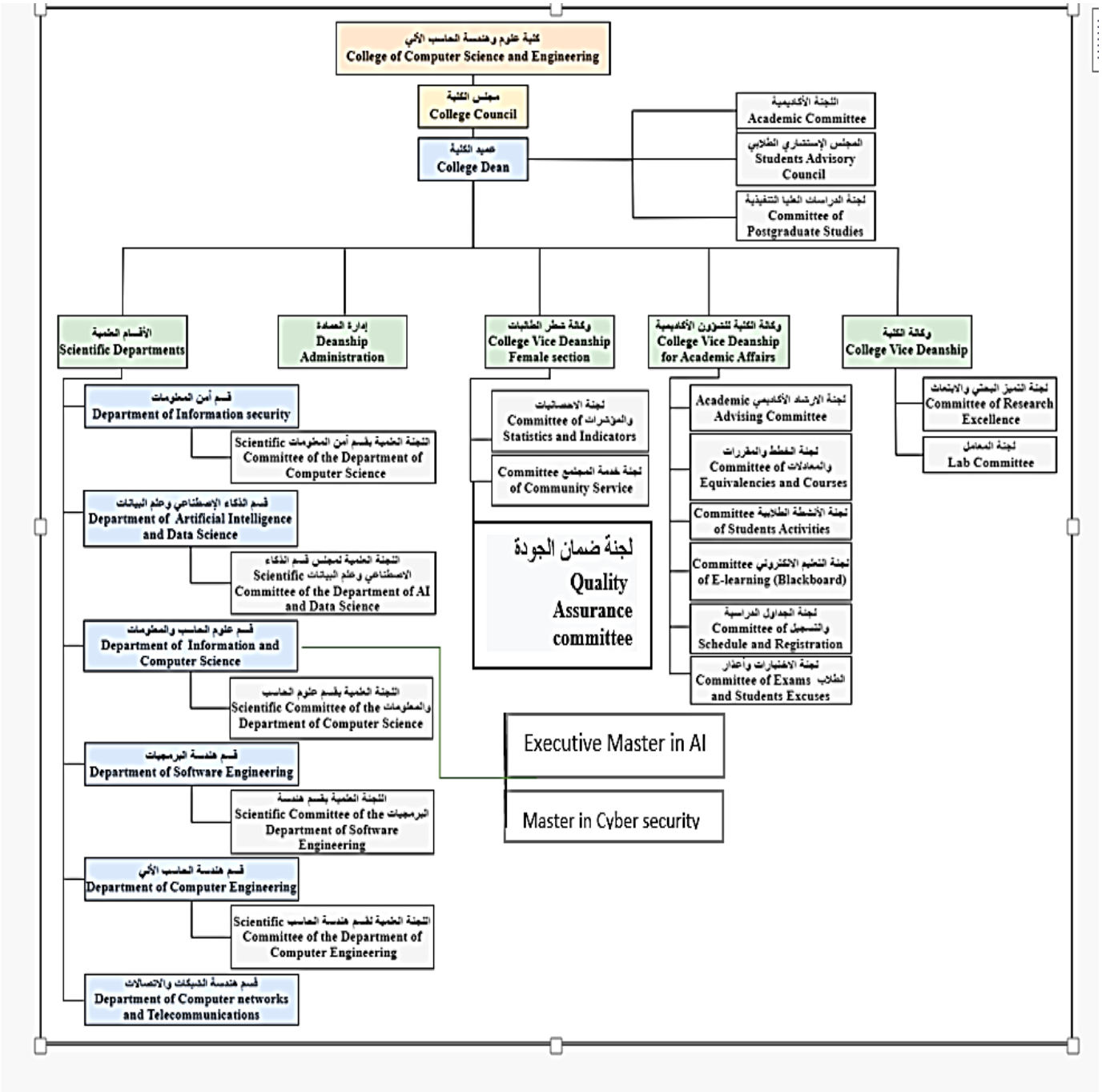


Figure 1. College Hierarchy

Admission requirements

Admission in the program is based on the regulations and procedures of University of Hail following the guidelines of MOE.

The College councils and the Deanship of Admission and Registration, determine the number of accepted students in the Computer Engineering Program.

The following are the conditions for admission to the program:

1. The applicant must be a Saudi National or born to a Saudi Mother, or those excluded by laws and regulations or the national interest.
2. An official high school leaving certificate is required either from inside or outside the Kingdom of Saudi Arabia.
3. The high school certificate is valid for two years for acceptance, exceptions in this regard referred to the university council.
4. Applicants must have a Character certificate of good conduct.
5. Applicants must pass all examinations and interviews listed by the university council.
6. Applicants must be medically fit.
7. If the applicant is working, approval from the employer is required.
8. Applicant must fulfill any other conditions or requirements required by the University Council during the admission process.
9. The admission of the applicants depends on high school percentage, interviews and acceptance exams such as skills and summative exams i.e “Qudurat” and “Tahsili”.

10. The minimum passing percentage of high school certificate and examinations may vary every year depending on the number of students and the number of available seats in the course. Admission in the college majors depends on preparatory year GPA (Grade Point Average), applicants' choices, and seats available.
11. The applicant must not be dismissed from the University of Hail or from another university for an academic or disciplinary term.

The accepted students will study one preparatory year (two regular semesters). The courses in this year include English, Mathematics, computer skills, Physical education/Public healthcare, and self-development skills. After completing the first preparatory year successfully, the students will be accepted in Computer Engineering program if the GPA is greater than 2 out 4.

Graduation Requirements

Students in the Computer Engineering (COE) program are required to complete 156 credit-hours covering general educational requirements, core requirements and some elective courses.

ARTICLE (19):

A student graduates after successfully completing the graduation requirements according to the degree plan, provided his cumulative GPA not less than "PASS". Following the recommendation of the department council, the college council may determine certain additional courses the student should take to improve his cumulative GPA if he has passed the required courses, but with a low GPA. Implementation Rules of ARTICLE (19):

1. The student is required to pursue his major degree plan and complete all requirements before graduation.
2. The Deanship of Admissions & Registration will provide the relevant departments with copies of the academic records of all candidates for graduation. The department will then review these records to ensure that the students have satisfied all graduation requirements and will provide the Deanship of Admissions & Registration with a list of the students who qualify for graduation.
3. The student must attain a cumulative GPA and major GPA of 2.00 or above (out of 4.00) to graduate.
4. If the cumulative GPA is lower than the required limit, it may be re-calculated at the student's request, provided he has successfully completed all the courses required for obtaining the degree. This will be based upon the recommendation of the department council in coordination with the Deanship of Admissions & Registration and the approval of the college council. However, at the time of graduation, the student's cumulative GPA should not be more than 2.00 (out of 4.00) after recalculation.

5. Cumulative GPA Re-calculation Rules: Following are the specific rules pertaining to GPA recalculation (applicable only at the time of graduation if the cumulative GPA is < 2.00):
    a. To exclude any previous grade of a course studied by a student, the student must have successfully repeated the course and obtained grade D or higher.
    b. The grades F, DN, WF and D may be excluded by subtracting the number of credit-hours of a certain course from the total credit-hours used in calculating the student's cumulative GPA and subtracting the quality points assigned to these credit hours from the total quality points used for calculating the student's cumulative GPA.
    c. The total credit-hours of the courses to be excluded from the cumulative GPA calculation should not exceed 24. The academic record must include all the grades of the courses taken by the student, showing the grades earned on each occasion. A special mark should be introduced to identify the courses which have been excluded from the cumulative GPA calculation. The academic record should show the re-calculated cumulative GPA.
    d. No change is to be introduced to the academic record after the graduation document is issued.
    e. The rules of re-calculation of cumulative GPA will be applied to courses the student has repeated at UOH.
    f. Under no circumstances will the re-calculation of cumulative GPA raise the GPA above 2.00, which is the minimum required to satisfy graduation requirements.
6. To obtain any degree from UOH, the student must have studied a minimum of 36 credit hours, at the University, including at least 18 credit hours in his major field.
7. The Deanship of Admissions & Registration thoroughly reviews all student records to ensure that all graduation requirements are satisfied.

8. The Deanship of Admissions & Registration submits a draft recommendation to the University Council listing the students nominated for graduation at the end of each semester.
9. The Deanship of Admissions & Registration submits a draft recommendation to the University Council listing the students who have satisfied all graduation requirements and graduated.
10. A graduating student is obliged to obtain a clearance form from the Deanship of Student Affairs and have it signed by the following departments: The Central Library, Bookstore, Security, Medical Center, Student Housing, Academic Major Department, Student Fund, Deanship of Admissions & Registration, Accounting, and any other departments as determined by the Deanship of Student Affairs.
11. The Deanship of Admissions & Registration prepares and releases the official graduation certificates and degrees and maintains copies of these documents.

Academic Reference Standards of Program

1- Knowledge and Understanding

K1 Explain Computer Engineering principles, terminologies, user experience theories, modeling, and mathematical concepts with their applications at basic and advanced levels.

K2 Recall hardware and software development and management principles, methodologies, techniques, and tools.

K3 Recognize operating systems, networks, databases, and security principles, theories, models, and relevant algorithms for systems and software with a focus on relevant issues to the program's discipline.

2- Skills

S1 Use abstraction, modeling, and mathematical concepts, methods, and techniques to analyze computing-based problems in a diverse context in the program's discipline.

S2 Apply systems and software development and management principles, methodologies, techniques, and tools for analyzing, designing, implementing, and evaluating systems and applications at various complexity levels.

S3 Select appropriate hardware, software, tools, and technologies to design, develop, integrate, test, configure and maintain secure Computer Engineering infrastructure, networks, systems and applications.

S4 Investigate current and emerging topics using appropriate research methods, techniques, and advances to the computer engineering discipline for continuing professional developments.

S5 Communicate effectively to demonstrate the results, knowledge, skills, and advanced principles in a variety of professional contexts.

3-Values

V1 Work with autonomy as a responsible citizen, constructive decision-maker, and cooperative team member based on Islamic ethics and principles with the ability to develop entrepreneur and leadership skills and actively participating in serving the society.

V2 Complying with ethical standards in both academic and professional sectors that satisfy the users' needs while considering relevant risks and latest technological advances.

Program Intended Learning Outcomes (PLOs)

The Program Learning Outcomes follow the three learning domains of the National Qualification Framework (NQF). The table below shows the PLOs.

Knowledge and understanding	
K1	Explain Computer Engineering principles, terminologies, user experience theories, modeling, and mathematical concepts with their applications at basic and advanced levels.
K2	Recall hardware and software development and management principles, methodologies, techniques, and tools.
K3	Recognize operating systems, networks, databases, and security principles, theories, models, and relevant algorithms for systems and software with a focus on relevant issues to the program's discipline.
Skills	
S1	Use abstraction, modeling, and mathematical concepts, methods, and techniques to analyze computing-based problems in a diverse context in the program's discipline.
S2	Apply systems and software development and management principles, methodologies, techniques, and tools for analyzing, designing, implementing and evaluating systems and applications at various complexity levels.
S3	Select appropriate hardware, software, tools, and technologies to design, develop, integrate, test, configure and maintain secure Computer Engineering infrastructure, networks, systems and applications.
S4	Investigate current and emerging topics using appropriate research methods, techniques, and advances to the computer engineering discipline for continuing professional developments.
S5	Communicate effectively to demonstrate the results, knowledge, skills, and advanced principles in a variety of professional contexts.
Values	
V1	Work with autonomy as a responsible citizen, constructive decision-maker, and cooperative team member based on Islamic ethics and principles with the ability to develop entrepreneur and leadership skills and actively participating in serving the society.
V2	Complying with ethical standards in both academic and professional sectors that satisfy the users' needs while considering relevant risks and latest technological advances.

Study Plan of Program

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Institution Requirements	Required	7	15	9.62%
	Elective	0	0	0%
College Requirements	Required	21	67	42.95%
	Elective	0	0	0%
Program Requirements	Required	15	46	29.49%
	Elective	4	12	7.69%
Capstone Course/Project	Required	2	6	3.85%
Field Training/ Internship	Required	2	10	6.41%
Residency year	Required	0	0	0%
Others	Required	0	0	0%
Total		53	156	100%

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
Level 1	ENGL 100	English Language	Required		2	Institution
	ETEC 115	Computer and Information	Required		2	Institution
	MATH 101	Calculus I	Required		4	College
	PHYS 101	General Physics	Required		4	College
	ENGL 1004	Pre-intermediate English	Required		4	College
	ENG 0013	Engineering Principles	Required		2	College
Level 2	MATH 102	Calculus II	Required	MATH 101	4	College
	ENGL 1005	Intermediate English	Required	ENGL 1004	4	College
	ENG 0023	Engineering Drawings and Modelling	Required	ENG 0013	2	College
	CSCE 0213	Critical Thinking and Study Skills	Required		2	College

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
	CSCE 0313	Creativity and Innovation	Required		2	College
	CSCE 0323	Interactive and Communication Skills	Required		2	College
Level 3	CSCE 101	Computer Programming I	Required		4	College
	ENGL 109	English for Computer	Required		2	College
	CENG 121	Digital Logic	Required	PHYS 101	4	Department
	CSCE 121	Discrete Structures	Required	MATH 101	3	College
	ARAB 100	Arabic Language Skill	Required		2	Institution
Level 4	CSCE 102	Computer Programming II	Required	CSCE 101	4	College
	CENG 231	Electric Circuits	Required	PHYS 101	3	Department
	MATH 201	Calculus III	Required	MATH 102	3	College
	CRCL 115	University Life Skills	Required		3	Institution
	IC 111	Islamic Culture	Required		2	Institution
Level 5	CENG 232	Computer Architecture	Required	CENG 121	3	Department
	SENG 232	Data Structures & Algorithms	Required	CSCE 102	4	College
	CSCE 232	Software Engineering	Required	CSCE 101	3	College
	CSCE 233	Probability & Statistics	Required	CSCE 121	3	College
	EDUC 115	Work Values and Ethics	Required		2	Institution
Level 6	CENG 241	Computer Organization	Required	CENG 121	4	Department
	CENG 242	Electronic Circuits	Required	CENG 231	4	Department
	CENG 243	Data and Computer Communications	Required	CENG 232	3	Department
	CENG 244	Computer Engineering Seminar	Required		1	Department
	MATH 260	Intro. to Diff. Eq & Linear Algebra	Required	MATH 102	3	College
Level	CENG 351	Systems & Signal Analysis	Required	CENG 242	3	Department

Level	Course Code	Course Title	Required or Elective	Pre-Requisite Courses	Credit Hours	Type of requirements (Institution, College, or Program)
7	CENG 352	Microprocessors	Required	CENG 241	3	Department
	CENG 353	Distributed Computing	Required	CENG 241	2	Department
	CENG 354	Computer Networks	Required	CENG 243	4	Department
	CSCE 352	Operating Systems	Required	CENG 241	4	College
Level 8	CENG 361	Microcomputer System Design	Required	CENG 352	3	Department
	CENG 362	Embedded Systems	Required	CENG 352	3	Department
	CENG 363	Computer and Network Security	Required	CENG 354	3	Department
	CENG 364	VLSI Design	Required	CENG 242	3	Department
	SENG 351	Database Management Systems	Required	SENG 232	4	College
	EDUC 125	Entrepreneurship	Required		2	Institution
Summer Session						
	CENG 400	Summer Training	Required	CENG 354 & CENG 361	0	Department
Level 9	CENG 401	COOP Training	Required	CENG 354 & CENG 361	10	Department
	CENG 470	Graduation Project I (online)	Required	CENG 361 & CENG 364	2	Department
Level 10	CENG 480	Graduation Project II	Required	CENG 470	4	Department
	Elective	CENG Elective I	Elective		3	Department
	Elective	CENG Elective II	Elective		3	Department
	Elective	CENG Elective III	Elective		3	Department
	Elective	Free Course	Elective		3	
	Include additional levels if needed (i.e. summer courses). Total Requirements (156 credit hours)					

1. **Elective Courses (9 - Credit Hours).**

Code	Title	Crd	Lec.	Lab	Prerequisite
CENG 490	Selected Topics I	3	4	0	
CENG 491	Selected Topics II	3	4	0	
CENG 492	Advanced Computer Architecture	3	4	0	
CENG 493	ASIC and FPGA Design	3	4	0	

CENG 494	Wireless Sensor Networks	3	4	0	
CENG 495	Robotics	3	4	0	
CENG 496	Parallel Computing	3	4	0	
CENG 497	Multicore Programming	3	4	0	
CENG 498	Digital Microelectronics	3	4	0	
CENG 499	Telecommunications Network Design	3	4	0	

2. Free Elective Courses (6 - Credit Hours).

Code	Title	Crd	Lec.	Lab	Prerequisite
ECN 101	Principles of Microeconomics	3	4	0	
ECON 403	Engineering Economics	3	4	0	
MGT 101	Principles of Management	3	4	0	
MGT 212	Legal Environment	3	4	0	
MKT 101	Principles of Marketing	3	4	0	
SCOL 101	Principles of Sociology	3	4	0	

Courses Description

Note:

CR = Credit Hours

(3-0-3) = (Lecture Credit - Lab Credit- Total Credit)

CENG 121 Digital Logic **(CR: 3-2-4)**

This course introduces students to logic design and the basic building blocks used in digital systems, particularly digital computers. Firstly, the course begins with Number representation, Boolean Algebra combinational circuit analysis and design, and K-map and tabulation methods. The course also involves the main concepts of sequential circuits and their related materials. More complex systems using programmable logic devices and different design and analysis tools are presented in this course.

CENG 231 Electric Circuits **(CR: 3-2-4)**

Electric circuits' course introduces students to direct current (DC) circuits, electrical components, nature of electricity (voltage, current, and resistance), Ohm's Law, energy and power concepts, and types of circuits (series, parallel, and series-parallel). The course also covers different theorems, including Thevenin's and Norton's Theorems. Besides, it aims to introduce students to elementary electronic circuits such as operational amplifiers and their circuit models, as well as advanced circuits such as first and second-order transient response.

CENG232 Computer Architecture **(CR: 3-0-3)**

This course provides students with a solid understanding of fundamental architectural techniques used to build today's high-performance processors and systems. Course topics include pipelining, superscalar, out-of-order execution, multithreading, caches, virtual memory, and multiprocessors. Some emphasis will be placed on hardware/software interaction to achieve performance. Issues affecting the nexus of architecture, compilers, and operating systems will be briefly touched upon.

CENG 241 Computer Organization **(CR: 3-1-4)**

This course provides students with a solid understanding of fundamental computer design tools and techniques used in computer organizations. It provides a deep understanding of the design of different parts of computer systems. Course topics include the history of computer organization, standards and design tools used in computer organization, instruction set architectures, including machine and assembly level representations and assembly language programming, computer performance measurement, computer processor organization, memory systems design, Input/output system technologies, Multi/many-core architectures, and Distributed system architectures.

CENG 243 Data and Computer Communications **(CR: 3-0-3)**

The course is developed to expose students to various aspects of data communications and computer networking systems. Topics include data transmission, multiplexing, switching, signal encoding techniques, protocols and architecture, internetworking and ISDN. It also covers different aspects of wide area networks.

CENG 244 Computer Engineering Seminar **(CR: 0-0-1)**

The course introduces the research methods from Computer Engineering field, writing skills, professional ethics and code of conduct, plagiarism and research ethics, presentation skills, etc. In this course, students are expected to participate in class discussion and to practice speaking by presenting one or more topics. Through a written and oral presentation, students also learn and demonstrate professional communication skills.

CENG 351 Systems & Signal Analysis **(CR: 3-0-3)**

This course is an introduction to the basic concepts and theory of analog and digital signal processing. The topics incorporate an integral part of engineering systems in sundry areas, including seismic data processing, communications, speech processing, image processing, defense electronics, consumer electronics, and consumer products.

CENG 352 Microprocessors **(CR: 3-0-3)**

This course provides students with a solid understanding of fundamental of microprocessors design and operations. It provides deep understanding of the arithmetic and logic operations. Course topics include architecture of microprocessor-based systems, study of microprocessor operation, assembly language, arithmetic operations, and interfacing.

CENG 354 Computer Networks **(CR: 3-2-5)**

This course will be taught using the top-down approach. Topics covered include introduction to computer networks, OSI model, WAN and LAN design issues. Application layer design issues and protocols are discussed. Then, Transport layer design issues, protocols as well as congestion control mechanisms are presented. Socket programming is explained. An in-depth analysis is presented of the Network layer design issues, and internetworking. MAC layer design issues and protocols are presented. Finally, multimedia network applications, network security and simple examples of network management protocols are explored.

CENE361 Microcomputer system design **(CR: 3-2-4)**

The course presents a thorough study of microprocessors and microcomputers. The purpose is to introduce the students to the procedures necessary to design and develop hardware and software for the microcomputer. The course help students approach programming problems with a machine-level mindset. It is important to think of the CPU as an interactive tool and to learn to monitor its operation as directly as possible.

CENG 362 Embedded Systems **(CR: 3-0-3)**

This course is an introduction to the basic concepts and theory of embedded systems. It provides different operations and modes of the embedded systems. The topics in this course incorporate interrupt-driven, reactive, real-time, object-oriented, and distributed client/server embedded systems.

CENG 363 Computer & Network Security **(CR: 3-0-3)**

Recent times have seen a proliferation of digital devices and the subsequent concern for the security of information. This course introduces students to the basic principles and practices of computer and information security. Focus will be on the software, operating system, and network security techniques with detailed

analysis of real-world examples. Topics include cryptography, authentication, software and operating system security, network security, mobile security, and legal and ethical issues. In addition, the unit promotes and strengthens important generic skills, such as communication, analysis and inquiry, problem solving, independent and group working, and professionalism and social responsibility.

CENG 364 VLSI Design (CR: 3-0-3)

This course introduces VLSI concepts and techniques (Very Large-Scale Integration) design, such as the VLSI design process, MOS transistors and capacitors operation, digital CMOS circuits, CMOS processing technology, and device fabrication, design rules, and real circuits performance. It includes the analysis and design of combinational and sequential circuits. This course introduces CMOS circuits design and analysis of digital logic gates. Students will be exposed to the basic elements of CMOS circuit design. They will also study CMOS fabrication process technology and how to synthesize a mask design (layout) of a CMOS digital circuit starting from a functional description.

CENG 401 Cooperative training (CR: 0-0-9)

The coop training experience enables students to apply and refine the knowledge and skills in a related curriculum course. The Co-op is a supervised work experience in one of the governmental or private sectors that aimed to help students transition from the classroom to industry. The Co-op training involves practical project development in the related training field.

CENG 470 Graduation Project I (online) (CR: 2-0-2)

Graduation project I is designed as the first capstone project for Computer Engineering students. Students will learn how to look up a practical problem to solve and properly describe it throughout the project. The course introduces students to different projects related techniques including project problem description, selecting appropriate project domain, technical writings, and a schedule-driven process.

CENG 480 Graduation Project II (CR: 1-6-4)

The student will work on an applied project designed to develop his/her interest in some applications of computer engineering to a real-life problem, or on a computer engineering research project. Student is expected to submit a written report at the end of the project.

CENG 492 Advanced Computer Architecture (CR: 3-0-3)

This course concentrates on the principles underlying systems organization, computer system design issues, Architecture and organization of high-performance computers, and contrasting implementations of modern systems. Also, it focuses on advanced computer architectures, Instruction level parallelism and multi-processors, memory, storage and interconnection, quantitative analysis, and evaluation of design alternatives.

CENG 493 ASIC and FPGA Design (CR: 3-0-3)

The course provides an introduction to computer-aided design tools for ASIC and FPGA Design. Besides, it introduces the synthesis concepts based on hardware description languages and the creation of finite state machines. Moreover, it differentiates between FPGA and ASIC design flows. Gate-level design, register

transfer level design, design methodologies, design reuse and intellectual property cores, and optimization are some of the topics to be covered in this course

CENE 494 WIRELESS SENSOR NETWORKS (CR: 3-0-3)

This course covers an overview of wireless sensor network (WSN) protocols, deployment and coverage issues, and various applications. Moreover, topics will include WSN architectures, hardware platforms, physical layer techniques, medium access control, routing, topology control, quality of service (QoS) management, operating systems, localization, time synchronization, and security.

CENG 495 Robotics (CR: 3-0-3)

This course introduces research and how to design and build Robots. It covers robot simulation, kinematics, control, optimization, and probabilistic inference. Students will learn programming on various microcontrollers. Students will apply current techniques of robotics to discover some of the most innovative robots.

CENE 496 PARALLEL COMPUTING (CR: 3-0-3)

This course covers the topics of parallel computers, parallel architectures, message-passing computing (MPI). embarrassingly parallel computations, partitioning, divide-and-conquer strategies, and threads. Moreover, the course including synchronous computations, programming with shared-memory (OpenMP), distributed shared-memory systems, load balancing, and scalable algorithmic techniques. Lastly, case studies will be discussed, including image processing and numerical algorithms.

CENG 497 Multicore Programming (CR: 3-0-3)

This course gives an introduction of modern multicore processor and concurrency platforms. It covers programming with threads, parallelism, synchronization, data dependencies and deadlocks. Students will analyze the performance of current multicore platforms through their research projects.

CENG 498 Digital Microelectronics (CR: 3-0-3)

Introduction to fabrication processes; Transistor models; Layout issues; ASIC design flow; VLSI design methodology and leaf cell design; Performance estimation of CMOS complex gates and interconnected modules using logical effort; Interconnect types and issues, clock distribution, design margin, reliability and scaling; Static and dynamic CMOS logic families and adders design; SRAMs, DRAMs, Pseudo-NMOS, and dynamic PLA; Low power design and system level consideration.

CENG 499 Telecommunications Network Design (CR: 3-0-3)

The basic concepts in Networking. Topics include: the language of computer networks; fundamentals of data and signals, analog signal, digital signal, the media; conducted and wireless, modems, networks of computers, LAN, WAN, Network devices. Basic modem operating principles, Bandwidth limitations, and alternatives to traditional modems: Channel Service Unit/ Data Service Unit, Cable Modems, ISDN, DSL. It also gives a brief knowledge about Data Link Connections.

Program Key Performance Indicator

No.	KPIs Code	KPIs	Measurement Methods	Measurement Time
1	**KPI-P-01**	Percentage of achieved indicators of the program operational plan objectives (i8)	1.1-Operational plan 1.2-Activities report 1.3-Graduate unit plan 1.4-Scientific research unit plan 1.5-Quality Assurance unit plan, 1.6Academic Advising unit plan 1.7-Registration unit plan	One academic year
2	**KPI-P-02**	Students' Evaluation of quality of learning experience in the program (i10)	2.1-Students Evaluation survey. 2.2-Analysis Report of survey.	One academic year
3	**KPI-P-03**	Students' evaluation of the quality of the courses (i6)	3.1-Courses evaluation 3.2-Course evaluation Analysis report.	Each academic semester
4	**KPI-P-04**	Completion rate (i12)	4.1-Registration statistics 4.2- Annual Program report	One academic year
5	**KPI-P-05**	First-year students retention rate (i1)	5.1-Registration statistics 5.2- APR	One academic year
6	**KPI-P-06**	Students' performance in the professional and/or national examinations	6.1-Proficiency Exam Report (Sample exam ,result, ILO and PLO analysis improvement plan)	One academic year
7	**KPI-P-07**	Graduates' employability (i14,19)	7.1-List of Students employed	One academic year
		Enrolment in postgraduate programs (i14,19)	7.2-List of Students enroll for postgraduate studies	One academic year
8	**KPI-P-08**	Average number of students in the class	8.1-Schedule of students enrollment record	One academic year
9	**KPI-P-9**	Employers' evaluation of the program graduates proficiency (i26)	9.1-Employer Evaluation survey. 9.2-Analysis Report of survey.	One academic year
10	**KPI-P-10**	Students' satisfaction with the offered services (i18,28)	10.1-Student satisfaction survey. 10.2- Analysis Report of survey.	One academic year
11	**KPI-P-11**	Ratio of students to teaching staff (i9)	11.1-List of students faculty wise from Academic advising unit	One academic year
12	**KPI-P-12**	Percentage of teaching staff distribution	12.1-Faculty list 12.2-Load distribution report	One academic year

No.	KPIs Code	KPIs	Measurement Methods	Measurement Time
13	**KPI-P-13**	Proportion of teaching staff leaving the program (i37)	13.1-List of faculty members for beginning of academic year 13.2-List of faculty members for end of academic year	One academic year
14	**KPI-P-14**	Percentage of publications of faculty members (i36)	14.1 -List of reprint of published papers 14.2-List of staff members	One academic year
15	**KPI-P-15**	Rate of published research per faculty member (i42)	15.1-List and reprint of published papers 15.2-List of staff members	One academic year
16	**KPI-P-16**	Citations rate in refereed journals per faculty member (i44)	16.1-List of cited papers 16.2-List of staff members	One academic year
17	**KPI-P-17**	Satisfaction of beneficiaries with the learning resources (i13,27,33)	17.1- Survey conducted to measure the satisfaction of beneficiary to the learning recourses	One academic year
18	**KPI-COE-01**	The awareness and support of the teaching staff and administrators of the mission of the program/institution (i2)	18.1-Mission Vision Awareness survey conducted by the Quality assurance unit participants were teaching administrative staff 18.2-Analysis Report of survey	One academic year
19	**KPI-COE-02**	Student evaluation of the Value and Quality of Field Activities (i15)	19.1-Student Evaluation of COOP quality survey. 19.2- Analysis Report of survey.	One academic year
20	**KPI-COE-03**	Relevance of the qualifications and experience of faculty members to the courses they teach (i17)	20.1-Faculty List with assigned Courses 20.2-Sample CV	One academic year
21	**KPI-COE-04**	The percentage of full-time teaching staff members and the others of administrative staff that participate in community services activities (i49)	21.1-Community services Activities report	One academic year

Facilities (Classrooms – Laboratories - Specialized equipment

Material Resources

Items	Male Branch	Female Branch
Classrooms	29	28
Specialized Labs/ workstations	9	9
Laboratories	9	7
Research Laboratories	4	
Faculties Offices	55	18
Admin offices	19	8
Meeting rooms	3	1
Technical equipment (projectors (Data show)- computers	One in each lab and class room	one each lab and class room
College Library internal	1	1

Male Campus: List of Labs with Location and Capacity

No	(Male Campus)	Location	Capacity	Courses/Lab Taught
1	Electrical/Electronic Circuits Lab	G118	25	EE201,203
2	Microcomputer System Design Lab	G123	12	COE305
3	Robotics Lab	G140	8	Robotics
4	Digital System Design Lab	G140	8	
5	Digital Logic/ Oracle Lab	G119	28	COE200
6	Printed Circuit Board Lab	G134	5	
7	High Performance Computing (HPC)	G181	27	Research
8	Information Systems and Networks (ISaN)	G183	25	Research
9	Computer Networks Lab	G129	20	ICS432,COE344
10	Computer Lab I	G145	23	

11	Computer Lab II	G150	19	COE200,ICS101,ICS201, ICS202,ICS232,ICS431, Stat-319,SWE214 ICS491, COE305,SWE316.
12	Computer Lab III	G153	25	COE200,ICS101, ICS201,ICS202,ICS232.
13	Computer Lab IV	G161	24	COE200,ICS101,ICS201,ICS202, ICS232,ICS431, SWE214.
14	Computer Lab V	G167	24	COE200,ICS101,ICS201,ICS202 ICS232,ICS431,Stat-319, ICS491,SWE316,COE305.
15	Computer Lab VI	G172	24	COE200,ICS101, ICS201,ICS202,ICS232,COE305.
16	Computer Lab VII	G177	23	ICS101,ICS201, ICS202,ICS232, SWE214,ICS491,COE305.
17	Computer Lab IX	G194	21	COE200,ICS101,ICS201,ICS202, ICS232,ICS431,Stat-319, SWE214,ICS491,SWE316, COE305.
18	Computer Lab VIII	G188	16	

Female Campus:

No	Lab	Location	Capacity
1	Electrical/Electronic Circuits Lab	11C-105	10
2	EMC Lab	11C-106	15
3	Oracle Lab	11C-107	24
4	Networks/CISCO lab	11C-108	12

5	Computer Science Lab	11C-205	15
6	Microprocessor Lab	11C-206	8
7	Digital System Design Lab	11C-207	5
8	Robotics Lab	11C-209	8
7	Digital Logic Lab	11C-004	15
8	Electrical/Electronic Circuits Lab	11C-005	15
9	Computer Lab I	11B-102	23
10	Computer Lab II	11B-103	23
11	Computer Lab III	11B-104	23
12	Computer Lab IV	11B-105	23
13	Computer Lab V	11B-106	24
14	Computer Lab VI	11B-107	24
15	Computer Lab VII	11B-108	24
16	Computer Lab IX	11B-109	24

List of research laboratories

Laboratory Name	Room Number	Total Computers	Computer, OS, and Devices
High Performance Computing (HPC)	G180	27	Lenovo Think Vision/Linux
Information Systems and Networks (ISaN)	G183	25	HP/Windows 11
Robotics	G140	6	Mindstorms robotic kits = 8
Advanced network simulation and research (ANSaR)	G156	20	HP/Windows 7 + Table and Chairs + Printer

Facilities highlights

Figure 2. Entrance to the College of Computer Science and Engineering - male side

Figure 3. Side of the College of Computer Science and Engineering

Figure 5. Teaching class room in the College of Computer Science and Engineering

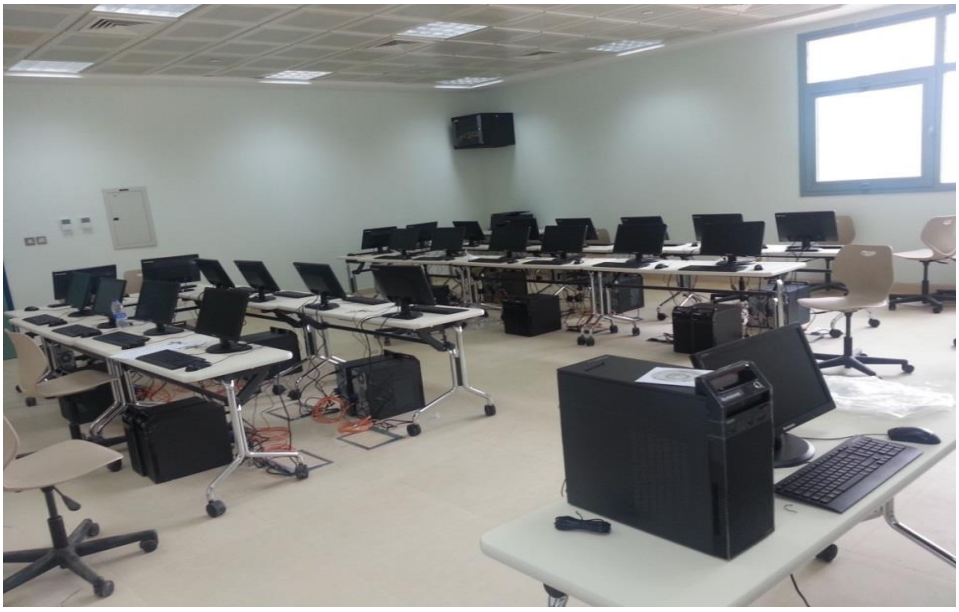


Figure 6. Teaching labs in the College of Computer Science and Engineering.

Figure 4. Microprocessor Lab

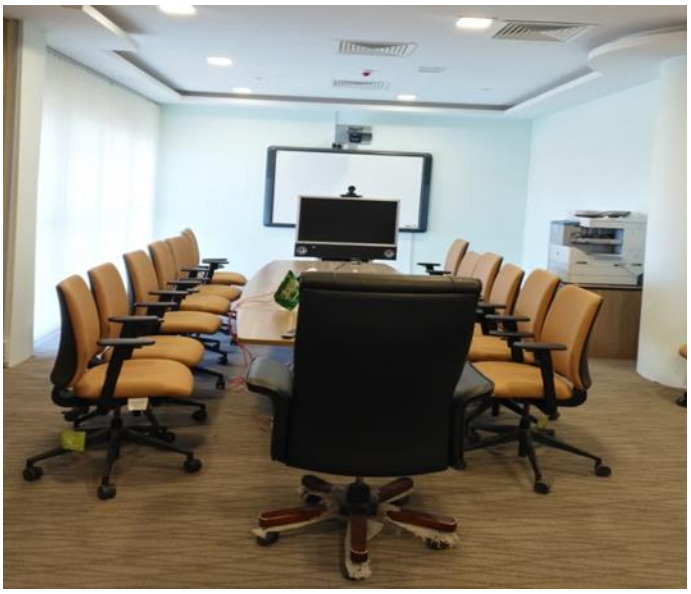
Figure 5. Electronics and Electrical Lab

Figure 6. Networks Lab

Figure 7. Digital Logic Circuits Lab

Figure 8. Programming I- Lab in Female Side

Figure 12: Microprocessor Lab – Female campus



Male branch meeting room *Female Branch meeting room*

Figure 13: Meeting Room in the College of Computer Science and Engineering

Figure 14: Library in the College of Computer Science and Engineering

Graduates Employment Opportunities

Job Opportunities for Graduates from Computer Engineering Program

Organization	Job Title	Brief Job Description
Technology Companies	Computer Engineer (17, 18,19)	Install, configure, troubleshoot, and maintain a variety of computing devices and networked systems (software or hardware) in accordance with documented functional requirements and standards. Apply principles of digital and analog circuits to troubleshoot computing devices.
Manufacturing Companies	Hardware Engineer (20)	Design computer hardware components such as processors, memory systems, and peripheral devices. Create schematics, circuit diagrams, and prototypes. Test and analyze performance and efficiency.
Technology Companies	Network Engineer (20)	Design and manage computer networks and communication systems. Configure network hardware and software, monitor performance, troubleshoot issues, and implement security protocols.
Technology and Manufacturing Companies	Project Manager (15)	Oversee the development and implementation of computer engineering projects. Manage resources, timelines, budgets, and risks. Coordinate with stakeholders and communicate progress.
Public and Private sector	Network or System Administrator (17)	Install, configure, and maintain computer systems and networks. Manage user accounts, security, backup, and recovery. Troubleshoot issues and provide technical support.

Computer Technology Training Companies	Computer Trainer (6)	Designs and teaches various computer courses, especially for international certificates.
Public and Private sector	Information Technology Consultant (23)	Works with user groups to solve business problems with available technology including hardware, software, databases, and peripherals.
Academic Institutions and Large Companies of computer manufacturing	Research Scientist	Conducting research to develop new or update computer technologies in order to solve problems in a variety of fields.