Bachelor in Computer Engineering (B.CE) Program CATALOG

College of Computers and Information Technology

Taif University

2023-2024

Contents

1. About the Department

Taif University (TU) is a public, baccalaureate institution located in Taif in the Kingdom of Saudi Arabia. The university was created by a royal decree in January 1980. In June 2004, the College of Computers and Information Systems was first established to become a year later College of Computers and Information Technology (CCIT). Its mission is to address the ever growing number of students wishing to study computer science (CS), computer engineering (CE), and information technology (IT). The CCIT offers computer intensive academic programs to Taif high school graduates and its neighboring towns. CCIT in general and the Department of Computer Engineering has seen itself staffed with academically and professionally qualified faculty members.

Today, Taif University has two main campuses: the Haweiyah campus for Males and the Haweiyah campus for Females. The CE Department in CCIT offers a Bachelor of Computer Engineering (B.CE) for each campus. The B.CE program-Haweiyah campus for Males is an ABET accredited program since May 01, 2013. The B.CE program has been accredited for six years by ABET. The accreditation was renewed in 2019 along with the accreditation of female campus. The B.CE program follows the conventional on-campus mode of instructions. All courses in CE are technology enhanced with online support through Blackboard. The B.CE prides itself on being a key player in shaping the minds and skills of local and regional students in this unique part of Saudi Arabia; Taif region, a rural area that is undergoing government-planned changes in most of its vital and technological infrastructures. This is mainly accomplished through the practice of hands-on approach in teaching, tutoring, and guiding students.

The Computer Engineering program is an on-campus (the Haweiyah campus for males and the Haweiyah campus for females), day-time, and in-class program using advanced lecture/laboratory/tutorial teaching. The department follows the semester system. Two semesters are offered in each academic year. The duration of each semester is 16 weeks excluding final examination.

2. Program Description:

The Department of Computer Engineering at Taif University was established in September 2004, and it has been developed and evolved over the years to become one of the active departments of the university in teaching, research, and service to the university. The B.CE program has been established to respond to new needs of the growing computer sector in the Kingdom. This prepares its graduates to be leaders in a wide range of Computer Engineering disciplines and to create new knowledge, products, and services. Graduates will enhance the economic well-being of the region and the Kingdom through a combination of technical expertise, leadership, and entrepreneurship. B.CE program constitutes a solid source of computer professionals who will fulfil the modernization and the regional economic development through the assimilation in medium to large size industry plants as well as service sector partners such as telecommunications companies, engineering consultants, and the government sector to name a few.

The CE department offers a high-quality education in computer engineering which prepares graduates to reach their full potential in computer engineering practice, industrial careers, research, and graduate studies.

3. Program Goals:

1. Provide the public and private sectors with qualified computer engineering professionals.
2. Providing computer engineering graduates with the necessary knowledge in fundamental theories, techniques, and tools to solve computer engineering problems, design hardware/software systems and improve their performance.
3. The computer engineering graduates will engage in lifelong learning activities within a professional, legal, and ethical framework.
4. Encouraging scientific research for environmental development.

4. Graduate Attributes:

1. Professionalism
2. Knowledge
3. Distinction
4. Ethics

5. Program Learning Outcomes:

Knowledge and Understanding

K1. Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics.

Skills

S1. Apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors.

S2. Communicate effectively with a range of audiences.

S3. Develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.

Values

V1. Acquire and apply new knowledge as needed, using appropriate learning strategies.

V2. Recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts.

V3. Function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives.

6. Student Admission

An applicant for admission to an undergraduate program at TU must satisfy a number of requirements, including:

1. The student must be a Saudi citizen at the time of application, or an immediate Saudi matrilineal descendent or a foreigner who has a valid residence at the time of applying to the university.
2. The student must possess a Saudi high school certificate, or its foreign equivalent.
3. The student must successfully pass a skills test with a mark of at least 70%. Such tests are administered by the National Assessment Center for Higher Education and carried out in a large number of centers across the Kingdom. This condition was applied till the academic year 2016-2017. This condition is cancelled from the academic year 2017-2018

4. The student is required to take an entrance exam, the result of which must be 70% or better. Such an exam is administered and managed by the Deanship of Admission and Registration at TU. This condition was applied till the academic year 2016-2017. This condition is cancelled from the academic year 2017-2018
5. For each candidate for admission, the deanship of Admission and Registration assigns a weighted average of the student's scores in high school, skills test and entrance test. The assigned weights are 40%, 30% and 30% to the high school grades, skills test and entrance test, respectively. This condition was applied till the academic year 2016-2017. This condition is modified from the academic year 2017-2018. The new condition is: For each candidate for admission, the candidate should get at least 90. 70 and 70 in the high school grades and the two exams of skills, respectively. The deanship of Admission and Registration assigns a weighted average of the student's scores in high school, skills test and entrance test. The assigned weights are 40%, 30% and 30% to the high school grades and the two exams of skills, respectively.

Admission to the College of Computers and Information Technology at TU is highly competitive. The number of students accepted is limited to the number of seats available as decided by the University Council and based on the capacity of resources of the College of Computers and Information Technology.

After finishing the TU preparatory year successfully, the admission office at TU decides to which college and program a student should join based on the student preference and his GPA in the preparatory year. For CCIT an extra condition is imposed, that is a student to join one of the three programs of the college: Computer Science, Computer Engineering, or Information Technology, he should get GPA in the preparatory year higher than 2. The number of students joining one of our departments and studying towards a Bachelor of computer engineering, Bachelor of computer science, and Bachelor of information technology may vary on a yearly basis, depending on the availability of resources. Nevertheless, students who joined the department have to achieve a General Point Average of no less than two. From the academic year 2017-2018, the preparatory was cancelled and the eligible students are admitted directly to CCIT from the first year.

7. Graduation Requirements

- Students may not graduate until all degree requirements have been fulfilled and certified by the Registration office. The EREG tool monitors the students' progress towards completing program requirements and academic advisor provides guidelines for completing program requirements. Students must

follow the rules and regulations of the University, and they must successfully complete each course in the curriculum to receive a degree.

- There are several processes in place to ensure that students are aware of all graduation requirements, students can appropriately plan for a timely graduation and understand what requirements still remain, and the registration office verifies fulfillment prior to graduation:
- Before the last semester, the EREG tool alerts all the students near graduation (who has remaining credit hours 18 or less). Note that students can run an unofficial transcript at any point. This transcript is formatted to make clear what graduation requirements are complete and which remain.
- Academic advisor advises students to take necessary courses for graduation.
- After successfully completing the required courses to graduate, students must fill out a graduation "application" and take clearance from all the necessary departments.
- Finally, the registration office verifies all the requirements to offer a degree.

Based on Taif University policy, to be eligible to file an application for graduation in each department student must have:
Completed 124 or more hours with a minimum grade point average of 2.00

Next table gives the distribution of plan courses.

Program Structure	Required/ Elective	No. of courses	Credit Hours	Percentage
Institution Requirements	Required	**9**	**18**	**11.25%**
	Elective	**2**	**4**	**2.5%**
College Requirements	Required	**17**	**45**	**28.125%**
	Elective			
Program Requirements	Required	**24**	**76**	**47.5%**
	Elective	**3**	**9**	**5.625%**
Capstone Course/Project		**2**	**6**	**3.75%**
Field Experience/ Internship		**1**	**2**	**1.25%**
Others				
Total		**58**	**160**	**100%**

8. Student Evaluation

Students are evaluated throughout their academic studies by their performance in all courses. Typically, each course has one or more of the following evaluation instruments: quizzes, tests, midterm and final examinations, homework assignments, laboratory work, and design project work. Instructors are required to list the course evaluation criteria on the course syllabus and distribute the course syllabus at the beginning of each term. Each course is assessed out of 100 total points with an appropriate proportion among all or some of the above-mentioned instruments. Finally, a grade point and a grade letter are given to a course based on the total marks obtained. The Grade Point is computed on a four-point scale according to the following table.

Table 1.2 Mapping between grade letters, percentage, and grade points

Grade Letter	Percentage	Grade Points (GP)
A+	95-100	**4.00**
A	90-less than 95	**3.75**
B+	85-less than 90	**3.50**
B	80-less than 85	**3.00**
C+	75-less than 80	**2.50**
C	70-less than 75	**2.00**
D+	65-less than 70	**1.50**
D	60-less than 65	**1.00**
F	Below 60	**0.00**

The Accumulative Grade Point Average (Ac.GPA) of a student which covers all semesters (including summer semesters) is computed as follows:

Earned Points per course (EP) = course CreditHours (CHrs) × GP

$$\text{Ac. GPA} = \frac{\sum_{all} EP}{\sum CHrs}$$

The semester GPA (S.GPA) is calculated by the following equation:

$$\text{S.GPA} = \frac{\sum_{semeter} EP}{\sum_{semester} CHrs}$$

Class attendance and participation is also an imperative performance evaluation parameter. Taif University requires that students attend at least 75% of the class lectures. TU has an online student's attendance system administered by the instructor of a course (http://edugate.tu.edu.sa/tu/init). Student can see his attendance record online. Students with 20% absents are warned by the system. Students failing to meet this prerequisite in any of the courses are automatically prohibited from attending the final examination of that course and earn an F (fail) grade in that course. Furthermore, the student who is absent in the final examination of a course(s) is given a substitute examination, subject to a valid reason accepted by the department council.

9. Transferring

Transfer to the college can be done through three different phases as follows:

A. Transfer from other universities to CCIT

Policy

A student wishing to transfer from another university to CCIT has to submit, for each course, an official course syllabus and course description. A student must also submit an official transcript and satisfy the following conditions:

1. Satisfactory GPA (good academic standing)
2. Does not exceed 10% (or the percentage set forth by the college each year) of the overall student population.
3. All courses require at least a grade of C.
4. Any Major course requires at least a grade C.
5. A Minimum of 2 semesters and no more than a maximum of 4 semesters can be spent at the originating academic institution.
6. The student whose application for transfer is approved shall be admitted to the same department he was enrolled in before the transfer.
7. Approval of Transfer is subject to the recommendations of the relevant Department.

Procedure

The procedure for a student to transfer from outside to CCIT is as follows:

1. Fill out a Transfer Form (found on the registrar's website) and attach an official transcript from his originating institution.
2. Obtain an official course description and syllabus for each course.

3. Submit the form plus all supporting documentations to the Chairperson of the Department you want to Transfer to.
4. Chairperson asks the Departmental Curriculum Committee (DCC) to review the case and make recommendation.
5. The Chairperson, based on the decision taken by the DCC's, communicates the Department's recommendation to the Dean.
6. The Dean communicate the decision to the Dean of the Registrar's

B. Transfer from other colleges within the university to CCIT

Policy

A student wishing to transfer from another college in TU to CCIT has to satisfy the following conditions:

1. An accumulated GPA of at least 3.0
2. The maximum number of transferees should not exceed the percentage set forth by the college each academic calendar year.
3. Accepted transferees are normally admitted to the first year in CCIT.
4. The student may petition to transfer any course that he has previously taken before that is required in his study plan and submit supporting documents.
5. A Minimum of 1 semester and no more than a maximum of 4 semesters can be spent at the originating college/department.

Procedure

A transferring student from inside TU must do the following steps:

1. Fill out and submit an online form at http://edugate.tu.edu.sa/tu/init
2. Follow up on the status of his transfer application online.
3. Contact his academic advisor regarding course registration and course transfer.

C. Transfer from one department to another department within CCIT

Policy

1. The student must have spent at least one semester in the department he wishes to transfer from.
2. The student should not have already been transferred from another department within CCIT.
3. The time to graduation should be sufficient to complete the graduation requirements.
4. All the terms and conditions determined by the relevant departments should be satisfied.

Procedure

1. Fill out and submit an online form at http://edugate.tu.edu.sa/tu/init
2. Follow up on the status of his transfer application online.
3. Contact his academic advisor regarding course registration and course transfer.

Transfer Credits

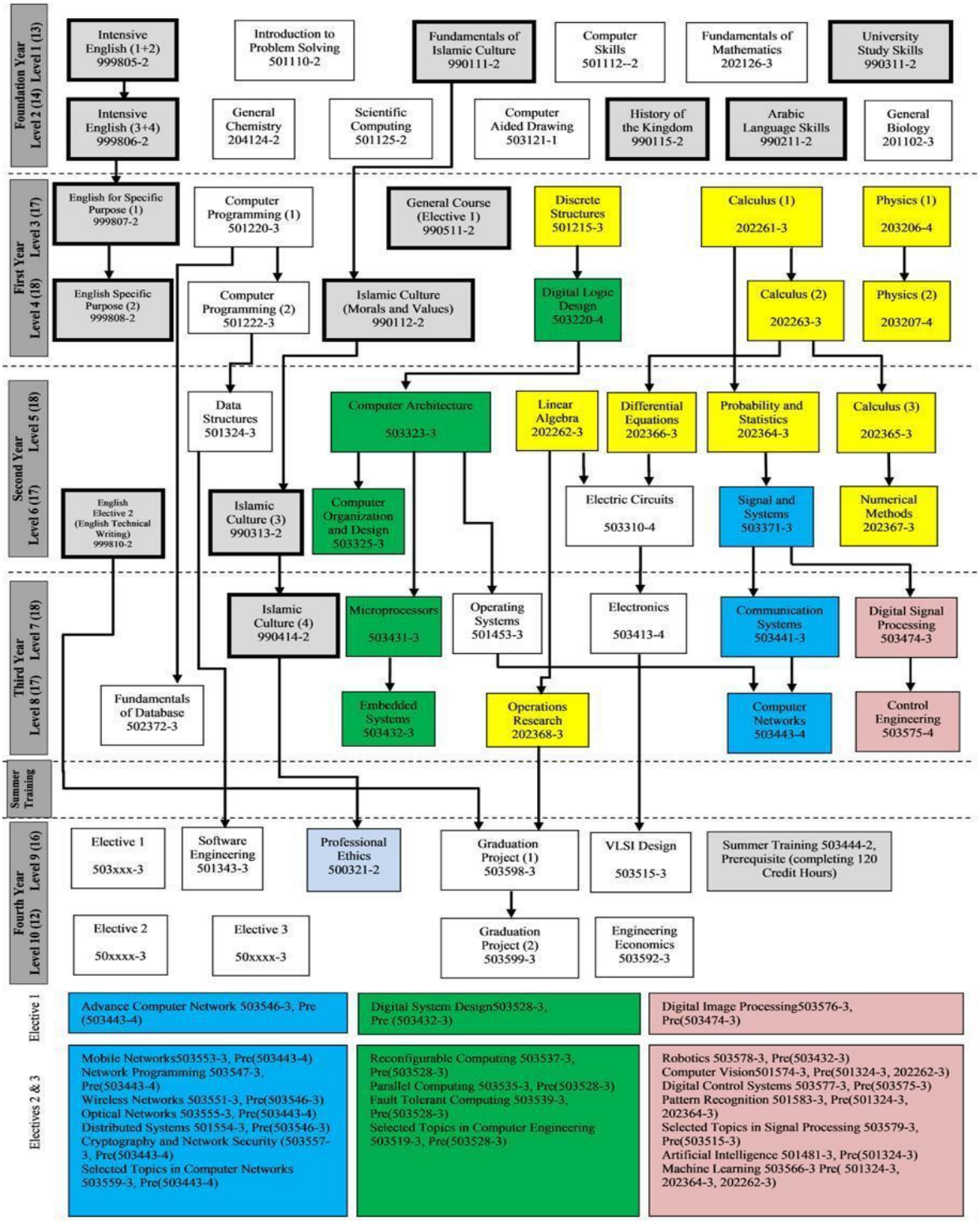
Students can normally transfer courses taken at other universities. The maximum allowable percentage of course credit hours that can be transferred is 50% of the total credit hours by one of programs in CCIT. The courses considered for transfer are evaluated by the Department Curriculum Committee (DCC) and faculty members who teach these courses. The recommendation of DCC is sent to the Chair who in turn sends it to the Dean. The grades for the transferred courses are not included in the GPA and instead a pass grade is assigned to these courses.

Procedure

A grade of C or higher is required for transferring courses to CCIT. To begin the process a student must fill out the online form and provide a transcript and the official course syllabi to the department. The following process then takes place:

1. The Chair consults the faculty who had taught the course.
2. The faculty and curriculum committee review the submitted supporting documents and submit the recommendation to the Chair who in turn submits the recommendation to the Dean.
3. Once approved by the Dean, a course equivalence certificate is then submitted to the Deanship of Admission and Registration.

10. CE Study Plan



11. CE brief Courses Description

Code	503121-1
Course Name	Computer Aided Drawing
Credit Hours	1
Prerequisite	--
Course Description	This course focuses on using AutoCAD program, introductory descriptive geometry , orthographic, deducing the missed view, and dimensioning.

Code	503221-4
Course Name	Digital Logic Design
Credit Hours	4
Prerequisite	501215-3
Course Description	This course covers many basic topics such as numbering systems, Boolean algebra, simplification using Boolean algebra and Karnaugh maps, and different logic gates. The course also deals with analysis and synthesis of combinational circuits, e.g., adders, encoders, decoders, multiplexers and demultiplexers. Flip-flops and Sequential circuits such as registers, counters, and other basic also presented. The course prepares the students to apply the above basic skills to design, implement, and test digital logic circuits in the laboratory.

Code	503323-3
Course Name	Computer Architecture
Credit Hours	3
Prerequisite	503221-4
Course Description	This course will provide the student with an in-depth study of the organization of the central processing unit, arithmetic logic unit, control unit, instruction set design, and addressing modes of digital computers. Register Transfer model of processors and data paths are considered. Extensive emphasis is placed on the translation of assembly language instructions into their micro sequence operations within the control unit. Both hardwire and microprogramming techniques will be covered. Reduced Instruction Set Computers (RISC) and Complex Instruction Set Computers (CISC) are introduced as well. Parallel architecture and inter-connection networks.

Code	503310-4
Course Name	Electric Circuits
Credit Hours	4
Prerequisite	202262-3, 202366-3
Course Description	Units and dimensions, Electric circuit elements and variables ,energy stored and power dissipated in circuit elements. DC circuit analysis: kirchhoff's voltage and current law.

Analysis Methods: mesh current method, Node voltage method. Superposition Principle, Thevenin's and norton's theorems, maximum power transfer theorem, Delta-Star Transformation. Transient Circuits: Basic circuit parameters, boundary conditions for energy storage elements, first-order circuits with DC excitations. AC circuits: Sinusoidal Functions, Phasors, DC and RMS Values, Complex Power in AC circuits, Transformers: Introduction, Ideal transformer, Transformer efficiency.
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Code	503325-3
Course Name	Computer Organization & Design
Credit Hours	3
Prerequisite	503323-3
Course Description	This course will provide the student with an in-depth study of the organization of the central processing unit, arithmetic logic unit, control unit, instruction set design, and addressing modes of digital computers. Register Transfer model of processors and data paths are considered. Extensive emphasis is placed on the translation of assembly language instructions into their micro sequence operations within the control unit. Both hardwire and microprogramming techniques will be covered. Reduced Instruction Set Computers (RISC) and Complex Instruction Set Computers (CISC) are introduced as well. Parallel architecture and inter-connection networks.

Code	503371-3
Course Name	Signals and Systems
Credit Hours	3
Prerequisite	202263-3
Course Description	This course focuses on classification and properties of signals and systems, Fourier series representation of periodic signals, Fourier transform and it properties, convolution, correlation and spectral density, Laplace transform, representation and analysis of linear time-invariant (LTI) systems, LTI systems characteristics, impulse response and transfer function of LTI systems, frequency response of LTI systems, Introduction to analog filters.

Code	503311-3
Course Name	Communication Systems
Credit Hours	3
Prerequisite	503371-3
Course Description	This course provides basic concepts of Analogue and Digital Communication Systems (Transmitter, Channel, and the Receiver). It includes components of analogue and digital communication systems with more emphasis on the digital communication systems. In this course students will familiarize with the design

of communication systems and be able to analyze the performance of the systems.

Code	503413-4
Course Name	Electronics
Credit Hours	4
Prerequisite	503310-4
Course Description	This course focuses on analysis and design used throughout electronic devices and circuit theory. Semiconductor diodes. Diode applications. BJT transistor modeling. BJT Small-signal. Theory of operational amplifiers, Inverting and noninverting operational amplifier, feedback theory, frequency response, applications of operational amplifier, voltage summation, subtraction and comparator, integration, and differentiation circuits, comparators, Oscillators Active filters and Multistage amplifier.

Code	503431-3
Course Name	Microprocessor
Credit Hours	3
Prerequisite	503323-3
Course Description	This course covers the microprocessor and microcomputer systems architectures. The architecture of a specific 16-bit Microprocessor, assembly language programming, data representation, addressing modes, instruction sets, I/O programming, interrupts, assembly process, cross assemblers and debugging. Bus systems, Memory subsystems, Interfacing and peripherals.

Code	503474-3
Course Name	Digital Signal Processing
Credit Hours	3
Prerequisite	503371-3
Course Description	This course gives detailed explanations of basic digital signal processing operations including sampling and reconstruction of continuous time signals, quantization, A/D, and D/A. Furthermore, transforms for discrete signals such Z-transform, Discrete Fourier Transform (DFT), and Fast-Fourier Transform (FFT) are studied. Topics also include: time and frequency domain techniques for designing and applying infinite impulse response (IIR) and finite impulse response (FIR) digital filters, and two-dimensional signal processing application.

Code	503432-3

Course Name	Embedded Systems
Credit Hours	3
Prerequisite	503431-3
Course Description	This Course introduces students to the design and analysis of computational systems that interact with physical processes. Applications include medical devices and systems, consumer electronics, toys and games, process control, and communications systems. The fundamentals of embedded system hardware and firmware design will be explored. Issues such as embedded processor selection, hardware/firmware partitioning, glue logic, circuit design, circuit layout, circuit debugging, development tools, firmware architecture, design, and debugging will be discussed. The architecture and instruction set of a common microcontroller will be discussed.

Code	503443-4
Course Name	Computer Networks
Credit Hours	4
Prerequisite	503311-3, 501453-3
Course Description	This course provides the students with an understanding of the fundamental concepts of computer networking. Important concepts related to layered architecture, wired and wireless local area networks, wide area networks, packet switching and routing, transport protocol, flow control, and congestion control are covered in this course.

Code	503575-4
Course Name	Control Engineering
Credit Hours	4
Prerequisite	503474-3
Course Description	This course focuses on techniques used for the analysis and design of LTI Feedback Control Systems, starting with the Mathematical Modeling, passing through the Analysis, and ending with the Design of LTI Feedback Control Systems. The main topics include Modeling of electrical, mechanical, and electromechanical systems as differential equations, transfer functions, and state-space; Block diagram reduction and Signal Flow Graph representation of LTI control systems; Analysis of stability of open-loop and closed-loop systems; Time and Frequency domain Analysis of LTI systems; Design of controllers for enhancing the performance of LTI control systems.

Code	503444-2
Course Name	Field experience
Credit Hours	2
Prerequisite	--

Course Description	To train the students in working places to master the essential skills in computer engineering through daily work activities

Code	503515-3
Course Name	VLSI Design
Credit Hours	3
Prerequisite	503413-3
Course Description	Introduction to the concepts and techniques of VLSI (Very Large Scale Integration) design. The VLSI design process, details of the MOS transistor, CMOS processing technology and device fabrication, MOS transistor theory, MOS transistor I-V characteristics, design rules, digital CMOS circuits, and performance estimation. CAD tools for schematic, layout, functionality, timing analysis, synthesis and performance.

Code	503598-3
Course Name	Capstone Project (1)
Credit Hours	3
Prerequisite	202368-3
Course Description	The graduation project (aka Capstone Design Project) challenges students to go beyond the learning that occurs as a result of their prescribed educational program, by developing design projects that demonstrate their intellectual, technical and creative abilities. Capstone project is a two-semester course (CP1 and CP2) in which student teams (groups of two or three persons) design a project to solve a computer engineering problem under the direction and supervision of faculty members, taking into account the engineering standards and realistic constraints. The teams demonstrate their ability to analyze, design, implement solutions, and communicate significant knowledge and comprehension. During the first semester, the team develops an execution plan of the project, acquires any necessary hardware and/or software, and performs necessary computations and simulations for adopting the best possible solution according to Engineering Standards, and satisfying imposed constraints. After achieving the graduation project 1 goals, students submit a comprehensive report and make a presentation to the examination committee.

Code	503592-3
Course Name	Engineering Economics
Credit Hours	3
Prerequisite	--
Course Description	This course describes how to evaluate alternatives to choose the most viable option based on engineering economic criteria. Topics include: decision making, cost types and estimates, time value of money, interest rate calculations,

	economic equivalence, comparison of alternative investments, evaluating economic life and replacement alternatives, inflation, depreciation, development of business case analyses for new product development projects, concept of time value of money in Islamic economy, Islamic investment tools like, Musharaka, Mudaraba, Sukuk, Murabaha.
Code	503599-3
Course Name	Capstone Project (2)
Credit Hours	3
Prerequisite	503598-3
Course Description	Capstone project is a two-semester course in which student teams design a project to solve a computer engineering problem under the direction and supervision of faculty members, taking into account the engineering standards and realistic constraints. The teams demonstrate their ability to analyze, design, implement solutions, and communicate significant knowledge and comprehension. During the second semester and after implementing, testing, and evaluating the proposed solution, students submit a final report, a poster, and prepare a PowerPoint presentation for the examination committee. In both projects the students are expected to show their abilities on designing, developing, orally presenting and documenting a project, just like they will need to in their professional lives. That is to say, the students are expected to display their social and communication skills as well as their technical abilities.

Code	503528-3
Course Name	Digital Systems Design
Credit Hours	3
Prerequisite	503432-3
Course Description	The objective of this course is to give the students the theoretical basis & practical skills in modern design of medium size digital systems in various technologies, with a focus on Field Programmable Gate Arrays (FPGAs). The design methodology, systematically introduced & used in the course, is based on simulation & synthesis with hardware Description language (VHDL) tools. Topics covered in this course include: conceptual design step from requirements & specification to simulation & synthesis model in VHDL, design of complex controllers with Finite State Machines, design of sequential blocks with Controller-Data path methodology, issues in design for testability, electrical & timing issues in logic and system design, overview of implementation technologies with emphasis on advances in FPGAs.

Code	503446-3
Course Name	Advanced Computer Networks
Credit Hours	3
Prerequisite	503443-4

Course Description	This course provides in depth coverage of some basic topics in computer networks related to network layer, link layer, and physical layer. Topic include routing protocols, medium access control of existing and emerging wired and wireless networks and physical technology and standards.

Code	503576-3
Course Name	Digital Image Processing
Credit Hours	3
Prerequisite	503474-3
Course Description	This course offers an introduction to the theory of multidimensional signal processing and digital image processing. Topics include; human visual system, image acquisition and display, image sampling and quantization, color representations, image filtering, image transforms; FFT and DCT, image enhancement, morphological image processing, image restoration, image denoising, image segmentation, and image compression.

Code	503519-3
Course Name	Selected Topics in Computer Engineering
Credit Hours	3
Prerequisite	503528-3
Course Description	This course covers emerging and advanced topics in computer engineering. The contents will vary depending on the topic.

Code	503535-3
Course Name	Parallel Computing
Credit Hours	3
Prerequisite	503528-3
Course Description	Parallel Computing is a study of the hardware and software issues in parallel comp Topics include an introduction to the basic concepts, parallel architectures and ne topologies, parallel algorithms, parallel metrics, parallel languages, granu applications, parallel programming design and debugging. Students will become fa with various types of parallel architectures and programming environments.

Code	503537-3
Course Name	Reconfigurable Computing
Credit Hours	3
Prerequisite	503528-3
Course Description	This course covers basic concepts of dependable computing. Reliability of non-redundant and redundant systems. Dealing with circuit-level defects. Logic-level fault testing and tolerance. Error detection and correction. Diagnosis and reconfiguration for system-level malfunctions. Degradation management. Failure modeling and risk assessment.

Code	503529-3
Course Name	Fault Tolerant Computing
Credit Hours	3
Prerequisite	503528-3
Course Description	This course covers basic concepts of dependable computing. Reliability of non-redundant and redundant systems. Dealing with circuit-level defects. Logic-level fault testing and tolerance. Error detection and correction. Diagnosis and reconfiguration for system-level malfunctions. Degradation management. Failure modeling and risk assessment.

Code	503547-3
Course Name	Network Programming
Credit Hours	3
Prerequisite	503443-4
Course Description	Review of computer network topologies and network protocols, TCP/IP and HTTP. Processes and Interposes Communication, IPC. Review of UNIX system software for IPC. Client-Server model and programming, some specific examples of IPC and Client-Server program using C language. Introduction to Hypertext Markup language, HTML and Web page designs using HTML. Introduction to JAVA language and Interactive Web pages. Use of JAVA to develop stand-alone and network applications

Code	503551-3
Course Name	Wireless networks
Credit Hours	3
Prerequisite	503546-3
Course Description	This course introduces fundamental concepts of wireless networks. It covers the following topics: wireless networking challenges, wireless communication overview, signal propagation characteristics of wireless channels, wireless MAC concepts, overview of cellular standards (LTE and WiMAX), overview of wireless MAC protocols including 802.11, Bluetooth and personal area networks, etc. Making wireless work in today's Internet: supporting mobility, TCP over wireless, mobility, security, etc. Review of selected advanced topics, e.g. sensor, mesh and vehicular networks will also be given.

Code	503553-3
Course Name	Mobile Networks
Credit Hours	3
Prerequisite	503443-4
Course Description	This course covers the mobility issues of wireless networks. Cellular networks, ad hoc networks; access protocols; radio and network resource management; quality of service; mobility and location management; routing; mobile-IP; current wireless technologies for personal, local and satellite networks will be covered in the course.

Code	503555-3
Course Name	Optical Networks
Credit Hours	3
Prerequisite	503443-4
Course Description	The course covers light-emission processes in semiconductors, light-emitting diodes (LEDs), laser diodes, modulation response, source-fiber coupling, photodetectors, receiver noise and sensitivity, power budget and rise-time budget. Physics of optical components: nature of light, optical material, propagation, diffraction, polarization. Optical fiber transmission medium: fiber modes, signal degradation, attenuation, dispersion. Optical components: filters, directional couplers, power attenuators, beam splitters, multiplexers, demultiplexers, cross connects, modulators, amplifiers. Optical communications: signal encoding, network structure, SDH and SONET, WDM, routing and wavelength assignment. DWDM Networks: Topologies, bandwidth management, wavelength management, interoperability.

Code	503557-3
Course Name	Cryptography and Network Security
Credit Hours	3
Prerequisite	503443-4
Course Description	This course provides students with the most common cryptographic algorithms and protocols and how to use cryptographic algorithms and protocols to secure distributed applications and computer networks Need for computer system security, Security attacks and threats, Security service, Conventional cryptography: concepts and methods, Conventional cryptography algorithms: DES, AES, etc., Public key cryptography, RSA Algorithm, Key management, User authentication and digital signature, Firewalls and proxy servers, Network intrusion detection and PC security.

Code	503559-3
Course Name	Selected Topics in Computer Networks
Credit Hours	3
Prerequisite	503443-4
Course Description	This course covers emerging and advanced topics in computer networks. The contents will vary depending on the topic

Code	503566-3
Course Name	Machine learning
Credit Hours	3
Prerequisite	501324-3, 202262-3, 202364-3
Course Description	This course provides a broad introduction to machine learning topics. These include: (i) Data preprocessing (acquiring datasets, identifying and handling missing values, encoding data). (ii) Supervised learning (the difference between parametric and non-parametric algorithms, support vector machines, logistic regression, neural networks). (iii) Unsupervised learning (dimensionality

reduction, recommender systems, deep learning). (iv) Best practices in machine learning (bias/variance theory; innovation process in machine learning). The course will also draw from many case studies and applications so that students will learn about not only the theoretical foundations of learning, but also gain the practical skills needed to apply these techniques to new problems.

Code	503577-3
Course Name	Digital Control Systems
Credit Hours	3
Prerequisite	503575-4
Course Description	This course focuses on the techniques used for analysis and design of digital control systems. It identifies different aspects of digital control systems. The course covers: Z-transform and its inverse to represent and analyze Discrete-Time system, pulse Transfer Function, Block Diagram, Signal flow graph, state space, Bilinear transformation, stability analysis, Transient response and steady state errors, Design of Digital Controllers and evaluation of systems performance.

Code	503578-3
Course Name	Robotics
Credit Hours	3
Prerequisite	503432-3
Course Description	The objective of this course is to introduce students to the field of robotics. The course is organized in two main parts: (i) Foundations of robot motion. (ii) Robot kinematics. In the first part, foundations of robot motion, students will learn the fundamentals of robot configurations for serial robot mechanisms. These include learning about configuration space (C-space), degrees of freedom, and implicit/explicit representations of configurations. In the second part, robot kinematics, students will learn to solve the forward kinematics using the product-of-exponentials formula. This is followed by learning about velocity kinematics and statics relating joint velocities and forces/torques to end-effector twists and wrenches as well as inverse kinematics. The students' understanding of the afore mentioned topics will be solidified by writing robotics software using a free state-of-the-art cross-platform robot simulator.

Code	503579-3
Course Name	Selected Topics in Signal Processing
Credit Hours	3
Prerequisite	503474-3
Course Description	This course covers emerging and advanced topics in signal processing. The contents will vary depending on the topic.

12.Faculty

Faculty Name	Highest Degree Earned- Field and Year	Rank[1]
Sameer Awn Alsharif	PhD in Control & systems, 2017	ASC
Mohammed Omar Baz	PhD in Electronic Engineering, 2015	P
Hesham Al Humyani	PhD in Computer Science & Engineering, 2016.	ASC
Salwa Mohammed Elsaid Abdel Rahman Ismaeil	PhD in Electronics and Electrical Communication Engineering, 2010	ASC
Mohamed Abdelaziz Abdallah	PhD in Parallel Processing, 2004	AST
Entesar Saeed Gemeay	PhD in Wireless Communication, 2010	AST
Ashraf Afifi Mostafa	PhD in Communication Engineering, 2002	P
Fahad alhumyani	PhD in computer Engineering, 2021	AST
Hana Mohammed Jameel Mujlid	PhD in Computer Engineering, 2016	AST
Karim Saadaoui	PhD in Electrical and Electronics Engineering, 2003	AST
Yasser Attia Albagory	PhD in Communication Engineering, 2008	ASC
Mohammed Abd-Elnaby	PhD in Communication Engineering, 2010	P
Faris Almalki	PhD in Communication Engineering, 2018	ASC
Hatem alzaini	PhD in Computer Network, 2010	P
Masoud Mohsen Alajmi	PhD in Electrical and Computer Engineering, 2016	ASC
Ahmed Mohammed Binmahfoudh	PhD in Operations Research, 2017	ASC

Entesar Saeed Gemeay	PhD in Wireless Communication, 2010	AST
Rashed Abdel Hamed	PhD in Communication and networking, 2008	P
Rania Mohammed	PhD in Communication and networking, 2011	ASC
Schahrazad Soltane	PhD in Automatic, 1999	ASC
Shaimaa Elnazer	PhD in image processing, 2018	AST
Chokri Ben Amar	PhD in Computer Engineering, 1994	P
Ibrahim El rube'	PhD in Systems Design Engineering, 2006	ASC
Fahad Alraddady	PhD in Telecommunication Network, 2008	P
Naveed Farhana	M. Tech (DSCE)	ASC
Fawaz Alaseri	PhD in Computer Engineering, 2015	P
Ahmed syed Alghamdi	PhD in Electrical and Computer Engineering, 2013	ASC
Mohsen Khan	MS in Electrical Engineering, 2006	I
Naief Al Etibi	MS in Electrical Engineering, 2011	I
Amrou Rached	MS in Electronics & Communications Engineering, 2010	I
Faisal Al Amri	Bachelor of Computer Engineering, 2014	I

Code: P = Professor ASC = Associate Professor AST = Assistant Professor I = Instructor