University of Technology

الجامعة التكنولوجية

First Cycle – Bachelor's Degree (B.Sc.) –
Network Engineering branch-
Computer Engineering Department.

بكالوريوس - فرع هندسة الشبكات - قسم هندسة الحاسوب.

Table of Contents

1. Overview

This catalogue is about the courses (modules) given by the program of Network Engineering to gain the Bachelor of Science degree. The program delivers (42) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظره عامه

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج الهندسة الكهربائية للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (٤٢) مادة دراسية، على سبيل المثال، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2023-2024

Module 1

Code	Course/Module Title	ECTS	Semester
ELCA111	Electrical circuit analysis	7	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0/2/1/1	93	82
Description			
Electrical circuit analysis is a fundamental part of undergraduate level in computer engineering department. The main objective of this course is to present an electrical dc and ac networks and to be more interesting and easier to understand complex electric networks. This course in circuit analysis is the first introduction to students have to computer engineering. it included several features to help students to feel at practicing environments with the subject. Thoroughly worked examples are given and explained clearly. Also, it encourages students to understanding of solving problems themselves with more confidence by themselves. Some problems are solved in different methods to facilitate an understanding and comparison results of different solving approaches.			

Module 2

Code	Course/Module Title	ECTS	Semester
MATH112	MathematicsI	6	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0/0/0/1	48	102
Description			
The course Mathematics I is oriented to the students of the Computer Engineering Department at the University of Technology - Iraq. It is designed to develop first-year engineering students' problem-solving skills in various topics related to Pre-differential calculus, enabling them to understand the definition of a derivative as a Function using the limit. In addition to getting a good grip on the Rules of differentiation (Constant, Powers of a function, Constant Multiple, Summation of Functions, Product of Two Functions, Quotient of Two Functions), and differentiation methods (Implicit, Logarithmic, and Chain rule). Consequently, they would be able to deal with several Interpretations of the derivative.			

Module 3

Code	Course/Module Title	ECTS	Semester
LOCD113	logic circuits design	7	1
Class (hr/w)	**Lect/Lab./Prac. /Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0/2/1/1	93	82
Description			
This course is the building block for all the Computer Engineering courses where students are exposed to the benefaction of using abstraction to solve real-world problems through using the ICs of logic gates instead of transistors and the use of logic 0 and logic 1 instead of voltage levels. Additionally, students are forced to critically thinking to obtain reliable and optimized designs by applying various design techniques and optimization algorithms to obtain the required logic circuits to implement the given projects. Furthermore, they will acquire the skill of utilizing Boolean Algebra to systematically obtain the required solutions. Since the course will utilize lab kits, software simulations and HDL to verify their design, together with theoretical lectures and assignments, students will acquire solid knowledge about designing combinational logic circuits.			

Module 4

Code	Course/Module Title	ECTS	Semester
ENDA114	Engineering Drawing and Autocad	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0/2/0/0	63	37
Description			
AutoCAD is a computer-aided design and drafting (CADD) software developed by Autodesk. It is widely used by professionals in various industries, including architecture, engineering, construction, manufacturing, and product design, to create precise and detailed drawings, models, and designs. With AutoCAD, users can create both 2D and 3D drawings and models. In the 2D drafting environment, users can draw and manipulate geometric shapes, lines, arcs, and text. They can also add dimensions, annotations, and symbols to accurately represent the design intent. AutoCAD provides a range of tools and commands for editing, modifying, and organizing the elements of a drawing. In the 3D modeling environment, users can create three-dimensional models of objects and structures. They can start with basic shapes or use advanced modeling tools to create complex geometries. AutoCAD offers features like extrusion, lofting, sweeping, and Boolean operations to build and manipulate 3D objects. Users can apply materials, textures, and lighting to enhance the visual representation of their designs.			

Module 5

Code	Course/Module Title	ECTS	Semester
ENLA107	English Language	2	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0/0/0/0	33	17
Description			
In this program, a significant emphasis is placed on the Academic English module, recognizing its critical importance in the field of engineering, including data science engineering. This module is designed to enhance students' English language skills, focusing on technical vocabulary, written communication, and presentation skills, fundamental to both academic success and professional development. Students will learn to articulate complex ideas clearly, write technical reports, research papers, and engage effectively in academic discourse. This extends to understanding and adhering to ethical standards in academic writing. The goal is to empower students to confidently and effectively communicate their ideas, research findings, and innovative solutions in the global arena of information engineering and data science engineering. The skills acquired in this module will provide a solid foundation for future coursework, research, and professional endeavors.			

Module 6

Code	Course/Module Title	ECTS	Semester
WSHE106	Workshops	4	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	0/0/6/0	90	10
Code			
The Introduction to Engineering Workshop is an immersive and dynamic class designed specifically for first-year engineering students. This workshop serves as a comprehensive introduction to the field of engineering, providing participants with a solid foundation of knowledge and skills necessary for success in their academic journey. Throughout the workshop, students will engage in a series of hands-on activities, collaborative projects, and interactive lectures, all tailored to enhance their understanding of engineering principles and foster critical thinking abilities. The workshop aims to cultivate a deep appreciation for the multidisciplinary nature of engineering and the role it plays in addressing real-world challenges.			

Module 7

Code	Course/Module Title	ECTS	Semester
PRSP121	Problem Solving and Programming	7	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
4	0/2/1/0	108	67
Description			
The Problem Solving and Programming module with a focus on C++ is designed to equip students with essential skills and techniques to solve complex problems and develop efficient programs using the C++ programming language. The module aims to cultivate a problem-solving mindset, logical thinking, and algorithmic reasoning within the context of C++ programming. Students will learn how to break down complex problems into smaller, manageable components, analyze requirements, and design effective solutions using C++. They will explore fundamental programming concepts specific to C++, such as data types, variables, control structures, functions, and object-oriented principles. Additionally, students will gain proficiency in utilizing the standard library of C++, including its rich collection of data structures and algorithms.			

Module 8

Code	Course/Module Title	ECTS	Semester
MATH122	Mathematics II	5	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0/0/0/1	48	77
Description			
The course Mathematics II is oriented to the students of the Computer Engineering Department at the University of Technology - Iraq. It is designed to develop first-year engineering students' problem-solving skills in various topics related Integration of functions. Furthermore, to understand the Integration of a function and its relation to the derivative. In addition, to enable the student to conveniently use integration formulas in cohorts with various Integration Techniques (Integration by Substitution, Integration by Parts, Integrals Involving Trigonometric Functions, Integration by Trigonometric Substitution, Integration of Rational Functions by Partial Fractions, Integrals Involving Quadratics, Integrals Involving Roots, Definite Integral) to evaluate complex integrals. Consequently, they would be able to deal with several applications of definite Integrals.			

Module 9

Code	Course/Module Title	ECTS	Semester
PECD123	Physics and Electronic Circuits Design	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0/2/1/1	93	57
Description			
Electronic circuits are a fundamental part of undergraduate level in computer engineering department. Physics and electronic circuit design course gives a balanced treatment of semiconductor device physics and electronic circuit analysis is described. The course topics are semiconductor physics, diodes bipolar transistors (BJTs), and field effect transistors (FETs). The course is a prerequisite for upper-level electronics, digital electronics, semiconductor physics, semiconductor circuit layout, sensor instrumentation, and microprocessors. A basic understanding of electronic circuit design is important to become a proficient electrical engineer. In many real-life engineering projects, it is often necessary to communicate with other engineering teams having different areas of expertise. Therefore, a basic understanding of electronic circuits will allow to improve the overall project performance from the electronic engineer point view.			

Module 10

Code	Course/Module Title	ECTS	Semester
DISD124	Digital Systems Design	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0/2/1/1	93	57
Description			
This course is the following course of the Logic Circuits Design course. Therefore, it carries the same merits as the previous course, and it is essential for the Computer Architecture, Microprocessor and Digital Communication courses. However, regarding the design of combinational logic circuits, students will be exposed to the use of more complicated ICs like decoders and multiplexers in their designs. Additionally, it is the first course where students will study state machines where they learn how to analyze, and design clocked sequential logic circuits. Hence, they will utilize flip-flops, shift registers and counters to design these circuits. Furthermore, all the course materials will be enforced through projects, software simulations and regular assignments.			

Module 11

Code	Course/Module Title	ECTS	Semester
DEHR105	DEMOCRACY	2	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	0/0/0/0	33	17
Description			
حقوق الإنسان والديمقراطية هما مفهومان أساسيان في السياسة والقانون والفلسفة، وهما يتعلقان بضمان حريات وحقوق الأفراد ومشاركتهم في صنع القرار السياسي. حقوق الإنسان هي مجموعة من الحقوق والحريات التي يحظى بها كل إنسان بمجرد وجوده ككيان بشري،ايا كانت جنسيته،عرقه،لون بشرته،دينه، معتقده أو أي خصائص أخرى. وتشمل حقوق الإنسان حقوقًا أساسية مثل حق الحياة،الحرية،المساواة أمام القانون، وحقوقًا اجتماعية واقتصادية وثقافية مثل حقوق التعليم،الرعاية الصحية والعمل اللائق. تهدف حقوق الإنسان إلى حماية الكرامة البشرية وضمان حياة كريمة وحرية تنموية للجميع. أما الديمقراطية، فهي نظام سياسي يستند إلى مبادئ المشاركة والحكم الشعبي. في الديمقراطية، يتمكن الأفراد من المشاركة في صنع القرار السياسي من خلال الانتخابات والتصويت وحرية التعبير وحق التجمع السلمي. يكون لدى الناس حق الاختيار والتأثير على القوانين والسياسات التي تحكمهم.تهدف الديمقراطية إلى تحقيق المشاركة الشعبية والشفافية والمساءلة وتحقيق العدالة الاجتماعية.			

Module 12

Code	Course/Module Title	ECTS	Semester
WSHE106	Workshops	4	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
0	0/0/6/0	90	10
Code			
The Introduction to Engineering Workshop is an immersive and dynamic class designed specifically for first-year engineering students. This workshop serves as a comprehensive introduction to the field of engineering, providing participants with a solid foundation of knowledge and skills necessary for success in their academic journey. Throughout the workshop, students will engage in a series of hands-on activities, collaborative projects, and interactive lectures, all tailored to enhance their understanding of engineering principles and foster critical thinking abilities. The workshop aims to cultivate a deep appreciation for the multidisciplinary nature of engineering and the role it plays in addressing real-world challenges.			

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