

**University of Information
Technology and Communications**
جامعة تكنولوجيا المعلومات والاتصالات



*Seventh Cycle – Bachelor's Degree (B.Sc.) – Mobile
Communications and Computing Engineering*
بكالوريوس - هندسة الاتصالات والحوسبة المتنقلة



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1. Overview

This catalogue is about the courses (modules) given by the program of Mobile Communications and Computing Engineering to gain the Bachelor of Science degree. The program delivers (48) Modules with (7500) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

نظرة عامة

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة الاتصالات والحوسبة المتنقلة للحصول على درجة بكالوريوس العلوم. يقدم البرنامج (48) مادة دراسية، على سبيل المثال، مع (7500) إجمالي ساعات حمل الطالب و 240 إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2024-2025

Module 1

Code	Course/Module Title	ECTS	Semester
ITC200011	Mathematics I	6.00	1
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	48	6
Description			
Qualifying, training and teaching the student on the properties of matrices and their mathematical applications in the field of physics and engineering and benefiting from them in solving linear systems, as well as studying the types of functions of one variable and how to find ends and continuities, and then studying the most important basics of engineering by explaining derivations, integrations and their applications. The second part of this curriculum, which is the important part in scientific and engineering life, is solving differential equations of the first and second degree, linking them with the rest of the other topics, and explaining several ways to solve this type of differential equations. Mathematics lectures for the first course are given in 3 theoretical hours each week, interspersed with many examples, issues and discussions to clarify the vocabulary of the mathematics curriculum in more detail.			

Module 2

Code	Course/Module Title	ECTS	Semester
ITC000021	Computer I	3.00	1
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	47	1
Description			
<p>This module explores the principles, concepts, and technologies associated with computer networks. It provides students with a comprehensive understanding of how computer networks function, how they are designed, and how they can be effectively utilized in various applications. Students should be familiar with commonly used notions and protocols in computer networks and be able to design and implement a simple network. The module focus on the main steps inside any network system which include: The design phase, the routing phase, and the services phase. The used practical side of this module will be a good knowledge to students for simulating a real scenario problem with their solutions. After completing this module, students should have gained a thorough understanding of various aspects related to computer networks.</p>			

Module 3

Code	Course/Module Title	ECTS	Semester
ITC200031	Electrical Circuits I	6.00	1
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	4
Description			
<p>This course on Electrical Circuits Analysis introduces students to the principles and techniques required to analyze and understand DC circuits. Through a combination of theoretical instruction and practical laboratory sessions, students will develop a strong foundation in circuit analysis. The course covers a range of topics, including fundamental concepts such as voltage, current, and resistance. Students will explore circuit analysis techniques such as Ohm's law, power and energy calculations, and the classification of circuit components. They will gain hands-on experience in analyzing series, parallel, and series-parallel circuits, applying voltage and current divider rules, and understanding power distribution in these circuits. Additionally, students will study Kirchhoff's laws, including Kirchhoff's current law (KCL) and Kirchhoff's voltage law (KVL), to analyze complex circuits. They will learn practical methods for circuit analysis, such as node-voltage analysis, mesh analysis, and the application of superposition, Thevenin's theorem, and Norton's theorem. The course emphasizes the integration of theory with practical skills, as students will engage in laboratory experiments to validate circuit analysis techniques. Through these hands-on experiences, students will develop problem-solving abilities, critical thinking skills, and a deeper understanding of DC electrical circuits.</p>			

Module 4

Code	Course/Module Title	ECTS	Semester
ITC20040	Engineering Drawing	3.00	1
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
-	3	48	1
Description			
<p>Engineering drawing is a general requirement for all engineering disciplines, as it is the means used to translate ideas from the world of perception and imagination to the world of tangible reality and to extract shapes and various components from reality to paper, which is the language of engineers, and aims to provide the student with the basic skills of engineering drawing and enable the student to read and understand engineering drawings Two- and three-dimensional drawing, isometric shapes, and projections. The ability to express ideas in an appropriate way of drawing and the ability to use some techniques in drawing. An engineering drawing is a subcategory of technical drawings that show the shape, structure, dimensions, tolerances, accuracy and other requirements needed to manufacture a product or part. An engineering drawing helps to define the requirements of an engineering part and conveys the design concept. The drawings can include an item or system's geometry, dimensions, tolerances, functions, finish, hardware and material.</p>			

Module 5

Code	Course/Module Title	ECTS	Semester
ITC22005	Engineering Ethics	5.00	1
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	63	4
Description			
<p>Engineering Ethics is a course that explores the ethical principles and considerations specific to the field of engineering. It emphasizes the importance of ethical decision-making, professional responsibility, and the social impact of engineering. Through the study of real-world case studies and ethical frameworks, students develop the knowledge and skills necessary to identify and address ethical challenges in engineering practice. Topics covered include the analysis of professional codes of ethics, ethical dilemmas in engineering, social and environmental implications of engineering decisions, and the global context of engineering ethics. By the end of the course, students will have a comprehensive understanding of ethical responsibilities in engineering and the ability to navigate complex ethical issues in their profession.</p>			

Module 6

Code	Course/Module Title	ECTS	Semester
ITC220010	Electronics Physics	5.00	1
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	48	5
Description			
<p>The course "Electronic Physics" offers students a comprehensive understanding of the fundamental principles and concepts underlying electronic devices and circuits. Through this course, students will delve into the physics of semiconductors, diodes, transistors, and other electronic components, and explore their diverse applications across various engineering domains. By combining theoretical knowledge with practical applications, students will develop the skills necessary to analyze, design, and troubleshoot electronic circuits. Moreover, this course serves as a crucial foundation for future studies in fields such as electrical engineering, electronics, and related disciplines. Through engaging lectures and hands-on activities, students will gain a deep understanding of electronic physics and its practical implications.</p>			

Module 7

Code	Course/Module Title	ECTS	Semester
ITC000031	English Language I	2.00	1
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	32	1
Description			
<p>In this course, the students will embark on a linguistic adventure, starting with a general introduction to the fundamentals of English grammar. Topics such as verb Be, possessive adjectives, and the usage of the possessive 's will be covered. Students then will delve into the practical aspects of language, including the present simple tense, forming questions and negatives, they will learn how to express habits, routines, and frequency using adverbs of frequency. Another essential aspect of communication is describing places, so they will explore how to use "there is/are" and demonstratives. Next, they will focus on personal abilities and possibilities using "can-can't," adverbs, and the past tense forms "was-were-could." Furthermore, students will be able to master the past simple tense, including regular and irregular verbs, and using appropriate time expressions. Additionally, they will explore prepositions ("in," "at," "on") and discuss plans and intentions using the <u>going to</u> future. Throughout the course, there will be ample opportunities for listening and speaking practice to improve the students' oral skills. they will also focus on reading and writing, with an emphasis on tense usage, enabling them to communicate effectively in different contexts.</p>			

Module 8

Code	Course/Module Title	ECTS	Semester
ITC2·0012	Mathematics II	5.00	2
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	48	5
Description			
<p>This part is considered anchored and complementary to the subject of calculus that the student studied in the first course, relying entirely on theories, facts, and methods of integration that the student studied. It is also assumed that the student is familiar with it well before studying this course, as this part is considered a basis for advanced courses in the link between the initial courses And advanced courses. The difficulty that the student faces in absorbing this course has been taken into account, as it includes the largest possible number of solved examples and applied aspects. The units of this course have been mentioned above under the subject of course objectives and learning and teaching strategy.</p>			

Module 9

Code	Course/Module Title	ECTS	Semester
ITC2·0020	Digital Systems Design	6.00	2
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	4
Description			
<p>Digital system design is a system in electrical and computer engineering that uses simple number values to produce input and output operations. As a digital design engineer, you may assist in developing cell phones, computers, and related personal electronic devices. This course presents an introduction to logic design and the basic building used in digital systems, number systems, combinational logic, logic gates, minimization technique, arithmetic circuits, Boolean Algebra and logic simplification, Digital Logic Families. At the end of this course the student will be able to perform arithmetic operations in number systems. manipulate Boolean algebra structures. simplify the Boolean expression using Karauagh Map, implement the Boolean Functions using logic gates, analyze, design, verified, and tested various combinational logic circuits.</p>			

Module 10

Code	Course/Module Title	ECTS	Semester
ITC2·0032	Electrical Circuits II	6.00	2
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	4
Description			
<p>The AC Electrical Circuits course provides understanding of alternating current (AC) circuits and their analysis techniques. Students will explore the fundamental concepts and principles underlying AC circuits, starting with an introduction to sinusoidal alternating waveforms. They will learn how to calculate average and RMS values and gain insight into different combinations of AC circuits. The course covers key components such as inductors, capacitors, and resistors, examining their behavior in series and parallel circuits. Students will gain knowledge in analyzing the effects of inductors and capacitors in various circuit configurations. Students will learn how to calculate and interpret these power quantities, including active power, reactive power, apparent power, and power factor highlighting their significance in practical applications. Students will investigate the phenomenon of resonance in series AC circuits and its practical implications. Throughout the course, laboratory experiments will provide hands-on experience, allowing students to apply theoretical concepts and develop practical skills. By the end of the course, students will be equipped with the knowledge and skills necessary to analyze and design AC electrical circuits, preparing them for further studies or careers in electrical engineering and related fields.</p>			

Module 11

Code	Course/Module Title	ECTS	Semester
ITC000041	Arabic Language 1	2.00	2
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	32	1
Description			
<p>لتعرف على أساسيات النحو العربي . *إكساب الطالب المهارة في الكتابة العربية من تصحيح الأخطاء الإملائية، ومعرفة القواعد النحوية والإملائية التي تصون اللسان عن الخطأ، ويفهم الطالب مدى أهمية اللغة العربية وقواعدها في الدراسات الإنسانية وفي كتابة البحوث والتقارير *التعريف بالأدب العربي وفنونه وعصوره القديمة.</p>			

Module 12

Code	Course/Module Title	ECTS	Semester
ITC2200٢٠	Mathematic for Computing	3.00	2
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	2
Description			
<p>Computational mathematics is an area of mathematics devoted to the interaction between mathematics and computer computation. A large part of computational mathematics consists roughly of using mathematics for allowing and improving computer computation in areas of science and engineering where mathematics are useful. This involves in particular algorithm design, computational complexity, numerical methods and computer algebra. Computational mathematics refers also to the use of computers for mathematics itself. This includes mathematical experimentation for establishing conjectures (particularly in number theory), the use of computers for proving theorems, and the design and use of proof assistants. Mathematics and Computing include the analysis and the in-depth study and understanding of abstract concepts, like numbers and patterns. It is designed to provide students with a theoretical background and practice training in computer science and mathematical finance of study. Mathematics is the study and application of languages for describing various universal modelling and beyond, whereas computing brings in solutions for the problems of mathematical approach efficiently. Mathematics and computing, therefore, go hand in hand and are connected in understanding both subjects related. Several universities provide the study of mathematics and computing with the rise in demand for the subject and the opportunities one receives in studying the subject.</p>			

Module 13

Code	Course/Module Title	ECTS	Semester
ITC000000	Democracy and Human Rights	2.00	2
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	32	1
Description			
<p>تعد حقوق الانسان والديمقراطية من الموضوعات ذات الاولوية والاهمية على الصعيدين المحلي والدولي ، فقد عقدت بشأنها العديد من المؤتمرات والندوات ، ووقيعت لأجله عشرات المعااهدات ، كما شغل هذا الموضوع ذهن رجال الفكر والقانون والسياسة ، ومايزالون منشغلين به ، فقد ابرت اقلامهم في سبيل توضيحه او المطالبة به . ونظرا لاهميته لمختلف فئات المجتمع الانساني عامة، فقد اصبح اليوم من المقررات الدراسية الاساسية في المؤسسات التعليمية لكثير من بلدان العالم ومنها العراق، ولعل اللجوء الى تدريس مثل هكذا مواجهات والتعرف بمقاهيمها وتعريف انواعها وخصائصها وتوضيح تاريخ تطورها والاطلاع على المواقف والاعلانات والاتفاقيات الدولية المتعلقة بهذا الشأن ، ومن ثم محاولة تحليل مضمونها وتبين حدودها وعرض موضعها القانوني، اصبح اليوم من الامور الملحقة على عاتق اغلب الكليات الانسانية والعلمية، وذلك من اجل تعميق وترسيخ فكرة حقوق الانسان في فكر ووجدان الطلبة، وتعزيز الوعي لديهم بأن هذه المباديء هي عالمية، ولا تختصر بأقليم معين، جاء التأكيد عليها في الكثير من الوثائق والاتفاقيات ، فضلا عن وجوب الدفاع عنها من المكاسب الحضارية للمجتمع الانساني . ومع ان المناهج الدراسية في العديد من الكليات لاتخلو من الاشارة الى الكثير من موضوعات حقوق الانسان ومقاهيم الديمقراطية والحربيات العامة، الا ان المعنيين بشؤون التعليم أدركوا اهمية تخصيص مادة مستقلة بذاتها لتدريسيها لطلبة الدراسات الاولية في المؤسسات التعليمية كافة، وذلك بعد التغيرات الجذرية التي حصلت بالعراق بعد عام ٢٠٠٣ .</p>			

Module 14

Code	Course/Module Title	ECTS	Semester
ITC200050	Computer Programming	6.00	2
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	4
Description			
<p>This course provides students with advanced programming concepts and applications, including learning functions, mathematical equations, search and order algorithms, containers, structures, pointers, file manipulation, and file input and output operations. The course also includes an explanation of the most important principles of programming, namely the principle of concurrency, multithreading, and exception handling. At the end of the course, students will have the ability to build complete programs correctly with the optimal use of the capabilities and tools provided by the language, the ability to follow up the logical implementation of the program and to identify and correct logical and syntax errors.</p>			

Module 15

Code	Course/Module Title	ECTS	Semester
ITC200061	Engineering Mathematics I	5.00	3
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	48	5
Description			
<p>This course introduces students to trigonometric series of Fourier, which is an expansion of a periodic function into a sum of trigonometric functions. Many problems involving the function become easier to analyze because trigonometric functions are well understood. This course also covers the common forms of the Fourier series (sine and cosine, exponential as well as amplitude phase forms. The Fourier transform, which is a transform that converts a function into a form that describes the frequencies present in the original function is also covered in this course. The integral transform that converts a function of a real variable in the time domain to a function of a complex variable in the complex frequency domain (also known as s-domain or s-plane). The many applications in science and engineering of this transform are also explained in this course. Hence a powerful tool for solving differential equations is gained.</p>			

Module 16

Code	Course/Module Title	ECTS	Semester
ITC220101	Computer Networks I	5.00	3
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	4
Description			
<p>This module explores the principles, concepts, and technologies associated with computer networks. It provides students with a comprehensive understanding of how computer networks function, how they are designed, and how they can be effectively utilized in various applications. Students should be familiar with commonly used notions and protocols in computer networks and be able to design and implement a simple network. The module focus on the main steps inside any network system which include: The design phase, the routing phase, and the services phase. The used practical side of this module will be a good knowledge to students for simulating a real scenario problems with their solutions. After completing this module, students should have gained a thorough understanding of various aspects related to computer networks.</p>			

Module 17

Code	Course/Module Title	ECTS	Semester
ITC200070	Electronics	6.00	3
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	4
Description			
<p>This course focuses primarily on the study of diodes. This course provides students with a comprehensive understanding of diode principles and their applications in electronic circuits. Throughout the class, students delve into the fundamental concepts of diode operation. They learn various diode models and circuit analysis techniques, enabling them to analyze and design basic diode circuits such as rectifiers, clippers, and clampers. Additionally, students explore more advanced topics. The course aims to develop students' theoretical knowledge and practical skills in working with diodes. Through hands-on laboratory sessions, students gain practical experience in building and troubleshooting diode circuits. They also learn to apply critical thinking and problem-solving skills to evaluate diode-based circuits' performance and limitations. By the end of the course, students are equipped with the necessary knowledge and skills to analyze, design, and troubleshoot diode circuits, preparing them for further studies or careers in the field of communications engineering.</p>			

Module 18

Code	Course/Module Title	ECTS	Semester
ITC220050	Electromagnetic Fields	4.00	3
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	4
Description			
<p>This course presents a study of electromagnetic fields and their relationship to problem solving in engineering. The course of study begins with the development of an understanding of the basics, moves to integration of the basic knowledge, and proceeds to the ability to use that knowledge to solve electromagnetic field problems. This course present information to deal with different coordinate systems for solving electromagnetic fields problems. Topics covered include: vector analysis, Coulomb's law and electric field, Gauss' law and divergence, energy and potential, Poisson's and Laplace's equation, study magnetic field, magnetic flux, magnetic intensity and Maxwell's Equations.</p>			

Module 19

Code	Course/Module Title	ECTS	Semester
ITC200080	Statistics and Probability	3.00	3
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	48	1
Description			
<p>Students will learn the two types of inferential and descriptive statistics, location and variance measures of random experiment data, and some of the most important descriptive schemes for that data, then teach them group theory in preparation for introducing them to probability theory, calculating probabilities using the Venn diagram method, and arithmetic methods for probabilities. Then they learn random variables of both types, intermittent and continuous, some statistical distributions, calculating statistical measures and probabilities according to probability distributions. Then we conclude the course by teaching them the coefficient and regression or correlation of data.</p>			

Module 20

Code	Course/Module Title	ECTS	Semester
ITC220040	Web Design	5.00	3
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	3
Description			
<p>This course introduces students to basic web design using HTML (Hypertext Markup Language) and CSS (Cascading Style Sheets). Throughout the course students are introduced to planning and designing effective web pages; implementing web pages by writing HTML and CSS code; enhancing web pages with the use of page layout techniques, text formatting, graphics, images, and multimedia; and producing a functional, multi-page website. Furthermore, the course introduced to deal with dynamic web pages; implementing web pages by writing JS code with involvement of practical sessions, assignments, and real-time projects which help the students in understanding the concepts better. The course covers the JS language fundamental. Students are trained in building actual web applications. This will help them in their future professions. The course also covers PHP & MySQL database, for developing interactive Web sites, build interactive, data-driven websites with the potent combination of open source technologies and web standards.</p>			

Module 21

Code	Course/Module Title	ECTS	Semester
ITC000010	AL-Baath Regime Crimes in Iraq Description	٢.٠٠	3
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	٣٢	1
Description			
<p>تهدف هذه المادة إلى تسلیط الضوء على الجرائم والانتهاکات الجسيمة لحقوق الإنسان التي ارتكبها نظام حزب البعث في العراق خلال فترة حكمه (١٩٦٨-٢٠٠٣). تشمل الدراسة التحليلية السياسات القمعية، حملات التصفية العرقية والطائفية، وممارسات الإبادة الجماعية، مثل عمليات الأنفال، وجرائم حلبجة، وقمع الانتفاضات الشعبية، وتهجير الأقليات. كما تركز المادة على الجوانب القانونية الإنسانية لتلك الجرائم، وتعنى بتوثيق الشهادات والوثائق الرسمية، في سياق العدالة الانتقالية والمحاسبة، من أجل بناء ذاكرة وطنية تضمن عدم تكرار الانتهاکات مستقبلاً</p>			

Module 22

Code	Course/Module Title	ECTS	Semester
ITC000042	Arabic Language II	2.00	4
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	32	1
Description			
<p>تهدف هذه المادة إلى تطوير مهارات الطالب اللغوية والتحريرية من خلال دراسة موضوعات متقدمة في النحو والصرف، وتحليل النصوص الأدبية الحديثة والقديمة، والتوسيع في مهارات الكتابة الأكاديمية والبحثية. كما ترتكز المادة على تقنيات التعبير الوظيفي والبلاغي، واستخدام اللغة العربية في السياقات المهنية والعلمية، بالإضافة إلى التدريب على كتابة المقالات، والتقارير، والخطابات الرسمية بأسلوب سليم ودقيق</p>			

Module 23

Code	Course/Module Title	ECTS	Semester
ITC200062	Engineering Mathematics II	6.00	4
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	48	6
Description			
<p>This course introduces students to z-transform in mathematics and signal processing, the Z-transform converts a discrete-time signal, which is a sequence of real or complex numbers, into a complex frequency-domain (z-domain or z-plane) representation. Bilateral Z-transform, Unilateral Z-transform and Inverse Z-transform are introduced in this course. The rest of course covers the differential equations and study how they relate one or more unknown physical quantity and their rates of change. Such relations are common; therefore, differential equations play a prominent role in many disciplines including engineering, physics, economics, and biology. The study of differential equations consists mainly of the study of their solutions (the set of functions that satisfy each equation), and of the properties of their solutions.</p>			

Module 24

Code	Course/Module Title	ECTS	Semester
ITC200090	Digital Electronics	6.00	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	7	78	4
Description			
<p>This course provides students with a comprehensive understanding of transistors and their circuits. This course explores the principles, operation, and applications of transistors in the digital domain. Students delve into the intricate workings of transistors, examining their characteristics, modes of operation, and the analysis of transistor-based circuits. Through a combination of theoretical knowledge and practical implementation, students learn to design and analyze various transistor circuits, including amplifiers, switches, logic gates, and oscillators. The course also covers topics such as digital logic families, operational amplifiers, and microcontroller interfacing. By the end of the course, students are equipped with the skills to comprehend and construct complex digital circuits utilizing transistors. They develop the ability to evaluate circuit performance, understand different logic families, and explore practical applications of digital electronics. This class serves as a foundation for students pursuing careers in communications engineering.</p>			

Module 25

Code	Course/Module Title	ECTS	Semester
ITC220070	Communication Fundamental	7.00	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	6
Description			
<p>This course provides the students the essential knowledge related to understand the principles of communications systems and the function of each element. It learns the types of signals which are deal by systems. It is providing the essential knowledge related to understand the Analog Modulation types, amplitude modulation (AM), angle modulation, generation and modulation, this course covers details of (FM& AM) transmitter and Receiver designs and how to calculate the important factors such as transmit power and operating bandwidth and represent the signals in time domain and frequency domain. The course learns the students how to build the Modulators and De-modulators for each applications in communication systems. Course offered the how to design the multiplexing and de-multiplexing for FDM, TDM, WDM. Moreover, provide essential knowledge related Noise and how to eliminate it.</p>			

Module 26

Code	Course/Module Title	ECTS	Semester
ITC200100	Linear Algebra	4.00	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	48	3
Description			
<p>Linear algebra courses have two basic parts. The first part is matrix arithmetic, a fairly simple, computational set of arithmetic rules. The second part of the course involves vector spaces. This will be most students' first exposure to axiomatic mathematics. In this section of the course, students will see material presented in the higher-level mathematical model of definition-theorem-proof. Students will usually find the vector space material more abstract and thus more difficult. The purpose of this course is to enable you to employ the concepts and techniques of linear mathematics and to provide a stepping stone to higher-level mathematics classes. S-2 MATH 2085 Linear Algebra Syllabus It is assumed you have completed a second-semester calculus course and are familiar with differentiation and integration of real valued functions of a single variable.</p>			

Module 27

Code	Course/Module Title	ECTS	Semester
ITC000022	Computer II	3.00	4
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	47	1
Description			
<p>This module explores the principles, concepts, and technologies associated with computer networks. It provides students with a comprehensive understanding of how computer networks function, how they are designed, and how they can be effectively utilized in various applications. Students should be familiar with commonly used notions and protocols in computer networks and be able to design and implement a simple network. The module focus on the main steps inside any network system which include: The design phase, the routing phase, and the services phase. The used practical side of this module will be a good knowledge to students for simulating a real scenario problem with their solutions. After completing this module, students should have gained a thorough understanding of various aspects related to computer networks.</p>			

Module 28

Code	Course/Module Title	ECTS	Semester
ITC000032	English Language II	2.00	4
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	32	1
Description			
<p>This course builds upon the foundations acquired in English Language I, aiming to enhance students' grammar, vocabulary, and communication skills. It covers more advanced grammatical structures such as the present continuous, comparative and superlative adjectives, countable and uncountable nouns, and modal verbs (must, have to, should). Students will develop their ability to describe actions in progress, make comparisons, express necessity, and give advice. The course emphasizes integrated language skills—reading, writing, listening, and speaking—with practical tasks designed to improve fluency and accuracy. Students will also engage in structured writing, including paragraphs and short essays, and participate in real-life communication scenarios to build confidence and proficiency.</p>			

Module 29

Code	Course/Module Title	ECTS	Semester
ITC220090	Antennas and Wave Propagation	7.00	5
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	6
Description			
<p>This course aims to provide students with capabilities to be able to design and implement antenna systems and to understand the effect of the frequency over the implemented and designed hardware. Moreover, choosing the matching hardware that is regarded optimum in term of power losses, reflected and transmitted is the core of this course, propagation waves over the space will be study in the course. This course provide the principles of design different types of antennas and array antenna. The direction of arrival techniques are explained based on its standard equations of different techniques. Finally, this course Prepares the student to work in the field of communications with high skill.</p>			

Module 30

Code	Course/Module Title	ECTS	Semester
ITC220110	Digital Communications	6.00	5
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	4
Description			
<p>Digital communication becomes the core for almost all the fields in the new smart world. The course aims to makes the student aware of the essential parts of the digital communication system. First, presents the importance of the digital systems, then gives the features with full analysis and mathematical representation for each stage in the digital communication system block diagram. Students are able to understand the formatting or the analog to digital conversion in the well-known steps, sampling, quantizing and encoding. Then, presents the main two types of modulation in the two frequency regions. Starting with the base-band modulation, presents the PAM, PPM and PWM with full knowledge of modulator and demodulator as well as advantages and disadvantages. Secondly, the digital modulation techniques are presented into four main essential types, BASK, BFSK, BPSK and QAM. Finally, student are learned how to use multiplexing techniques, TDM, FDM, CDM, PDM and SDM to make efficient utilization for the system resources represented by bandwidth and time of access.</p>			

Module 31

Code	Course/Module Title	ECTS	Semester
ITC200121	Space Science I	4.00	5
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	48	3
Description			
<p>This course introduces the principles and applications of space science in the context of communication systems. Students will explore topics such as the laws of motion, gravitation, and celestial mechanics to understand the dynamics of space objects. They will examine satellite systems, including communication architectures and orbital mechanics, and learn how to analyze link budgets for effective communication. The course covers remote sensing and Earth observation from space, including data acquisition and processing techniques. Students will gain insights into space weather phenomena and their impact on communication systems, as well as mitigation strategies. Additionally, the principles and applications of global navigation satellite systems (GNSS), with a focus on GPS, will be explored. Assessment methods include quizzes, assignments, and a final examination. Prerequisites: Foundational courses in mathematics, physics, and basic engineering principles.</p>			

Module 32

Code	Course/Module Title	ECTS	Semester
ITC200110	Numerical Analysis	4.00	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	48	3
Description			
<p>is the study of algorithms that use numerical approximation for the problems of mathematical analysis (as distinguished from discrete mathematics). It is the study of numerical methods that attempt at finding approximate solutions of problems rather than the exact ones. Numerical analysis finds application in all fields of engineering. Current growth in computing power has enabled the use of more complex numerical analysis, providing detailed and realistic mathematical models in science and engineering. Numerical analysis is a branch of mathematics that solves continuous problems using numeric approximation. It involves designing methods that give approximate but accurate numeric solutions, which is useful in cases where the exact solution is impossible or prohibitively expensive to calculate. Numerical analysis also involves characterizing the convergence, accuracy, stability, and computational complexity of these methods. Matlab is widely used for applied numerical analysis in engineering. It provides a range of numerical methods for: Interpolation, extrapolation, and regression, Differentiation and integration, linear systems of equations, Eigenvalues and singular values, Ordinary differential equations (ODEs), Partial differential equations (PDEs). Perform fast Fourier transforms, quadrature, optimization, and linear programming with the MATLAB. Create and implement new numerical methods using the built-in support for vector and matrix operations in the MATLAB language. Series expansions: from calculus to computation. Integrals as sums and derivatives as differences. Interpolation, splines, and a second look at numerical calculus. Numerical methods for ODE, initial-value problems. Root finding, Newton's method, and boundary-value problems.</p>			

Module 33

Code	Course/Module Title	ECTS	Semester
ITC220102	Computer Networks II	5.00	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	4
Description			
<p>This module explores the concepts for computer network protocols. It provides students with a comprehensive understanding of how computer networks protocols function, how they are designed, and how they can be effectively utilized in various applications. Students should be able to understand Common Network Protocols including RIP, OSPF, HTTP, DNS, FTP, and others. They should understand the purpose, and functionality of these protocols. Also the students will take a brief look on network security issues. By mastering these concepts, students completing a network protocols module will have a deep understanding of the principles, functionality, and operation of network protocols. They will be equipped to analyze, evaluate, design, and troubleshoot protocols, ensuring efficient and reliable communication in computer networks, also the functionality of the WWW will be cleared.</p>			

Module 34

Code	Course/Module Title	ECTS	Semester
ITC220120	Project Management	4.00	5
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	2
Description			
<p>Project management is the systematic approach of planning, organizing, and controlling resources to achieve specific goals within defined constraints. It involves the careful coordination of tasks, timelines, budgets, and team members to successfully complete projects. The project manager plays a pivotal role in overseeing the entire project lifecycle, from initiation to closure. They ensure that project objectives are clearly defined, stakeholders are engaged, risks are identified and mitigated, and progress is monitored. Effective project management involves communication, collaboration, problem-solving, and adaptability. By utilizing proven methodologies, tools, and techniques, project management enhances efficiency, minimizes risks, and maximizes the likelihood of project success.</p>			

Module 35

Code	Course/Module Title	ECTS	Semester
ITC220140	Digital Signal Processing	4.00	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	4
Description			
<p>The course covers theory and methods for digital signal processing including basic principles governing the analysis and design of discrete-time systems as signal processing devices. Review of discrete-time linear, time-invariant systems, Fourier transforms and z-transforms. Topics include sampling, impulse response, frequency response, finite and infinite impulse response systems, linear phase systems, digital filter design and implementation, discrete-time Fourier transforms, discrete Fourier transform, and the fast Fourier transform algorithms. also covers how to manipulate data via digital filters and how to convert analog signals into digital. The solid theoretical bases are complemented by applied examples in Matlab. Design and lab exercises are also significant components of the course.</p>			

Module 36

Code	Course/Module Title	ECTS	Semester
ITC220150	Information Theory and Coding	6.00	6
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	5
Description			
<p>In this course the student will be able to define the concept of the entropy and its relation to the information. To transmit the data from the transmitter to the receiver via the channel, this course presents the philosophy of data transmission and the modelling of each side of the system as a random variable. So, to make this model of data transmission, the course presents the derivation for different types of entropy the discrete shape (marginal, joint and conditional) and the continuous shape as the differential entropy, us and the concept of mutual information, the student will be able to derive the mathematical model for AWGN, BSC and BEC channel capacity. Then the student will learn how to use channel error correction to achieve this channel capacity by using FEC codes. Coding theory is presented in basic information to encode and decode linear block codes and cyclic codes for single error correction.</p>			

Module 37

Code	Course/Module Title	ECTS	Semester
ITC200122	Space Science II	4.00	6
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	-	48	3
Description			
<p>Space Science II is an advanced course in the 5th semester of the Communications Engineering program. Building on the foundations of Space Science I, this course explores advanced topics in space science and their applications in communication systems. Topics include advanced satellite communication systems, satellite link analysis, space mission design, space-based navigation, space debris management, and emerging technologies in space science. Students will develop skills in optimizing communication performance, mission planning, navigation techniques, and ensuring space sustainability. Assessment methods include assignments, projects, and a final exam. Prerequisites: Completion of Space Science I or equivalent introductory course.</p>			

Module 38

Code	Course/Module Title	ECTS	Semester
ITC220170	Embedded Systems	5.00	6
Class (hr/w)	Lect/Lab./prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	78	3
Description			
<p>This subject explores the design, development, and integration of embedded systems, which are specialized systems designed for specific tasks and integrated within larger devices or systems. The course provides a comprehensive understanding of the principles, architectures, and technologies underlying embedded systems. Students will learn about hardware and software aspects, including microcontrollers, sensors, actuators, and communication protocols. Emphasis is placed on the design process, system modeling, programming, and debugging techniques for embedded systems. Practical projects and hands-on exercises allow students to apply their knowledge to solve real-world problems and gain experience in system integration and optimization. By the end of the subject, students will have acquired the skills necessary to develop and deploy embedded systems in various domains, such as automotive, consumer electronics, and industrial automation.</p>			

Module 39

Code	Course/Module Title	ECTS	Semester
ITC220080	Microprocessors	5.00	6
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	4
Description			
<p>This course introduces microprocessor architecture and microcomputer systems including memory and input/output interfacing. Topics include low-level language programming, bus architecture, I/O systems, memory systems, interrupts, and other related topics. The course deals with advanced concepts in the programming and the interfacing of microprocessors/microcontrollers to the outside world as demonstrated by a variety of application examples. It covers the advanced architecture of modern processors and the many I/O peripherals now commonly found on-board the device. Detailed studies of computer I/O and interrupt techniques as applied to analog-to-digital, digital-to-analog, timers, parallel and serial interfaces are included. Laboratory activities provide the student with experience in developing the hardware and software required to incorporate microprocessors into systems that solve real-world interfacing problems.</p>			

Module 40

Code	Course/Module Title	ECTS	Semester
ITC220201	Mobile Applications Development I	6.00	6
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	5
Description			
<p>This course offers the fundamentals for understanding the principles of mobile application design and development. The Android platform will be used as a basis for teaching programming techniques and design patterns related to the development of standalone applications and mobile portals. Topics covered will include memory management, user interface design, user interface building, input methods, data handling, network techniques, URL loading, and specific features such as GPS and motion sensing. The emphasis of this course is placed on the processes, tools, and frameworks required to develop applications for current and emerging mobile computing devices. Students will work at all stages of the software development life cycle, from inception to implementation and testing.</p>			

Module 41

Code	Course/Module Title	ECTS	Semester
ITC200131	Graduation Project I	4.00	7
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	48	3
Description			
<p>This course is the first phase of a two-part graduation project sequence. It focuses on project planning, problem identification, requirements gathering, and initial design. Students are expected to select a project topic, conduct background research, perform a feasibility study, and define clear objectives and deliverables. Emphasis is placed on applying theoretical knowledge to practical, real-world problems. Students will work individually or in teams under faculty supervision to prepare a detailed project proposal, including system design, methodology, timeline, and resource allocation. By the end of this course, students are expected to submit a comprehensive project report and deliver a presentation outlining their proposed solution.</p>			

Module 42

Code	Course/Module Title	ECTS	Semester
ITC220202	Mobile Applications Development II	5.00	7
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	4
Description			
<p>This course is a continuation of Mobile Applications Development I and delves deeper into advanced mobile programming techniques and development strategies. Building on the Android platform, students will explore more complex topics such as multithreading, background services, advanced UI/UX design patterns (including Material Design), integration with cloud services (such as Firebase), local and remote database connectivity, push notifications, sensor fusion, and performance optimization. Emphasis will be placed on real-world application development, scalability, security, and deployment to app stores. Students will work on comprehensive projects that require applying the full software development lifecycle, including version control, collaborative development, and automated testing.</p>			

Module 43

Code	Course/Module Title	ECTS	Semester
ITC220210	Mobile Communications	6.00	7
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	5
Description			
<p>Communication is one of the integral parts of science that focus for exchanging information among parties at locations physically apart. After its discovery, telephones have replaced the telegrams and letters. Similarly, the term 'mobile' has completely revolutionized the communication by opening up innovative applications that are limited to one's imagination. Today, mobile communication has become the backbone of society. When a user makes a call request by using channel allocation strategies their requests are fulfilled. Channel Allocation Strategies are designed in such a way that there is efficient use of frequencies, time slots and bandwidth. These are Fixed, Dynamic, and Hybrid Channel Allocation. Mobile phone is primarily designed for Voice communication. While new generation mobile phones support many additional services, and accessories, such as SMS, email, packet switching for access to the Internet, gaming, Bluetooth, camera and MMS for sending and receiving photos and video, MP3 player, radio and GPS.</p>			

Module 44

Code	Course/Module Title	ECTS	Semester
ITC220190	Network security	4.00	7
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	2
Description			
<p>Networks are the foundation for most business operations today. As more and more computers become connected to larger public networks to power information availability, learning how to keep the data, network, and servers safe in today's organizations has now become more important than ever. This course will help you understand the challenges and solutions for designing secure networks. First, you will gain an understanding of the core network security concepts, applying security design principles for securing network systems. Next, you will explore network monitoring techniques to identify potential hackers targeting your network. Using tools like TCPDUMP and Wireshark. Then, you will fully understand how to best use firewalls, IDS and IPS in your network to secure it against threats and attacks. Finally, you will learn about wireless encryption weaknesses and social engineering techniques attackers' use to compromise systems, and the tools you can use to fight back.</p>			

Module 45

Code	Course/Module Title	ECTS	Semester
ITC220160	Artificial Intelligence	5.00	7
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	4
Description			
<p>Artificial Intelligence introduces students to the fundamental concepts and methods of artificial intelligence. It covers search techniques, knowledge representation, reasoning, and basic machine learning approaches. Students will learn how to apply AI techniques to solve real-world problems, especially in the fields of mobile computing and communication systems. The course aims to build a solid understanding of how intelligent systems work and how they can be designed and implemented in modern engineering applications.</p>			

Module 46

Code	Course/Module Title	ECTS	Semester
ITC220180	Satellite Communications	6.00	7
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	4
Description			
<p>This course introduces the fundamental principles of satellite communication systems. It covers satellite orbits, frequency bands, signal propagation, link budget analysis, and satellite transponders. The course also explores multiple access techniques, modulation schemes, and error control used in satellite links. Applications of satellite systems in broadcasting, navigation, and global communications are also discussed. Emphasis is placed on understanding system design considerations and the role of satellites in modern communication networks.</p>			

Module 47

Code	Course/Module Title	ECTS	Semester
ITC220220	Optical Fiber Communications	5.00	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	4
Description			
<p>A fiber optics communication course covers the principles, technologies, and applications of fiber optic communication systems. It includes topics such as optical fibers, light sources, detectors, optical amplifiers, and signal processing. Students will learn about the physics of light propagation in optical fibers, different types of optical fibers and their properties, and how to design and implement fiber optic communication systems. The course also covers fiber optic network architectures, transmission techniques, and performance analysis. Overall, the course equips students with the skills and knowledge needed to design and implement high-speed and reliable fiber optic communication systems.</p>			

Module 48

Code	Course/Module Title	ECTS	Semester
ITC220230	Internet of Things	5.00	8
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	4
Description			
<p>The subject "Internet of Things" explores the interconnected network of physical devices, vehicles, buildings, and other objects embedded with sensors, software, and connectivity, enabling them to collect and exchange data. This interdisciplinary field encompasses the integration of various technologies, such as embedded systems, sensors, actuators, cloud computing, and artificial intelligence, to create a seamless environment where everyday objects can communicate and interact with each other and with humans. This subject delves into the fundamental concepts, architectures, and applications of the Internet of Things (IoT). Students will gain an understanding of the underlying technologies, protocols, and standards that enable IoT systems, as well as the challenges related to security, privacy, and scalability. They will explore the transformative potential of IoT across various sectors, including healthcare, transportation, smart cities, agriculture, and manufacturing. Through hands-on projects and case studies, students will develop the necessary skills to design, implement, and manage IoT solutions, contributing to the advancement of this rapidly evolving field.</p>			

Module 49

Code	Course/Module Title	ECTS	Semester
ITC200132	Graduation Project II	4.00	8
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	48	3
Description			
<p>This course is the second and final phase of the graduation project sequence. Building on the planning and design completed in Graduation Project I, students will focus on the implementation, testing, evaluation, and documentation of their projects. The course emphasizes the development of a functional prototype or system that addresses the defined problem or need. Students will apply software engineering principles, project management practices, and technical skills to bring their proposed solution to life. Continuous progress reviews, peer feedback, and instructor supervision will guide the development process. By the end of the course, students are expected to deliver a working solution, a comprehensive final report, and a formal presentation or demonstration before a review committee.</p>			

Module 50

Code	Course/Module Title	ECTS	Semester
ITC220240	Wireless Communication Networks	6.00	5
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	78	4
Description			
<p>This course will cover the latest research in the area of Wireless Sensor Networks. We will cover all aspects of these unique and important systems, from the hardware and radio architecture through protocols and software to applications. Topics will include sensor network architectures, hardware platforms, physical layer techniques, medium access control, routing, topology control, quality of service (QoS) management, localization, time synchronization, security, storage, and other advanced topics. Each student must complete a semester-long course project related to wireless sensor networks. The computation of energy consumption of sensor node is presented and analyzed. Finally, the design of wireless sensor network for different application is presented. At the final of this course the student can work with different types of sensor nodes for design and implement the wireless sensor network for different applications.</p>			

Module 51

Code	Course/Module Title	ECTS	Semester
ITC220060	Mobile Computing	5.00	8
Class (hr/w)	Lect/ Lab. /Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	4
Description			
<p>This course focuses on the concepts, technologies, and challenges of mobile computing. It covers mobile communication systems, wireless networks, mobile IP, and data management in mobile environments. The course explores the architecture of mobile devices, mobile application development basics, and context-aware computing. Students will understand how mobility affects computing and communication, and how to design systems that support seamless mobile connectivity and user experience.</p>			

Module 52

Code	Course/Module Title	ECTS	Semester
ITC220130	Mobile Computing	5.00	8
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	4
Description			
Introduces computational techniques that deal with imprecision and uncertainty, including fuzzy logic, neural networks, and genetic algorithms. Focuses on solving complex real-world problems where traditional methods fall short. Emphasis is placed on hybrid approaches and their applications in optimization, control systems, and intelligent decision-making, particularly within communication and mobile computing contexts.			

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