

University OF MOSUL



*First Cycle – Bachelor's Degree (B.Sc.) –
Communications and Intelligent Digital Systems Engineering*
بكالوريوس - هندسة الاتصالات والأنظمة الرقمية الذكية



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1. Overview

This catalogue is about the courses (modules) given by the program of Communications and Intelligent Digital Systems Engineering to gain the Bachelor's degree. The program is delivered over four years (eight semesters) with 240 total ECTS credits, where 1 ECTS equals 25 student workload hours. The module delivery is based on the Bologna Process.

نظرة عامة

يتناول هذا الدليل المواد الدراسية التي يقدمها برنامج هندسة الاتصالات والأنظمة الرقمية الذكية للحصول على درجة البكالوريوس. يمتد البرنامج أربع سنوات (ثمانية فصول دراسية) بإجمالي 240 وحدة أوروبية، وبواقع ساعة من حمل الطالب لكل وحدة أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا 25.

2. Undergraduate Courses 2025-2026

Module 1

Code	Course/Module Title	ECTS	Semester
CS111	Electrical Circuits Analysis	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
3	3	93	57
Description			
This course develops students' understanding of DC electrical circuit theory and analytical problem-solving. It covers current, voltage and power, circuit elements and sources, resistive networks, series and parallel reduction, source combinations, star-delta transformation, Ohm's law, Kirchhoff's current and voltage laws, mesh and nodal analysis, Thevenin and Norton theorems, maximum power transfer and superposition. Laboratory and tutorial activities develop skills in handling electrical equipment, analyzing and simulating circuits, and comparing theoretical, simulated and practical results.			

Module 2

Code	Course/Module Title	ECTS	Semester
CS112	Mathematics	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
3	1	63	87
Description			
This course provides the mathematical foundations required for engineering study. Topics include real and complex numbers, algebraic equations and inequalities, vectors, Cartesian coordinates, functions and graphs, trigonometric functions, limits and continuity. The course also introduces differentiation, including basic differentiation rules, higher-order derivatives, derivatives of trigonometric functions, the chain rule, implicit differentiation and applications involving rates of change. Tutorial exercises emphasize mathematical reasoning and problem-solving.			

Module 3

Code	Course/Module Title	ECTS	Semester
CS113	Engineering Drawing	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
2	2	63	62
Description			
This course introduces the principles and practices of engineering drawing. Students learn drawing tools, line types, scales, basic engineering constructions, orthographic projection and isometric drawing, with emphasis on visualizing and representing engineering objects accurately. The course also introduces AutoCAD through laboratory work covering drawing, viewing, modifying, dimensioning and text commands, enabling students to produce engineering drawings efficiently for design and project applications.			

Module 4

Code	Course/Module Title	ECTS	Semester
CS114	Physics	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
2	1	48	102
Description			
This course establishes the physics foundations of modern electronics. It covers atomic models, quantum concepts, electron energy levels, energy-band theory and the classification of conductors, semiconductors and insulators. Students study intrinsic and extrinsic semiconductors, carrier concentration, Fermi level, mobility, conductivity, drift and diffusion currents, work function and the Hall effect. The course concludes with the formation, biasing and electrical characteristics of the p-n junction, including barrier potential, depletion width and junction capacitance.			

Module 5

Code	Course/Module Title	ECTS	Semester
UOM1031	Computer 1	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
1	2	48	27
Description			
This course provides fundamental computer literacy and practical digital skills. It introduces computer hardware and software, CPU, memory, input/output units, storage, operating systems, graphical user interfaces and file management. Students practice word processing, spreadsheets and presentation software, and learn internet, email, collaboration and cloud-computing concepts. The course also introduces networking and security basics, troubleshooting common hardware and software problems, and fundamental concepts, applications and ethical considerations of Artificial Intelligence.			

Module 6

Code	Course/Module Title	ECTS	Semester
UOM1040	Democracy and Human Rights	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
2	0	33	17
Description			
This course introduces the concepts, sources and historical development of human rights, including international, regional, national and religious sources. It examines civil and political rights, economic and social rights, and environmental, cultural and development rights, together with legal, institutional and societal safeguards against violations. The course also discusses the concept and forms of democracy, the Islamic stance on democracy, strengths and weaknesses of democratic systems, administrative corruption, its effects on society, and methods for combating corruption and promoting transparency and good governance.			

Module 7

Code	Course/Module Title	ECTS	Semester
UOM1011	Arabic Language 1	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
2	0	33	17
Description			
يهدف هذا المقرر إلى تمكين الطالب من القراءة الصحيحة واستعمال اللغة العربية استعمالاً سليماً في الاتصال والتعبير، وتنمية مهارات الاستماع والذوق الأدبي وتجاوز الأخطاء اللغوية. يتناول المقرر قواعد اللغة العربية، ومنها المبتدأ والخبر ونواسخه، وكان وأخواتها، وإن وأخواتها، وظن وأخواتها، والأسماء المنصوبة والمفعول المطلق، إضافة إلى الأخطاء اللغوية والإملاء. كما يتناول الأدب في العصر العباسي ونماذج من شعر المتنبي وأبي تمام وأبي فراس الحمداني.			

Module 8

Code	Course/Module Title	ECTS	Semester
CS121	Physics 1	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
3	2	78	22
Description			
This course introduces semiconductor devices and their basic electronic applications. Students study the structure, operation and characteristics of diodes using ideal and practical models, together with forward and reverse bias behavior. Applications include half-wave and full-wave rectifiers, clipping and clamping circuits and basic diode logic. The course also introduces bipolar junction transistors (BJT), npn and pnp structures, transistor current relationships, biasing methods, and basic circuit analysis for amplifier and switching applications.			

Module 9

Code	Course/Module Title	ECTS	Semester
CS122	Mathematics 1	6	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
3	1	63	87
Description			
This course extends students' calculus knowledge with emphasis on integration and its applications. Topics include definite and indefinite integrals, areas between curves, volumes of solids of revolution using disc, washer and cylindrical-shell methods, arc length and surface area of revolution. Techniques of integration include algebraic and trigonometric identities, integration by parts, trigonometric integrals and substitution, rational functions and partial fractions, and improper integrals. The course also introduces plane curves and polar coordinates, supported by tutorials and problem-solving exercises.			

Module 10

Code	Course/Module Title	ECTS	Semester
CS123	Digital Techniques	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
2	2	63	62
Description			
This course introduces the principles of digital systems and logic circuit design. It covers number systems and base conversion, binary codes, Boolean algebra, Boolean functions, canonical and standard forms, digital logic gates and Karnaugh maps. Students study arithmetic circuits, adders and subtractors, code conversion, decoders, encoders, comparators, multiplexers and demultiplexers. Sequential logic topics include latches, flip-flops, shift registers, asynchronous and synchronous counters, BCD and up/down counters, and basic state-machine concepts, with laboratory and tutorial exercises.			

Module 11

Code	Course/Module Title	ECTS	Semester
CS124	C Language Programing	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
2	2	63	62
Description			
This course introduces fundamental computer programming concepts using the C programming language. Students learn problem-solving techniques, algorithms and flowcharts, C program structure, variables, data types, constants, input/output operations, expressions and operators. The course covers selection statements, repetition statements, functions, one-dimensional and two-dimensional arrays, strings, basic pointers and memory addressing, and structures. Laboratory practice develops the ability to design, write, compile, debug and execute simple C programs for computational and engineering problems.			

Module 12

Code	Course/Module Title	ECTS	Semester
CS125	Principles of Artificial Intelligent	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
2	1	48	52
Description			
This course introduces the foundations and terminology of Artificial Intelligence and the operation of intelligent systems. Topics include intelligent agents and environments, problem formulation and state-space representation, uninformed and informed search, heuristic methods, knowledge representation, propositional logic and rule-based reasoning. Students are introduced to machine learning, supervised, unsupervised and reinforcement learning, and basic neural-network concepts. Engineering applications in communications, intelligent digital systems, IoT, routing, signal processing and data analysis are discussed together with ethical, safety, fairness and societal considerations.			

Module 13

Code	Course/Module Title	ECTS	Semester
CS126	Probability and Statistics	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
2	1	48	52
Description			
This course provides the probability and statistics foundations required for engineering analysis. It covers data types, frequency distributions, graphical presentation, measures of central tendency and dispersion, counting techniques, probability axioms, conditional probability and Bayes' theorem. Students study discrete and continuous random variables, PMF, PDF and CDF, expectation and variance, and Binomial, Poisson, Uniform, Normal and Exponential distributions. The course also covers joint distributions, covariance and correlation, the Central Limit Theorem, confidence intervals and hypothesis testing, with applications to engineering uncertainty and system performance.			

Module 14

Code	Course/Module Title	ECTS	Semester
UOM1021	English Language 1	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/sem)
2	0	33	17
Description			
This course develops students' communication and writing skills in the English language, with emphasis on correct grammatical usage and professional communication. Topics include parts of speech, nouns, verbs, adjectives, adverbs, pronouns, prepositions and articles, together with present, past and perfect tenses. Students study active and passive voice, the use of "since" and "for", conjunctions, and techniques for correcting grammatical errors. The course also develops professional email-writing skills relevant to future engineers.			

Contacts

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