

Al-karkh University of Science

جامعة الكرخ للعلوم



*First Cycle – Four levels-240 ECTS - Bachelor's degree (B.Sc.) –
Civil Engineering*

الدورة الاولى - بكالوريوس الهندسة المدنية – اربع سنوات -240 وحدة اوروبية



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1. Overview

This catalogue is about the courses (modules) given by the program of Civil Engineering to gain the Bachelor of Science degree. The program delivers 58 Modules with (6000) 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 الهندسة المدنية للحصول على درجة بكالوريوس العلوم. يقدم البرنامج 58 مادة دراسية، مع (٦٠٠٠) إجمالي ساعات حمل الطالب و ٢٤٠ إجمالي وحدات أوروبية. يعتمد تقديم المواد الدراسية على عملية بولونيا.

2. Undergraduate Courses 2025-2026

Module 1

Code	Course/Module Title	ECTS	Semester
KUS11001	Mathematics	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
This course provides students with a comprehensive introduction to integral calculus, focusing on both theoretical understanding and practical application. It establishes a solid foundation in the principles and methods of integration, enabling students to compute indefinite and definite integrals of a wide range of functions. Advanced integration techniques are introduced and explored through illustrative examples that demonstrate their relevance in solving real-world problems. The course emphasizes the development of logical and analytical reasoning skills, fostering a systematic and accurate approach to mathematical problem solving. Applications of integration in geometry, physics, and related fields are examined to reinforce conceptual understanding and practical relevance. By promoting clarity, precision, and structured computation, the course prepares students for advanced studies that require calculus-based analysis and mathematical modeling.			

Module 2

Code	Course/Module Title	ECTS	Semester
KUS11002	Fundamentals of computer science	3	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	48	27
Description			
This course introduces students to the fundamental concepts of computer science, providing a comprehensive overview of computer systems and their practical use. It covers the basic components of computers, including hardware, software, and data representation, along with an introduction to operating systems and graphical user interfaces. The course develops essential digital literacy skills through hands-on experience with word processing, spreadsheet, and presentation software. Students are also introduced to the fundamentals of the Internet, web browsing, and electronic communication, as well as modern concepts of cloud computing and digital collaboration tools. In addition, the course provides an introductory foundation in programming using the Python language, enabling students to develop basic problem-solving skills and computational thinking required for further studies in computing and engineering.			

Module 3

Code	Course/Module Title	ECTS	Semester
KUS11003	Democracy and Human Rights	2	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17
Description			
This course introduces students to the concept of human rights and their fundamental nature, with an emphasis on understanding their philosophical, legal, and social foundations. It examines the historical development of human rights across different eras and civilizations, highlighting the distinction between human rights and other forms of rights. The course explores human rights as reflected in divine religions and analyzes their influence on societies and social values. It also examines the recognition of human rights within international conventions, treaties, and agreements, as well as the role of national legislation in their protection and enforcement. In addition, the course addresses the emergence and role of non-governmental organizations in promoting and defending human rights. The course further introduces the concepts of democracy, freedoms and their various forms, and citizenship as reflected in different legal and legislative systems, aiming to promote civic awareness and responsible participation in society.			

Module 4

Code	Course/Module Title	ECTS	Semester
CEN11004	Engineering Drawing	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
1	2	48	77
Description			
The module aims to develop students' ability to communicate technical ideas through graphical representation. It covers the fundamentals of engineering drawing, use of instruments, geometric constructions, orthographic and isometric projections, sectional views, and dimensioning. Students will learn to interpret and create machine and assembly drawings following BIS/ISO standards and gain introductory skills in computer-aided drafting (CAD). The course enhances visualization, accuracy, and understanding of engineering components and systems.			

Module 5

Code	Course/Module Title	ECTS	Semester
CEN11005	Physics	5	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
This course provides an introduction to the fundamental concepts and core branches of physics, emphasizing physical quantities, units, vectors, and the nature of electric charge, fields, and forces. It examines the structure of atoms, types of matter, and the behavior of electric charge, with particular focus on Coulomb's law, electric dipoles, and electric potential energy. The course develops a solid understanding of basic electrical principles, including Ohm's law, resistance, capacitance, inductance, and the behavior of alternating current (AC) circuits. In addition, it introduces the physics of semiconductors, covering atomic configuration, charge carriers, doping processes, and the distinction between intrinsic and extrinsic materials. The formation and operation of PN junctions and semiconductor diodes under forward and reverse bias conditions are also discussed, providing students with essential knowledge for further studies in electronics and engineering applications.			

Module 6

Code	Course/Module Title	ECTS	Semester
CIV11006	Engineering Mechanics	6	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	87

Description
This module introduces students to the fundamental concepts of mechanics and structural analysis, providing a foundation for understanding the behavior of engineering structures under various loading conditions. It develops students' ability to analyze truss systems and determine internal forces using established analytical methods. The module explores the principles of friction and their applications in mechanical systems, along with the study of centroids for lines, areas, and composite shapes. Key topics include the calculation and application of moments of inertia for single and composite areas, the concept of the product of inertia, and the use of Mohr's circle for transforming inertia properties. Emphasis is placed on analytical reasoning and systematic problem solving through practical engineering examples. The module prepares students for advanced studies in structural analysis, mechanics, and related engineering disciplines.

Module 7

Code	Course/Module Title	ECTS	Semester
CIV11007	Chemistry	4	1
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37
Description			
This module provides students with a solid foundation in fundamental chemistry concepts essential for engineering applications. It develops an understanding of atomic structure, chemical bonding, and molecular interactions, alongside quantitative chemical analysis and stoichiometry for practical problem solving. The module introduces the principles of thermodynamics and chemical kinetics to explain chemical behavior and reactions, and explores acid-base chemistry, solutions, and electrochemistry. An introductory overview of organic chemistry and engineering-relevant materials is included, emphasizing applications related to construction materials, sensors, and electronic devices relevant to Civil Engineering and AI & Robotics fields. Through analytical exercises and applied examples, the module enhances problem-solving abilities and promotes critical thinking within chemical and engineering contexts.			

Module 8

Code	Course/Module Title	ECTS	Semester
CIV12008	Mathematics II	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	1	48	52
Description			
This module are provide students with an understanding of mathematical concepts, skills, and techniques that can be applied to a range of real- world problems. This course aims to introduce the concepts of calculus, complex numbers, vectors, and linear algebra. Additionally, the module aims to prepare students for future academic and professional pursuits that require mathematical proficiency.			

Module 9

Code	Course/Module Title	ECTS	Semester
CIV12009	Engineering Drawing II	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
This module will be to encourage student Participation in the tasks, while also honing and enhancing their critical thinking skills. This will be accomplished through courses and student-oriented interactive tutorials. The primary objective of studying engineering mechanics is to develop the ability to predict the effects of force and motion while performing engineering's creative design functions.			

Module 10

Code	Course/Module Title	ECTS	Semester
KUS12010	Arabic Language	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17
Description			
يركز مقرر اللغة العربية لطلبة الهندسة المدنية على تطوير المهارات اللغوية، والكتابة الصحيحة، والتواصل المهني. يغطي المقرر القواعد النحوية الأساسية مثل بنية الجملة، وعلامات الإعراب، والأخطاء الشائعة. ويتناول أصول الإملاء الوظيفي مثل قواعد كتابة الهمزات وعلامات الترقيم. كما يشمل المنهج مهارات الكتابة الفنية لإعداد التقارير الهندسية			

والرسائل الرسمية والسير الذاتية. أخيرًا، يتضمن المقرر تحليل نصوص أدبية لتنمية التذوق البلاغي وزيادة الحصيلة اللغوية للتحديث والإلقاء بوضوح.

Module 11

Code	Course/Module Title	ECTS	Semester
KUS12011	English Language	2	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	-	33	17
Description			
This module is based on hand-in assignments, written exam, Case study, Quizzes, seminars, Practical testing and Online testing.			

Module 12

Code	Course/Module Title	ECTS	Semester
CIV12012	Geology	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
This module (Geology) for applies geological sciences to ensure earth factors are recognized in project design. It covers earth materials by examining the physical properties of minerals and classifying igneous, sedimentary, and metamorphic rocks. The course analyzes structural geology including folds, faults, joints, and seismic hazards that threaten structural stability. It studies surface processes like rock weathering, soil formation, and slope stability to prevent landslides. Finally, it addresses applied hydrogeology by exploring groundwater flow, seepage effects on foundations, and site investigation methods.			

Module 13

Code	Course/Module Title	ECTS	Semester
CIV12013	Workshop	3	2

Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
-	3	48	27
Description			
The module Provide students with the fundamental technical knowledge and skills in workshop to recognize, analyze and solve problems, and to apply these abilities to the generation of new knowledge, ideas or products in industry.			

Module 14

Code	Course/Module Title	ECTS	Semester
CIV12014	Engineering Mechanics II	5	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	62
Description			
The module focuses on the motion of bodies and the forces causing it. The course covers kinematics of particles by studying position, velocity, and acceleration along straight and curved paths. It applies kinetics of particles using Newton's second law, work-energy principles, and impulse-momentum methods to calculate forces during movement. The curriculum also introduces planar kinematics of rigid bodies to analyze translation and rotation about a fixed axis. Finally, it explores planar kinetics of rigid bodies by linking forces and torques to the angular acceleration of structural components.			

Module 15

Code	Course/Module Title	ECTS	Semester
CIV12015	Building Materials	4	2
Class (hr/w)	Lect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	63	37
Description			
The module focuses on the properties, manufacturing, and testing of materials used in construction. The course explores the physical, chemical, and mechanical properties of cement, aggregates, and mixing water as the main components of concrete. It analyzes fresh concrete behavior, including workability and segregation, alongside hardened concrete characteristics like compressive strength and durability. The curriculum covers the production and testing of structural steel, bricks, timber, and modern composite materials. Finally, it addresses quality control standards, mix design methods, and material sustainability under different environmental conditions.			

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