Al-karkh University of Science

جامعة الكرخ للعلوم

First Cycle – Bachelor's degree (B.Sc.) – Artificial Intelligence & Robotics Engineering

بكالوريوس علوم - هندسة الذكاء الاصطناعي والانسان الالي

Table of Contents

1. Overview

This catalogue is about the courses (modules) given by the program of Artificial Intelligence and Robotics Engineering to gain the Bachelor of Science degree. The program delivers 52 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 هندسة الذكاء الاصطناعي والانسان الالي للحصول على درجة بكالوريوس العلوم. يقدم البرنامج ٥٢ مادة دراسية، 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
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**
AIR11006	Engineering Mechanics	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	62
Description			
This course introduces the fundamental laws and principles governing static and dynamic systems in engineering. It develops students' ability to analyze and resolve force systems in two and three dimensions using vector methods and Newton's laws of motion. Emphasis is placed on the construction and application of free-body diagrams for the analysis of equilibrium problems and the understanding of frictional forces and their practical engineering applications. The course also introduces the principles of work and energy, including the concept of virtual work, as a foundation for solving			

mechanical systems. In addition, the study of particle kinematics and kinetics provides a basis for understanding dynamics. Through systematic problem-solving and analytical reasoning, the course prepares students to apply theoretical mechanics concepts to real-world engineering situations.

Module 7

Code	Course/Module Title	ECTS	Semester
AIR11007	Discrete logic	5	1
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	62	63
Description			
This course introduces students to the fundamental principles and applications of digital electronics as a foundation for computing, artificial intelligence, and robotic systems. It provides a solid understanding of number systems, logic circuits, and digital components commonly used in control, embedded, and intelligent applications. Students develop the ability to analyze, design, and implement digital systems that interface with sensors, actuators, and microcontrollers. The course emphasizes the effective use of Boolean algebra, Karnaugh maps, and logic simplification techniques in digital system design. Through the study of combinational and sequential logic circuits, students gain practical skills in designing, testing, and evaluating digital systems. In addition, the course enhances logical reasoning, abstraction, and problem-solving abilities, while encouraging the integration of digital logic concepts into broader areas of automation, computing, and artificial intelligence.			

Module 8

Code	Course/Module Title	ECTS	Semester
AIR12008	Fundamentals of Engineering Mathematics	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			

Module 9

Code	Course/Module Title	ECTS	Semester

AIR12009	Data Structures and Algorithms	6	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	87
Description			
The module			

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			
The module			

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			
The module			

Module 12

Code	Course/Module Title	ECTS	Semester
AIR12012	Chemistry	4	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	2	63	37
Description			
The module			

Module 13

Code	Course/Module Title	ECTS	Semester
AIR12013	Workshop	3	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
-	3	48	27
Description			
The module			

Module 14

Code	Course/Module Title	ECTS	Semester
AIR12014	Electrical Ciruits	7	2
Class (hr/w)	**Lect/Lab./Prac./Tutor**	**SSWL (hr/sem)**	**USWL (hr/w)**
2	3	78	97
Description			
The module			

Contact

Program Manager:
Zaid Al-Shammari | Ph.D in Radio Communication Systems | Lecturer
Email: zaid.shaker.elc@kus.edu.iq

Program Coordinator:
Osama Mohammed Noori| MSc. In Computer Science | Assistant Lecturer
Email: osama20111989@kus.edu.iq