Ministry of Higher Education and Scientific Research

Scientific Supervision and Scientific Evaluation Apparatus

Directorate of Quality Assurance and Academic Accreditation

Accreditation Department

Academic Program and Course Description Guide

University of Mosul

College of Computer Science and Mathematics

Department of Artificial Intelligence

2025

Ministry of Higher Education and Scientific Research

Scientific Supervision and Scientific Evaluation Apparatus

Directorate of Quality Assurance and Academic Accreditation

Academic Program Description Form

University Name: University of Mosul

Faculty /Institute: Collage of Computer Science and Mathematics

Scientific Department: Department of Artificial Intelligence

Academic or Professional Program Name: Bachelor Science in Artificial Intelligence

Final Certificate Name: Bachelor Science in Artificial Intelligence

Academic System: Bolonga Process and Courses System

Description Preparation date: 3/12/2024

File Completion Date: 8/12/2024

Signature

Head of Department Name

Asst. Prof Dr. Mohammed Chachan Younis

Date: 20/1/2025

Signature

Scientific Associate Name:

Prof Dr. Safwan Omar Hasoon

Date: 20/1/2025

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department

Date: 20/1/2025

Signature:

Dr. Ibrahim Mohammed Ahmed

كلية علوم الحاسوب والرياضيات
جامعة الموصل
مكتب العميد
DEAN OFFICE
University Of Mosul
College of Computer Science and Mathematic

كلية علوم الحاسوب والرياضيات
Quality Assurance
شعبة ضمان الجودة وتقويم الاداء

Approval of the Dean

Prof. Dr. Dhuha Basheer Abdullah

20/1/2025

Academic program description form

Reviewing the performance of higher education institutions ((academic program review))

Description of the academic program

This academic program description provides a brief summary of the most important features of the program and the learning outcomes the student is expected to achieve; Demonstrating whether he has made the most of the available opportunities. It is accompanied by a description of each course within the program

1	Educational institution	University of Mosul
2	University department/center	College of Computer Science and Mathematics/Department of Artificial Intelligence
3	Name of the academic program	Artificial Intelligence
4	Name of the final certificate	Bachelor of Science in Artificial Intelligence
5	School system	Bologna System (First and Second Phase)
6	Accredited accreditation program	Academic accreditation(ABET)
7	Other external influences	Central examinations
8	Date the description was prepared	2025

Vision of the Computer Artificial Intelligence
The Artificial Intelligence Department aspires to achieve excellence in education and scientific research by: Offering innovative curricula that meet the demands of the modern era. Providing a supportive learning environment that fosters innovation and creativity. Graduating highly skilled students capable of developing cutting-edge technological solutions. Conducting advanced research that contributes to the development of artificial intelligence technologies. Collaborating with industrial and academic institutions to enhance students' practical expertise.

Mission of the Artificial Intelligence Department
The department aims to create a positive social, economic, and environmental impact by equipping graduates with the knowledge and skills to apply AI technologies in various aspects of life. The department focuses on producing graduates with essential skills and expertise gained during their studies. These include both theoretical knowledge and practical applications in diverse fields, as well as the ability to innovate and contribute to technological advancements post-graduation.

Objectives of the Artificial Intelligence Department	
1	The primary objective of the Artificial Intelligence Department is to equip students with the fundamental knowledge and skills required for the development and application of advanced AI technologies.
2	The program aims to create employment opportunities in both the private and public sectors, including IT companies, engineering industries, digital marketing, the healthcare sector, and many other fields that actively seek AI graduates.

Objectives of the academic program

1	Equip students with robust theoretical knowledge and practical skills in core AI disciplines, including machine learning, neural networks, natural language processing, and data analytics, ensuring proficiency in current and emerging technologies.
2	Foster an understanding of ethical frameworks, bias mitigation, and societal impacts of AI, empowering students to design and deploy AI solutions that prioritize fairness, transparency, and accountability.
3	Integrating AI with fields such as healthcare, environmental science, finance, and robotics promotes cross-disciplinary learning, preparing students to address complex global challenges through innovative, multidisciplinary approaches.
4	Develop critical research competencies through hands-on projects, access to cutting-edge tools, and mentorship, encouraging students to contribute to AI theory, algorithms, and applications breakthroughs.
5	Bridge academia and industry by offering experiential learning opportunities, internships, and partnerships with tech leaders, ensuring graduates possess the technical, collaborative, and problem-solving skills required in a dynamic workforce.
6	These objectives aim to create well-rounded AI professionals capable of driving technological progress while addressing ethical, societal, and cross-sector challenges.

Required learning outcomes and teaching, learning and assessment methods

1	**Knowledge and Understanding** 1. Students will learn the concepts and foundations of artificial intelligence and its supporting programming languages. 2. Ability to find scientific solutions to societal problems using the principles of artificial intelligence. 3. Ability to use and develop AI algorithms and apply them effectively. 4. Ability to analyze and evaluate intelligent systems. 5. Enhance students' skills in building intelligent systems across various life domains.
2	**Subject-specific skills** 1 .theoretical 2 .practical 3 .Summer training 4 .Graduation research

Teaching and learning methods

1	Ordinary blackboard
2	Smart board
3	Data display device
4	Theoretical, practical, and applied lectures, daily assignments and discussions

Evaluation methods

1	Electronic exams
2	Central and monthly examinations
3	Daily exams
4	Scientific reports
5	Practical exams
6	Research projects
7	Exams, assignments, daily assignments, discussions, laboratory reports, graduation project

Thinking skills

1	The skill of deduction and analysis
2	Comparison skill
3	Discussion skills
4	Skills in using computers and the Internet
5	Research and investigation skill
6	The skill of conducting research and drawing conclusions
7	Decision making skill

Teaching and learning methods

1	Theoretical lectures
2	Practical laboratories
3	Research and investigation
4	Discussion groups within practical lessons
5	Lectures, practical experiments, applications, homework, scientific discussions

Evaluation methods

1	Electronic exams
2	Oral and written examinations
3	Research projects
4	Class discussions
5	Evaluation of assignments and discussions

6	Evaluating individual and group research
7	Exams, assignments, daily assignments, discussions, laboratory reports, graduation project

General and transferable skills (other skills related to employability and personal development)

1	Developing the ability for effective teamwork
2	Developing the ability for self-learning
3	Developing the ability to present and discuss ideas
4	Developing the ability to address problems in a logical, organized manner
5	Ability to work in a multidisciplinary team
6	Ability to communicate and build

Teaching and learning methods

1	Cooperative learning
2	Group discussions
3	Individual learning
4	Lectures, practical experiments, applications, homework, scientific discussions

Evaluation methods

1	Observing students' interaction in different situations
2	Presenting real-life issues and problems and observing how students deal with them programmatically.
3	Evaluating group and individual work
4	Solutions to summer training problems through graduation projects

Academic program

Bologna System - Level 1

2024-2025

Republic of Iraq - Ministry of Higher Education and Scientific Research

University of Mosul

Bachelor's degree in Artificial Intelligence (First cycle)

Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr

Program Curriculum (2024 - 2025)

جمهورية العراق - وزارة التعليم العالي والبحث العلمي

جامعة الموصل

بكالوريوس في الذكاء الاصطناعي (الدورة الأولى)

أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوربية - كل وحدة اوربية = ٢٥ ساعة

المنهاج الدراسي للعام 2024-2025

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem			
UGI	One	1	UOMAI105	Algorithms and Structured Programming (1)	الخوارزميات والبرمجة المهيكلة (1)	English	2		2		2		3	93	107	200	8.00	C	
		2	UOMAI107	Artificial Intelligence	الذكاء الاصطناعي	English	2		2				3	63	87	150	6.00	C	
		3	UOMAI102	Logic Design	التصميم المنطقي	English	2		2				3	63	87	150	6.00	C	
		4	UOMAI106	Discrete Structures	هياكل متقطعة	English	2				1		3	48	27	75	3.00	C	
		5	UOM1031	Computer	الحاسوب	English	1		2				3	48	27	75	3.00	B	
		6	UOM101	Arabic Language	اللغة العربية	Arabic	2						3	33	17	50	2.00	B	
		7	UOM1040	Democracy and Human Rights	الديمقراطية وحقوق الانسان	Arabic	2						3	33	17	50	2.00	B	
						Total	13	0	8	0	3	0	21	381	369	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem			
UGI	Two	1	UOMAI205	Algorithms and Structured Programming (2)	الخوارزميات والبرمجة المهيكلة (2)	English	2		2		2		3	93	107	200	8.00	C	UOMAI105
		2	UOMAI203	Computer Organization	تركيب الحاسوب	English	2		2				3	63	87	150	6.00	C	
		3	UOM1021	English Language	اللغة الانكليزية	English	2						3	33	17	50	2.00	B	
		4	UOMAI206	Knowledge Representation	تمثيل المعرفة	English	2		2				3	63	87	150	6.00	C	
		5	UOMAI202	Mathematics for AI	الرياضيات للذكاء الاصطناعي	English	2		2				3	63	37	100	4.00	S	
		6	UOMAI204	Web Development	تطوير شبكة الانترنت	English	2		2				3	63	37	100	4.00	S	
						Total	12	0	10	0	2	0	18	378	372	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem			

Curriculum Skills Map																			
Please tick the boxes corresponding to the individual learning outcomes of the program that are subject to assessment																			
Year/Level	Course code	Course name	Module Type	knowledge and understanding				Subject-specific skills				Thinking skills				General, transferable or other skills related to employability and personal development			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
First year / Semester 1	UOMCSAI1101	Democracy and Human Rights	C	√	√				√			√	√	√		√			
	UOMCSAI1102	Logic design	C	√										√				√	
	UOMCSAI1103	Computer Skills	S	√				√				√	√	√		√	√		
	UOMCSAI1104	Discrete Structures	C	√				√				√	√	√		√	√		
	UOMCSAI1105	Algorithms and Structured Programming (1)	C					√											
	UOMCSAI1106	Arabic language	S					√											
	UOMCSAI1107	Artificial Intelligence	C		√			√						√		√			
First year / Semester 2	UOMCSAI1201	Knowledge Representation	C	√	√				√			√	√	√		√			
	UOMCSAI1202	Mathematics for AI	C	√					√			√	√	√					
	UOMCSAI1203	Algorithms and Structured Programming (2)	C					√											
	UOMCSAI1204	English Language	S																
	UOMCSAI1205	Computer Organization	C	√				√				√	√	√		√	√		
	UOMCSAI1206	Web Development	C	√	√			√	√			√	√	√		√	√		

B→Basic learning activities , C→Core learning activity, S→Support or related learning activity, E→Elective learning activity

Curriculum Skills Map																		
Please tick the boxes corresponding to the individual learning outcomes of the program that are subject to assessment																		
Year/Level	Course code	Course name	Module Type	knowledge and understanding				Subject-specific skills				Thinking skills				General, transferable or other skills related to employability and personal development			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
Second year / Semester 1			C	√	√				√			√	√	√		√			
			C	√										√				√	
			C	√				√				√	√	√		√	√		
			B	√				√				√	√	√		√	√		
			S					√											
			E					√											
			C		√			√						√		√			
Second year / Semester 2			C	√	√				√			√	√	√		√			
			C	√					√			√	√	√					
			B					√											
			E																
			S	√				√				√	√	√		√	√		
			E	√	√			√	√			√	√	√		√	√		

Curriculum Skills Map																		
Please tick the boxes corresponding to the individual learning outcomes of the program that are subject to assessment																		
Year/Level	Course code	Course name	Module Type	knowledge and understanding				Subject-specific skills				Thinking skills				General, transferable or other skills related to employability and personal development			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
Third year / Semester 1			C	√	√				√			√	√	√		√			
			C	√										√				√	
			C	√				√				√	√	√		√	√		
			B	√				√				√	√	√		√	√		
			S					√											
			E					√											
			C		√			√						√		√			
Third year / Semester 2			C	√	√				√			√	√	√		√			
			C	√					√			√	√	√					
			B					√											
			E																
			S	√				√				√	√	√		√	√		
			E	√	√			√	√			√	√	√		√	√		

Curriculum Skills Map																			
Please tick the boxes corresponding to the individual learning outcomes of the program that are subject to assessment																			
Year/Level	Course code	Course name	Module Type	knowledge and understanding				Subject-specific skills				Thinking skills				General, transferable or other skills related to employability and personal development			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4	D1	D2	D3	D4
Fourth year / Semester 1			C	√	√				√			√	√	√		√			
			C	√										√				√	
			C	√				√				√	√	√		√	√		
			B	√				√				√	√	√		√	√		
			S					√											
			E					√											
			C		√			√						√		√			
Fourth year / Semester 2			C	√	√				√			√	√	√		√			
			C	√					√			√	√	√					
			B					√											
			E																
			S	√				√				√	√	√		√	√		
			E	√	√			√	√			√	√	√		√	√		

Courses Description

Bologna System - Level 1

Semester 1

2024-2025

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Human Rights**			**Module Delivery**	
Module Type				☒**Theory** ☐ **Lecture** ☐**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)					
Module Level		UGI-1	**Semester of Delivery**		1
Administering Department		Artificial Intelligence	**College**	Computer Science and Mathematics	
Module Leader	Sahbaa Hikmat Alyass		**e-mail**	sahbaa.hikmat@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		MSc.
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		10/10/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Urging students to participate objectively in the dialogue in a manner consistent with the ethics of Arab society. 2. Clarifying the concepts and terms of human rights and democracy to students and bringing them closer to their minds. 3. Explaining and simplifying the universal declarations and international conventions and the position of the political system related to this topic. 4. Accustoming students to work in their environment in the field of human rights and introducing them to the world's experiences in this regard. 5. Training students to uncover and document human rights violations without bias and according to a scientific approach as much as possible. 6. Rooting the idea of accepting the other, respecting his opinion, respecting pluralism in the political system, and eradicating the tendency to exclude and marginalize the opposing opinion.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١. Introducing the student to human rights and basic freedoms as well as the basic principles of democracy ٢. Enabling the student to exercise his rights effectively through the comprehensive development of his personality and sense of dignity and respect for the rights and basic freedoms of others in accordance with the values of a democratic society ٣. Making the student able to influence others positively in a manner consistent with the principles of human rights ٤. Consolidating theoretical information in the student's mind is done by linking this information to current social, political and economic events and phenomena in order to achieve the desired goal of teaching this subject. When the concept of democracy is presented to the student, the concepts freedom, justice in rights and duties, and peaceful social life, where the rule of law and equality of citizens and other concepts and practices that express respect for human rights and citizens regardless of their idea, color and affiliation, in addition to developing his concept of political rights and practicing them and reflecting this in his social and political life alike and developing his political intellectual development in distinguishing political systems and methods of managing political governance
Indicative Contents المحتويات الإرشادية	The guiding content includes the following. Part A - Basic Concepts of Human Rights: What are human rights, definition, types, contents of human rights, importance, characteristics, features, categories, standards. [20 hours] Part B - Duties: Duties imposed on the exercise of human rights and restrictions on them. [20 hours] Part C - Human Rights Guarantees International guarantees for the protection of human rights (international governmental and international non-governmental) and regional (European Convention and Arab Charter on Human Rights) and national guarantees (political, legal and judicial)

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	١. Human rights strategies revolve around three basic matters: ٢. General strategy: Introducing the university student to the nature of human rights from global, humanitarian, scientific and religious perspectives and in an objective manner away from political, intellectual and sectarian influences...etc. ٣. Special strategy is to seek to bring about a change in the student's behavior in line with the general goal by directing attention to the true content of human rights and their legal dimensions and studying international declarations and charters, and the impact of flagrant violations of those rules that affect people's lives or dignity, especially since human rights are comprehensive and for all human societies. As for special strategies in democracy, they are in two matters: 1. General strategy: Introducing the university student to the nature of the democratic system from global, humanitarian, scientific and religious perspectives and in an objective manner away from the importance of political and intellectual influences on the mechanism and operation of the political system and the independence of political rule 2. Special strategy is to seek to bring about a change in the student's way of thinking in line with the general the goal by directing attention to the true content of the democratic system and its benefits that will be reflected in the economic and social fields, in addition to the importance of the role of the general will In directing course of government through the exercise of political rights.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٣٣	**Structured SWL (h/w)** **Regular weekly student load**	٢
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	١٧	**Unstructured SWL (h/w)** **Irregular student load per week**	١
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	٥٠		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	١	١0% (١0)	5 and 10	All
	Assignments	2	٢0% (٢0)	2 and 12	All
	Report	1	10% (10)	13	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	The concept of democracy
Week 2	Forms of democracy
Week 3	Direct democracy, semi-direct democracy
Week 4	Representative democracy
Week 5	Parliament
Week 6	Representative system (election)
Week 7	The concept of election
Week 8	Electoral body
Week 9	Organizing the election process
Week 10	Electoral systems
Week 11	The concept of human rights
Week 12	Human rights in heavenly laws
Week 13	Sources of human rights
Week 14	Human rights guarantees
Week 15	The future of human rights
Week 16	Final exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	محاضرات في الديموقراطية، د. فيصل شنطاوي	No
Recommended Texts	حقوق الانسان والطفل والديموقراطية، د. ماهر صالح الجبوري واخرون	No
Websites		

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Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Logic Design** **التصميم المنطقي**			**Module Delivery**	
Module Type				☒**Theory**	
Module Code				☒**Lecture**	
ECTS Credits				☒**Lab**	
SWL (hr/sem)				☐**Tutorial**	
				☐**Practical**	
				☐**Seminar**	
Module Level	UGI – 2		**Semester of Delivery**	One (1)	
Administering Department	Artificial Intelligence		**College**	**Computer Science and Mathematics**	
Module Leader	Dr. Ban Shareef Mustafa		**e-mail**	banmustafa66@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understanding Digital Systems: Learn and understand the core principles of digital systems and how they function. 2. Binary Logic Mastery: Gain a clear understanding of binary logic and how it forms the basis for digital computing and design. 3. Comprehension of Logic Gates: Understand the functioning of basic logic gates (AND, OR, NOT) and more complex gates (NAND, NOR, XOR, XNOR), as well as how to combine these gates to create digital circuits. 4. Boolean Algebra Proficiency: Develop a strong understanding of Boolean algebra, including how to simplify Boolean expressions and how these expressions are used in logic design. 5. Sequential and Combinational Logic: Learn the difference between sequential and combinational logic, and how to design circuits using each type of logic. 6. Logic Minimization Techniques: Understand and apply logic minimization techniques, such as K_map to simplify logic designs.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcomes of a logic design course are the specific knowledge, skills, and abilities that a student should possess after completing the course. While these can vary based on the specific course and institution, they typically include: 1. Understanding Fundamental Concepts: The students will have a firm grasp of binary systems, digital signals, logic gates, and Boolean algebra. 2. Proficiency in Logic Minimization Techniques: Students will know how to use Karnaugh map to simplify logic circuits. 3. Hands-On Experience: Students will gain practical experience in implementing logic circuits, either physically with electronic components or virtually using design and simulation software. 4. Knowledge of Different Logic Families: Students will learn about different logic families, their characteristics, and the advantages and disadvantages of each.
Indicative Contents المحتويات الإرشادية	The indicative contents for the first course on Logic Design will typically cover the following areas: • Part 1: Different Number Systems and data representation (integer and fraction) using different number systems. Conversion Between Different Numbers Systems. Arithmetic operations using different number systems, and Digital Codes (BCD, Parity, Gray, Excess-3, etc.) [15 hrs] • Part 2: Logic Gates: The Inverter (NOT Gate), AND Gate, OR Gate, NAND Gate, NOR Gate, the Exclusive-OR Gate and Exclusive-NOR Gates, simplification and Boolean Functions, Karnauph Map. [20 hrs] • Part 3: Digital Circuit Design, Combinational Circuits, Binary Full and Half Adder, Binary Subtractor. [20 hrs] • Part 4: Multiplexer and Demultiplexer, Decoder and Encoder, Sequential Circuits, Flip Flops. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Learning and teaching logic design, particularly digital logic design, requires a deep understanding of binary systems, gates, Boolean algebra, and much more. Here are some effective strategies to facilitate learning and teaching of this subject: • Using Visual Tools: Visual representations can greatly enhance understanding in

	this field. Using diagrams to explain concepts such as truth tables, Karnaugh maps, and logic gates. Software like Circuit Maker can be used to virtually design and test digital circuits. • Starting with basic binary arithmetic, explaining the importance of 0s and 1s in digital logic design. Moving to basic logic gates (AND, OR, NOT), and gradually introducing more complex ones (NAND, NOR, XOR, XNOR). • Utilizing Hands-On Learning: Incorporating practical exercises whenever possible. This could involve using breadboards and basic electronic components or using software to design and simulate circuits.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Basic logic Design
Week 2	Number system
Week 3	Arithmetic Circuits
Week 4	Data and control inf.

Week 5	Logical properties and Gates & Boolean
Week 6	Simplification and Boolean Functions
Week 7	K_Map and Design procedure
Week 8	Digital Circuit Design
Week 9	Combinational Circuits
Week 10	Binary subtraction and binary adder_subtractors
Week 11	Design procedure and Multiplexer & De-multiplexer
Week 12	Decoder and Encoder
Week 13	Sequential Circuits, and Latches (SR and CR latch, d_latch)
Week 14	Flip-Flops (SR and JK)
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Basic Logic Gates (AND, OR, NOT)
Week 2	Lab 2: Basic Logic Gates (XOR, XNOR)
Week 3	Lab 3: SOP & POS
Week 4	Lab 4: Boolean Function Simplification
Week 5	Lab 5: Karnaugh Maps
Week 6	Lab 6: Logic Circuit Design
Week 7	Lab 7: Logic Circuit Design for Number System Conversion
Week 8	Lab 8: Logic Circuit Design Emulating Logical Gates Using Specific Gates
Week 9	Lab 9: Full Adder & Half Adder
Week 10	Lab 10: Full Subtractor & Half Subtractor
Week 11	Lab 11: Decoders & Encoders
Week 12	Lab 12: Multiplexers & Demultiplexers
Week 13	Lab 13: Latches
Week 14	Lab 14: Flip-Flops
Week 15	Lab 15: Practical Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• M. M. Mano,2016, “Digital Design”, Prentice Hall • Digital Fundamental, by Floyd	yes

	• Switching Theory and Logic Design, by M. V. Sabramanyam	
Recommended Texts	• Thomas l. Floyd, 2006, "Digital Fundamentals", Prentice Hall • Digital Principles and Applications, by Malvino and Leach	No
Websites	https://www.tutorialspoint.com/digital-electronics/logic-gates.htm	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	الحاسوب			**Module Delivery**	
Module Type				☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)					
Module Level	UGI - 3		**Semester of Delivery**	One (1)	
Administering Department	Artificial Intelligence		**College**	**Computer Science and Mathematics**	
Module Leader	Dr. Hassan Mohammed Noori		**e-mail**	hmn1973@ uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	10/10 /2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Computer Organization	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives	1. Understand the two essential components of a computer system: hardware and software.

أهداف المادة الدراسية	2. Gain knowledge about different hardware components, including input and output devices, storage devices, CPU, motherboard, and RAM. 3. Comprehend the role of software in computer operation, distinguishing between system software and application software. 4. Learn how hardware components work together to process data and execute software instructions. 5. Gain proficiency in basic file and folder operations such as renaming files, copying and pasting files, sorting files, searching for files, and organizing files in folders and subfolders. 6. Learn how to format a removable device. 7. Understand the concepts of the Internet, World Wide Web (WWW), and email. 8. Gain knowledge about different types of computer networks and their significance in the development of the Internet. 9. Explore the history of computer networks and how they evolved to become popularly known as the Internet and the Web. 10. Familiarize students with web browsers, their tools, and search engines for effective web browsing and information retrieval. 11. Gain an understanding of electronic mail (email) and its role in communication. 12. Explore the impact of social media on the Internet and understand its uses and implications. 13. Learn about cloud storage and its significance in storing and accessing data over the Internet. The objectives of this module are: 14. Understand the fundamental concepts of information security. 15. Learn about the different aspects of information security, including confidentiality, integrity, and availability of data. 16. Gain knowledge about various types of malware, such as viruses, worms, and trojans, and understand the measures to prevent and mitigate their impact. 17. Explore the security features and capabilities of Windows 10 operating system. 18. Understand the importance of security updates and patches in maintaining a secure computing environment.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe the main functional blocks of a computer system and how they work in sequence to process information. 2. Describe the functions of different hardware components such as CPU, storage systems, types of memories like RAM, ROM etc. and common input and output devices. 3. Compare and contrast different types of computing and end-user devices. 4. Describe the different types of software: operating systems, application software and Explain the terms shareware, freeware, end-user license agreement. 5. Describe the different types of menus. 6. Demonstrate searching, sorting and changing views for files and folders. 7. Describe the different file types. 8. Demonstrate how to compress and decompress files and folder. 9. Demonstrate the usage of removable media for storing files. 10. Connect basic peripheral devices. 11. Demonstrate logging on and off a computer network. 12. Understand the different types of networks. 13. Identify the purpose of a browser in accessing information on the World Wide Web

	(WWW) and navigate the Web. 14. Understand how to deal with web browser tools such as: bookmarks, display and hide built-in toolbars, deleting browsing history and print web pages. 15. Use search engines. 16. Understand how electronic mail works including the components of electronic mail message, electronic mail address, and electronic mail options. 17. Understand how social media works. 18. Explain the essential concepts of cloud storage. 19. Identify the benefits and risks of network computing. 20. Identify the security issues with electronic mails. 21. Identify risks to personal and organizational data. 22. Describe the protected web sites, use of digital certificates, encryption-decryption, and uses of firewall and how to get protected from hackers etc. 23. Explain different types of viruses (including worms, Trojans etc) and clean viruses and worm-infected system with appropriate software. 24. Explain privacy issues, good passwords and access right. 25. Describe the concept of backup and its importance to data recovery.
Indicative Contents المحتويات الإرشادية	**Computer System Overview** - Describe the main functional blocks of a computer system and their sequential processing of information. **Hardware Components** - Explain the functions of different hardware components such as CPU, storage systems, RAM, ROM, etc. - Identify common input and output devices and their roles in computer systems. **Computing and End-User Devices** - Compare and contrast different types of computing and end-user devices. **Software Types** - Describe the different types of software, including operating systems and application software. **Removable Media and Peripheral Devices** - Demonstrate the usage of removable media for storing files. - Connect basic peripheral devices to a computer. **Computer Networking** - Demonstrate logging on and off a computer network. - Understand different types of networks. **Web Browsing and Search Engines** - Identify the purpose of a browser in accessing information on the World Wide Web (WWW) and navigate the Web. - Understand how to use web browser tools such as bookmarks, toolbars, deleting browsing history, and printing web pages. - Utilize search engines for information retrieval. **Electronic Mail and Social Media** - Understand how electronic mail works, including the components of an email message, email address, and email options. - Understand how social media works. **Cloud Storage** - Explain the essential concepts of cloud storage.

	Network Computing and Security - Identify the benefits and risks of network computing. - Identify security issues related to electronic mails. - Identify risks to personal and organizational data. -Describe protected websites, digital certificates, encryption-decryption, firewall usage, and protection against hackers. **Viruses and Privacy Issues** - Explain different types of viruses (including worms, Trojans) and demonstrate virus removal with appropriate software. - Explain privacy issues, good password practices, and access rights. **Backup and Data Recovery** - Describe the concept of backup and emphasize its importance for data recovery.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The modules may involve interactive lectures where the main functional blocks of a computer system, functions of hardware components, different types of software, and essential concepts of cloud storage are described. The sequential processing of information in a computer system may be explained using visual aids and real-world examples to enhance comprehension. Group discussions and collaborative learning activities are encouraged to foster peer interaction and the exchange of ideas. Students may be asked to compare and contrast different types of computing and end-user devices, discuss the benefits and risks of network computing, and analyze security issues related to electronic mails and data protection. To develop practical skills, students may engage in activities such as web browsing and search engine utilization, where they learn to navigate the web, use browser tools effectively, and retrieve information using search engines. Additionally, they may gain an understanding of how electronic mail and social media work, including the components of an email message and the implications of privacy issues. Continuous assessments and feedback mechanisms are utilized to monitor student progress and provide opportunities for reflection and improvement. These assessments may include quizzes, assignments, and projects that assess students' understanding of the topics covered and their ability to apply the concepts learned.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem)	**75**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Basic concepts of Information technology
Week 2	Hardware
Week 3	Memory
Week 4	Storage and Performance
Week 5	Software
Week 6	Data Communication &Networks
Week 7	Data Communication &Networks
Week 8	Computers in everyday life
Week 9	Computers in everyday life
Week 10	Health & Environment
Week 11	Health & Environment
Week 12	Computer Ethics
Week 13	Computer Ethics
Week 14	Windows
Week 15	Office
Week 16	Preparatory week before the Final Exam

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Windows 10
Week 2	Lab 2: Windows 10
Week 3	Lab 3: Windows 10
Week4	Lab 4: Microsoft Office (WORD)
Week 5	Lab 5: Microsoft Office (WORD)
Week 6	Lab 6: Microsoft Office (WORD)
Week 7	Lab 7: Microsoft Office (WORD)
Week 8	Lab8: Microsoft Office (PowerPoint)
Week 9	Lab 9: Microsoft Office (PowerPoint)
Week 10	Lab 10: Microsoft Office (PowerPoint)
Week 11	Lab 11: Microsoft Office (PowerPoint)
Week 12	Lab 12: Microsoft Office (Excel)
Week 13	Lab 13: Microsoft Office (Excel)
Week 14	Lab 14: Microsoft Office (Excel)
Week 15	Lab 15: Microsoft Office (Excel)
Week 16	Lab 16: Preparatory week before the Final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**الحاسوب والبرمجيات الجاهزة (مهارات الحاسوب)، د. محمد بلال الزعبي وآخرون**	No
Recommended Texts		
Websites	• TechTerms: https://techterms.com/ • Computer Hope: https://www.computerhope.com/ • Google Web Fundamentals: https://developers.google.com/web/fundamentals • National Institute of Standards and Technology (NIST) Computer Security Resource Center: https://csrc.nist.gov/ • OWASP (Open Web Application Security Project): https://owasp.org/	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Discrete Structure** **الهياكل المتقطعة**			**Module Delivery**	
Module Type				☒**Theory** ☒**Lecture** ☐ **Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)					
Module Level		UGI - 6	**Semester of Delivery**		One (1)
Administering Department		Artificial Intelligence	**College**	**Computer Science and Mathematics**	
Module Leader	**Dr. Zeyad Abd-Algfoor Hasan**		**e-mail**	**drzeyad@uomosul.edu.iq**	
Module Leader's Acad. Title		lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		10/10/2024	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem-solving skills in the fundamentals of discrete mathematics through understanding the concepts of propositional logic. 2. To understand the logical equivalence between two compound propositions. 3. This course deals with the basic concepts of the concept predicate and

	quantifiers. 4. To understand the concepts of isomorphism and planar their applications in the real life. 5. To understand the concepts of permutations and combinations and how to use it. 6. To understand how to convert any object in the real world into its vertices and edges then we can process it. 7. To understand what the structure of any programming language is through understanding its symbols and strings and all the applied operations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize and understand the outline of the proposition and not a proposition terms and their equations and truth table construction. 2. Describe the equations that satisfy the equivalence logically. 3. Summarize what is meant by converting not propositional logic to proposition through predicate and quantifier. 4. Understanding the graphical representation and contents of the lists. 5. Understanding the tuples representation compared with the lists. 6. Identify how to produce a new string for any language. 7. Identify the algebraic structures with all types. 8. The ability to determine the isomorphism case between two objects. 9. Understanding how to convert any graph to a plane graph. 10. Discrete structure terms and notations are useful for studying and expressing problems of objects in computer programming and algorithms. 11. Some branches of discrete mathematics are also useful in studying some business and economic issues.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Propositional logic definition, Compound proposition elements, Compound proposition classification Building a truth table, Logical operators' definition and equivalences in propositional logic. [10 hrs] • Predicate and quantifier concepts, truth values, Universal quantification, Existential quantification, negation operation, object structure, vertices and edges, Functions, injection function, surjection function, bijection, function properties, Domain and co-domain definition, image, and pre-image comparison. [15 hrs] • tree definition, m-ary tree, rooted tree, in-order traversal, post-order traversal and pre-order traversal. [15 hrs] • Definition of lists, graphical representation of the list, initializing a list, accessing the values of the list, Tuples construction, applied operations on tuples, [15 hrs] Mechanisms of Strings and Languages construction, isomorphism between two objects, plane graph construction, object segmenting to regions, algebraic structures and permutation and combination analysis. [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Discrete structure is the study of mathematical structures that are essentially discontinuous, in the sense that they do not require the presence of the adjective of communication and do not require it to study this subject. Most of the topics studied in discrete mathematics are related to countable sets (a completely different concept from finite sets), an example of which is the set of integers.

	Discrete mathematics has gained wide importance in recent decades due to its wide applications in computer science. Discrete mathematics terms and notations are useful for studying and expressing objects in computer programming and algorithms. Some branches of discrete mathematics are also useful in studying some business and economic issues.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٣
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	4, 11	LO # 1, 5, 7, 9 and 10
	Assignments	2	10% (10)	1, 3, 6, 10, 12	LO # 2, 3, 4, 6 and 8
	Projects	1	10% (10)		
	Report	1	10% (10)	13	LO # 11
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Set theory-sets & subsets-how to specify sets, and sequences-Operations on sets
Week 2	Algebra of sets & its proves, and sets of numbers-Finite sets
Week 3	Mathematical induction & recursion, Matrices
Week 4	Logic and propositions-Equivalency, Tautology & Contradiction
Week 5	Relations- Computer representation of relations & Digraph
Week 6	Manipulation of relations, and Properties of relations

Week 7	Composition of relations (Functions-types of functions)
Week 8	Composition of relations (Graphs-definition-graphs & multigraphs- subgraph – degree of graph)
Week 9	Walk –length of walk- trail- path- cycle- the bridges of Konigsberg
Week 10	Traversable multigraphs- Euler theorem- special graph- bipartite graph matrices & graph
Week 11	Labeled graphs – trees- rooted tree- ordered rooted tree- polish notation
Week 12	Spanning tree-directed graph- matrix of digraph, and Minimal path
Week 13	Finite state machines
Week 14	Language & pattern recognition machines
Week 15	Optimistic approach to construct FSM, Finite automata
Week 16	**Final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	• Discrete mathematics by Seymour Lipschut and Marc Lars Lipson. Schaum's Outline Series McGraw-Hill. Copyright 2007 • Discrete mathematical structures for computer science by Bernard Kolman & Robert C. Busby 2004	Yes
Recommended Texts	Pace, Gordon J. *Mathematics of discrete structures for computer science*. New York: Springer, 2012.	No
Websites	https://www.google.iq/books/edition/Mathematics_of_Discrete_Structures_for_C/kYYJLhL2arwC?hl=en&gbpv=0	

Grading Scheme
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Algorithms and Structured Programming (1)** الخوارزميات والبرمجة المهيكلة (١)			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**UOMAI105**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	UGI - 5		**Semester of Delivery**	One (1)	
Administering Department	Artificial Intelligence		**College**	**Computer Science and Mathematics**	
Module Leader	Baydaa Sulaiman Bahnam		**e-mail**	baydaa_sulaiman@uomosul.edu.iq	
Module Leader's Acad. Title	Assist. Prof.		**Module Leader's Qualification**	MSc.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	10/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	**Algorithms and Structured Programming (2)**	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Develop Problem-Solving Skills: Enable students to analyze problems, break them down into smaller components, and design appropriate solutions using a systematic approach. 2. Understand Input-process-output model: understand the input-process output model. 3. Master C++ Programming Fundamentals: Familiarize students with the syntax, data types, control structures, and functions of the C++ programming language. 4. Design Algorithms and Flowchart: Teach students how to translate the problem Solving strategies into Flowchart and implementing them in C++. 5. Software Development Method: Understand the software development method. 6. Enhance Debugging and Troubleshooting Skills: Help students develop effective debugging techniques to identify and resolve errors in their programs. 7. Promote Effective Programming Practices: Encourage good programming habits, such as code documentation, proper naming conventions, and writing readable and maintainable code. 8. Master Console Application Coding: Develop code writing skills. 9. Prepare for Advanced Programming Courses: Lay the foundation for further studies in computer science and programming by providing a solid understanding of problem-solving techniques and programming fundamentals in C++.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Recognize how to read and design algorithms and flowcharts. 2. Analyze and break down problems. 3. Practice professional C++ programming. 4. Debug and troubleshoot C++ code. 5. Demonstrate efficient programming skills. 6. Read and write professional C++ console applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Part A - Problem Theory Algorithm, Flowcharts, simple sequential flowchart, branched flowchart, Loop flowchart. [15 hrs] Identifier names, variables and data types (Integer, float, double, char), Input and output statements (cin and cout statements). [15 hrs] Operators (Arithmetic, Relational, Logical, Assignment, Unary plus and/Minus, Increment and /decrement, Bitwise, Ternary Operators) +, −, *, /, %, >, <, &&, ||, ! Operator precedence in C++ (( ), ++, −−, */% ,+− ,?). [20 hrs] Control statements (If statement), Nested control statement (Nested if statement). [15 hrs] Part II (Control statement) Switch …. Case selected , Break and Continue Control Statement [15 hrs]

	Part B - Control statements (second type), Iteration Statement (For Statement), Iteration Statement (While loop, Iteration Statement (Do while loop). (25 hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures: Lectures cover theoretical concepts and provide an overview of key topics. Hands-on Labs: Provide practical lab sessions where students can apply their knowledge and skills acquired in lectures. Use of Technology: Incorporate interactive tools and online platforms for practice and reinforcement. Peer Learning and Collaboration: Encourage students to work together and learn from each other. Scaffolded Learning: Break down complex concepts into manageable parts. Assessment Strategies: Employ a mix of formative and summative assessments. Real-World Examples: Connect theory with practical applications. Continuous Learning: Stay updated on computer science advancements and adapt teaching methods. Reflection and Feedback: Encourage self-reflection and provide constructive feedback.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٩٣	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٦
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	١٠٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٧
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	٢٠٠		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	٢	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	٢	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	١	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, Procedural Programming Principles
Week 2	Algorithm, Algorithm properties, Flowcharts, Flowchart Figure, Examples
Week 3	C++ Language Basics (Character set, Identifiers, Getting Started with C++)
Week 4	Variables Declaration, Variables, Constants
Week 5	Library, Math Library, Input and output statements
Week 6	Operators in C++ (Arithmetic, Relational, Logical, Assignment Operators)
Week 7	Operators in C++ (Unary plus and/Minus, Increment and /decrement, Bitwise, Ternary Operators)
Week 8	Operator precedence in C++
Week 9	Selection Statements (Control statement), The Single If Statement Structure
Week 10	The Single If Statement Structure (Blocks), The If/else Statement Structure
Week 11	Nested If and If/else Statements
Week 12	Break and Continue Control Statement, Switch Selection Statement (Selector), Conditional Statement
Week 13	Iteration Statements (for Statement), Nested Loops
Week 14	Iteration Statements (while Statement)
Week 15	Iteration Statements (Do/while Statement)
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to the language
Week 2	Lab 2: Input and output statements, variables and constants declaration and usage
Week 3	Lab 3: Library, Math Library, Input and output statements, variables and constants declaration and usage
Week 4	Lab 4: Operators in C++ (Arithmetic, Relational, Logical, Assignment Operators)
Week 5	Lab 5: Operators in C++ (Unary plus and/Minus, Increment and /decrement, Bitwise, Ternary Operators)
Week 6	Lab 6: Control Decision (if statement, If/else statement)
Week 7	Lab 7: Control Decision (Nested If and If/else Statements)
Week 8	Lab 8: Break and Continue Control Statement, Conditional Statement
Week 9	Lab 9: Control Decision (switch case)
Week 10	Lab 10: Iteration statement (for)
Week 11	Lab 11: Iteration statement (for), Nested Loops
Week 12	Lab 12: Iteration statement (while)

Week 13	Lab 13: Iteration statement (while), Nested Loops
Week 14	Lab 14: Iteration statement (do/while)
Week 15	Lab 15: Iteration statement (do/while), Nested Loops

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Mastering C++ by Sorhan Sami & Oqeli Saleh 2002	Yes
Recommended Texts	Practical C++ programming C++ from control structures through objects, eighth edition, by Tony Gaddis	No
Websites	https://books.google.iq/books?hl=en&lr=&id=-6fdDwAAQBAJ&oi=fnd&pg=PT3&dq=complete+guide+programming+in+c%2B%2B&ots=xYG363hrHS&sig=O0nZEquCDPXc8SDIQliLS3nWeuc&redir_esc=y#v=onepage&q=complete%20guide%20programming%20in%20c%2B%2B&f=false	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C – Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title				**Module Delivery**	
Module Type				☒**Theory** ☒**Lecture** ☐ **Lab** ☒ **Tutorial** ☐**Practical** ☐**Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)					
Module Level		UGI – ٦	**Semester of Delivery**		One (1)
Administering Department			**College**	**Computer Science and Mathematics**	
Module Leader	م. م. مروة عدنان إسماعيل		**e-mail**	Marwa-Adnan@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		MSc.
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		25/02/2024	**Version Number**	1.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	

	1- Getting to know Arabic speech: in terms of its definition, divisions, and signs for each section. 2- Knowing the Arabic sentence and the divisions of the Arabic sentence, nominal sentences and verbal sentences 3- Getting to know the movements of inflection: whether original or subsidiary 4- The student's knowledge of the Arabic verb: in terms of soundness and defect 5- The student's knowledge of the Arabic verb in terms of necessity and transitivity 6- The student's knowledge of the Arabic verb in terms of tense 7- Ways of writing the number, its masculinity and feminization 8- Knowing the punctuation marks in speech 9- Learning the rules of drawing the hamza 10- Learning how to write the tied and extended taa 11- Say and do not say: common mistakes among speakers and writers 12- Knowing what the declarative style is, 13- Knowing what the constructive style is, 14-Learning linguistic skills: Developing linguistic taste and improving the style of learners
Module Learning Outcomes	1- The student should know the Arabic language: in terms of its definition, divisions, and signs for each section. 2- The student should learn the Arabic sentence and the divisions of the Arabic sentence, nominal sentences and verbal sentences 3- Identify the movements of inflection: whether original or subsidiary 4- The student should know the Arabic verb: in terms of soundness and defect 5- The student should learn the Arabic verb in terms of necessity and transitivity 6- The student should know the Arabic verb in terms of tense 7- The student should know the ways of writing the number, its masculine and feminine forms 8- The student should know the punctuation marks in speech 9- The student should learn the rules of drawing the hamza 10- The student should know the way of writing the tied and extended taa 11- Say and do not say: common mistakes among speakers and writers 12- Identify the declarative style, 13- Know what the constructive style is, 14-Learn linguistic skills: Develop linguistic taste, and improve the style of learners
Indicative Contents	1- Getting to know Arabic speech: in terms of its definition, divisions, and signs for each section] Hour 2[2- Getting to know the Arabic sentence and the divisions of the Arabic sentence, nominal sentences and verbal sentences, Hour 2 3- Getting to know the movements of inflection: whether original or subsidiary, Hour 2 4- The student’s knowledge of the Arabic verb: in terms of soundness and defect, Hour 2 5- The student’s knowledge of the Arabic verb in terms of necessity and transitivity, Hour 2

	6- The student's knowledge of the Arabic verb in terms of tense, Hour 2 7- Methods of writing the number, its masculinity and feminization, Hour 2 8- Getting to know the punctuation marks in speech, Hour 2 9- Learning the rules of drawing the hamza, Hour 2 10- Getting to know the method of writing the tied and extended taa, Hour 2 11- Say and do not say: Common mistakes made by speakers and writers, Hour 2 12- Knowing what the news style is, Hour 2 13- Knowing what the construction style is, 2 hours 14-Learning linguistic skills: Developing linguistic taste and improving style among learners, 2 hours

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this unit is to encourage students to engage in speaking and writing Arabic correctly, while at the same time improving and expanding their critical thinking skills. This will be achieved through interactive classes and tutorials and by considering types of simple experiments that include some sampling activities that interest students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	20% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0	0% (0)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Arabic speech: definition, divisions, and signs of each division.
Week 2	Arabic sentence: definition, divisions: nominal and verbal
Week 3	I'rab movements: original, subsidiary
Week 4	Arabic verb: in terms of soundness and defect
Week 5	Arabic verb in terms of necessity and transitivity
Week 6	Arabic verb in terms of necessity
Week 7	Exam
Week 8	Number: reminder, and its feminization
Week 9	Punctuation marks in speech
Week 10	Rules for drawing the Hamza
Week 11	Ta marbuta, and the extended ta
Week 12	Say and do not say: common mistakes among speakers and writers
Week 13	Informative style, and the constructive style
Week 14	Informative style, and the constructive style
Week 15	**Linguistic skills: developing linguistic taste, and improving style among learners**
Week 16	**End of semester exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1:
Week 2	Lab 2
Week 3	Lab 3
Week 4	Lab 4:
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7:

Learning and Teaching Resources

	Text	Available in the Library?
Required Texts	Collector of Arabic Lessons: Sheikh Mustafa Al-Ghalayini	no
Recommended Texts	The Arabic Sentence: Its Composition and Sections Dr. Fadhel Al-Samarrai	No
Websites	https://www.almrsal.com/post/923401	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C – Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Artificial Intelligence** **الذكاء الاصطناعي**			**Module Delivery**	
Module Type				☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐ **Practical** ☐**Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)					
Module Level		UGI – 7	**Semester of Delivery**		One (1)
Administering Department		Artificial Intelligence	**College**	**Computer Science and Mathematics**	
Module Leader	Dr. Luma Akram Abdullah		**e-mail**	**Luma.akram@uomosul.edu.iq**	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	None	
Peer Reviewer Name			**e-mail**	None	
Scientific Committee Approval Date		10/10/2024	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To introduce students to the fundamental concepts and techniques of Artificial Intelligence (AI). 2. To foster critical thinking and problem-solving skills in AI-related domains. 3. To explore ways to model and represent knowledge and search strategies. 4. To effectively utilize intelligent systems, such as expert systems and reasoning engines. 5. Investigating inference rules and proof methodologies, predicate and propositional logic, and Conceptual graphs models for representations of knowledge. 6. To gain practical experience in creating AI systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the underlying ideas and fundamental concepts of artificial intelligence. 2. Define and explain the key concepts and terminology of Artificial Intelligence. 3. Design and implement AI algorithms for problem-solving, including search, planning, and decision-making. 4. Communicate AI concepts and results effectively to both technical and non-technical audiences. 5. Evaluate and assess the performance of artificial intelligence models using appropriate metrics and techniques. 6. Work effectively in teams to design, develop, and deploy AI problem-solving.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: <u>Part A – problem solving</u> Introduction to AI, how to solve problems, rules, AI applications, Solve the State Space Search Problems. [6 hrs] Strategies Search- Depth-First and Breadth-First Search, Hybrid first search- Using the State Space to Represent Reasoning with the Predicate. [10 hrs] Heuristic search such as the Generated and Testing method, Hill-Climbing algorithm, Best-First Search Algorithm, and A* search method, properties of Heuristic function such as Admissibility, Monotonicity, and informedness. [15 hrs] Knowledge Representation - Introduction to Logic Representation, proposition logic, predicate logic, Clauses, Unification, Reasoning with knowledge, and Production representation using Fact and Rule. [10 hrs] <u>Part B - Retrieving structured information from a database Doing data abstraction</u> Network Knowledge Representation, Semantic network, Conceptual Graphs and Frames Network [8 hrs] Algorithms for State Space Search, Blind Search, Heuristic Search, Knowledge Representation, and Expert Systems. [9 hrs] Data representation – Knowledge representation in production rules, tree, Definitions, Frame representation, List representation, and relational. [15 hrs] Expert system - Definition, Architecture of ES, ES elements, Expert System types [6 hrs]. Expert system - Definition, Architecture of ES, ES compound, export, knowledge engineering, ES examples. [7 hrs]. NLP- lexical processing, syntactic processing syntactic processing-assignment, semantic processing, building chatbots with rasa. [7 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy of AI course specialized educational program that focuses on teaching the principles, theories, and applications of artificial intelligence (AI). It is designed to provide students with a comprehensive understanding of AI concepts, algorithms, and techniques, as well as hands-on experience in developing AI systems.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٦٣	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٤
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٨٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٦
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, Propositional Logic and Predicate Logic
Week 2	First-Order- Predicate
Week 3	Production rules and Problem Characteristics
Week 4	Search Strategies (Problem state space and search space)
Week 5	Search Strategies (Problem Solving)
Week 6	Search Strategies (Blind Search)

Week 7	Search Strategies (Search Space Problems)
Week 8	Search Strategies (Monkey & Banana)
Week 9	Search Strategies (8puzzle, 2-jug)
Week 10	Forward & Backward
Week 11	Forward & Backward
Week 12	Matching
Week 13	Prolog (Terms)
Week 14	Prolog (List)
Week 15	Prolog (String)
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Prolog
Week 2	Declarative and procedural meaning of programs
Week 3	Data objects Matching
Week 4	Declarative meaning of Prolog programs
Week 5	Hill-Climbing and Dynamic Programming –Prolog
Week 6	The Best-First Search Algorithm Admissibility, Monotonicity,
Week 7	Retrieving structured information from a database, Doing data abstraction
Week 8	The Predicate Calculus
Week 9	Structures and Strategies
Week 10	Preventing backtracking, Examples using cut, Negation as failure, Problems with cut and negation
Week 11	Communication with files, Processing fi les of terms, Manipulating characters, Constructing and decomposing toms, Reading programs: consult, consult
Week 12	Representing and sorting lists, Insertion and deletion in a binary dictionary, Displaying trees, Graphs
Week 13	Introductory concepts and examples, Depth-first search strategy, Breadth-first search strategy
Week 14	applied to the Eight Puzzle, Best-first search applied to scheduling
Week 15	Forward & Backward

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	*Minds and computers: An introduction to the philosophy of artificial intelligence*. Edinburgh University Press, 2007 by Carter, Matt	Yes
Recommended	• *Artificial Intelligence Structures and Strategies for Complex Problem Solving* ***by*** George F Luger.	Yes

Texts	• *Artificial Intelligence A Guide to Intelligent Systems*. Second Edition, by M ichael Negnevitsky.	
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

Courses Description

Bologna System - Level 1

Semester 2

2024-2025

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Knowledge Representation** **تمثيل المعرفة**			**Module Delivery**	
Module Type				☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐ **Practical** ☐**Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)					
Module Level		UGI – 7	**Semester of Delivery**		Two (2)
Administering Department		Artificial Intelligence	**College**	**Computer Science and Mathematics**	
Module Leader	Dr. Luma Akram Abdullah		**e-mail**	**Luma.akram@uomosul.edu.iq**	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Noor Ammar		**e-mail**	noor.ammar@uomosul.edu.iq	
Peer Reviewer Name			**e-mail**	None	
Scientific Committee Approval Date		10/10/2024	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The objectives of a Knowledge Representation (KR) module are as follows: 1. **Structured Knowledge Modeling**: To represent real-world information, concepts, relationships, and processes in a formal, structured format that can be easily processed by computational systems. 2. **Enabling Inference and Reasoning**: To facilitate automated reasoning

	capabilities, allowing the system to derive new knowledge from existing data and make informed decisions based on that knowledge. 3. **Managing Complex Data**: To represent and manage complex, ambiguous, incomplete, or contradictory data in a way that ensures it can be understood, interpreted, and used by the system. 4. **Maintaining Consistency**: To ensure the integrity and consistency of the knowledge base, even as new information is introduced or existing data is modified. 5. **Facilitating Learning**: To support continuous learning by enabling the system to update and refine its knowledge base based on new inputs or experiences. 6. **Enabling Knowledge Sharing**: To create a framework that promotes the exchange of knowledge across different systems, users, and domains, ensuring interoperability and fostering collaboration. 7. **Optimizing Problem Solving**: To improve the system's problem-solving capabilities by providing an organized, easily accessible knowledge base for efficient retrieval and processing of relevant information. 8. **Supporting Explainability**: To ensure that the system's reasoning processes and decisions can be understood and explained in a manner that is transparent and accessible to human users, thereby increasing trust and reliability. 9. **Enhancing Decision-Making**: To enable data-driven, informed decision-making by organizing and structuring relevant knowledge in a way that it can be effectively accessed and applied in a given context. 10. **Ensuring Scalability**: To design the knowledge representation system to accommodate the increasing volume, complexity, and variety of data, ensuring it remains effective as the system grows. These objectives aim to establish a comprehensive and effective framework for organizing, retrieving, and utilizing knowledge, empowering systems to make accurate, relevant, and context-aware decisions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Knowledge and understanding: at the end of the course the students should be acquainted with the broad principles of knowledge representation, such as the separation of representation and reasoning, the declarative nature of representations, and the universal (domain-independent) nature of inference mechanisms. Apply knowledge and understanding: students will have practical experience with different representation formalisms and be able to implement a reasoning tool for at least one of these formalisms. This will allow them to better understand the role of knowledge representation in the broader context of AI. Making judgment: students will be able to set up empirical experiments to evaluate the pros and cons of Knowledge Representation formalisms in specific application areas. Communication skills: students can write a scientific report about an original research question in a small group of students. Learning Outcomes: Students will develop the ability to acquire knowledge about a range of complex formal systems, formulate research questions and scientific hypotheses, and conduct the requisite empirical research to validate or refute these hypotheses.
Indicative Contents المحتويات الإرشادية	**Indicative Contents of Knowledge Representation (KR)** 1. **Introduction to Knowledge Representation** o Definition and importance of KR o Overview of KR in artificial intelligence and cognitive science

	○ Key challenges in representing knowledge 2. **Types of Knowledge** ○ Declarative vs. procedural knowledge ○ Explicit vs. tacit knowledge ○ Structured vs. unstructured knowledge 3. **Formal Logics for Knowledge Representation** ○ Propositional logic and predicate logic ○ Modal logic and non-monotonic reasoning ○ Description logics and their applications 4. **Semantic Networks** ○ Structure and components of semantic networks ○ Representation of concepts and relationships ○ Applications in natural language processing and AI systems 5. **Frames and Ontologies** ○ Structure and use of frames in KR ○ Ontology design and representation ○ The role of ontologies in semantic web and knowledge integration 6. **Rule-Based Systems** ○ Knowledge representation using rules ○ Forward and backward chaining ○ Expert systems and their applications 7. **Graph-Based Knowledge Representation** ○ Knowledge graphs and their construction ○ Graph-based reasoning and applications ○ Relationship between nodes, edges, and attributes 8. **Uncertainty and Incomplete Knowledge** ○ Handling uncertainty in KR (e.g., probabilistic reasoning) ○ Representing incomplete or contradictory knowledge ○ Fuzzy logic and its applications 9. **Inference and Reasoning Mechanisms** ○ Deductive vs. inductive reasoning ○ Logical inference and automated reasoning tools ○ Challenges in reasoning over large-scale knowledge bases 10. **Applications of Knowledge Representation** ○ Expert systems, decision support systems, and AI applications ○ Natural language processing and understanding ○ Knowledge representation in robotics and machine learning 11. **Evaluation and Testing of Knowledge Representation Models** ○ Metrics for assessing KR models ○ Validity, consistency, and completeness in KR systems ○ Performance evaluation of reasoning mechanisms 12. **Future Trends in Knowledge Representation** ○ Advances in KR for AI and machine learning ○ Integration with big data and cloud computing ○ Ethical considerations and challenges in KR development

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Learning and Teaching Strategies for Knowledge Representation (KR)**

	1. **Lectures and Theoretical Sessions**: Deliver foundational knowledge on the principles, techniques, and methodologies used in Knowledge Representation, including formal logic, semantic networks, ontologies, and knowledge graphs. These sessions will provide students with a solid understanding of the core concepts and theories underlying KR. 2. **Hands-On Workshops and Practical Exercises**: Facilitate interactive sessions where students can apply theoretical concepts to real-world scenarios. These workshops will focus on practical skills such as designing knowledge representations, implementing inference mechanisms, and using KR tools and software. 3. **Case Studies and Problem-Based Learning**: Utilize case studies to illustrate the application of KR in various domains, such as artificial intelligence, expert systems, and natural language processing. Problem-based learning approaches will encourage students to analyze complex problems and develop KR solutions. 4. **Collaborative Learning and Group Projects**: Encourage teamwork through group projects that involve the creation of knowledge representations for specific domains or applications. Collaborative learning helps students develop critical thinking, communication, and problem-solving skills. 5. **Research and Independent Study**: Guide students in conducting independent research to explore specific KR topics in greater depth. Students will be encouraged to investigate advanced KR techniques, emerging trends, and the application of KR in different fields. 6. **Interactive Discussions and Seminars**: Foster an interactive learning environment where students can engage in discussions, share ideas, and critically evaluate different KR approaches. Seminars will provide a platform for students to present their research, findings, and solutions to peers. 7. **Use of Software Tools and Simulations**: Incorporate the use of KR tools and simulation software to provide hands-on experience in building and managing knowledge bases. This will allow students to gain practical skills in working with real-world datasets and applying KR techniques to solve complex problems. 8. **Assessment through Practical Assignments and Exams**: Assess students' understanding and ability to apply KR concepts through practical assignments, projects, and written exams. The focus will be on both theoretical knowledge and practical application of KR methods. 9. **Feedback and Reflection**: Provide regular feedback on assignments, projects, and exams, encouraging students to reflect on their learning and improve their understanding of KR. This feedback loop helps ensure continuous learning and development.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٦٣	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٤
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٨٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٦

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to knowledge-based technologies and knowledge representation
Week 2	Propositional Logic as a simple knowledge representation language
Week 3	Classical logic and knowledge representation
Week 4	Logic programming and answer set programming
Week 5	Reasoning about actions and planning
Week 6	Ontology
Week 7	linked data and the Semantic Web
Week 8	linked data and the Semantic Web
Week 9	Probability: Bayesian networks, Markov networks
Week 10	Probability: Bayesian networks, Markov networks
Week 11	Combining logic and probability: Markov Logic, Probabilistic Soft Logic
Week 12	Combining logic and probability: Markov Logic, Probabilistic Soft Logic
Week 13	LPMLN
Week 14	Applications of KRR
Week 15	Applications of KRR
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lists and List Operations
Week 2	Introduction to lists in Prolog
Week 3	Manipulating lists: head, tail, length, append, member, etc.
Week 4	Defining recursive predicates for list operations
Week 5	Hands-on exercises: Solving problems involving list processing (e.g., reversing a list, summing elements)
Week 6	More Complex Data Structures
Week 7	Introduction to compound terms and structures in Prolog
Week 8	Using facts with multiple arguments and more complex relationships
Week 9	Representing trees, graphs, and other data structures
Week 10	Hands-on exercises: Defining complex relationships using compound terms
Week 11	Input/Output and File Handling in Prolog
Week 12	Reading from and writing to files in Prolog
Week 13	Using Prolog's built-in predicates for file handling
Week 14	Hands-on exercises: Implementing I/O operations in Prolog, such as saving and reading knowledge bases from files
Week 15	Prolog in Problem Solving (Search Problems)

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• *George F. Luger, "Artificial Intelligence structures and strategies for complex problem solving". 2008* • *Max Bramer, "Logic Programming with prolog ", spring, 2005.*	Yes
Recommended Texts	SWI Prolog Reference Manual Updated for version 6.2.2, September 2012 Jan Wielemaker J.Wielemaker@vu.nl http://www.swi-prolog.org	
Websites	https://www.tutorialspoint.com/prolog/prolog_quick_guide.htm https://athena.ecs.csus.edu/~mei/logicp/exercises.html	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics for AI** **الرياضيات للذكاء الاصطناعي**			**Module Delivery**	
Module Type	**Supportive**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOMAI202**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	UGI – 3		**Semester of Delivery**	Two (2)	
Administering Department	Artificial Intelligence		**College**	Computer Science and Mathematics	
Module Leader	Dr. Zeyad Abd-Algfoor Hasan		**e-mail**	drzeyad@uomosul.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	02/01/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This module provides students with some fundamental mathematical concepts relevant to applications in AI and CE. The focus will be on applying mathematical proofs to solve computer science problems as well as introducing basic concepts and techniques in linear algebra and calculus. In addition to theoretical treatments, there will be laboratory applications using Python and Jupyter to visualize, manipulate and explore mathematics.
Module Learning	• Critically appraise various mathematical approaches to analyzing a given data

Outcomes مخرجات التعلم للمادة الدراسية	set. • Select and apply suitable techniques to solve relevant AI and Data Science problems in calculus, linear algebra, and probability • Analyze and apply periodic functions. • Summarize how mathematical approaches can be applied to AI and Data Science problems.
Indicative Contents المحتويات الإرشادية	• Understand key mathematical concepts such as linear algebra, probability, statistics, calculus, and optimization. • Grasp the role of these concepts in the context of AI models and algorithms. • Use matrices, vectors, and tensors to represent and process data in AI applications. • Analyze probabilistic models and handle uncertainty in decision-making. • Perform optimization to train AI models efficiently.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The course focus on a blend of theoretical instruction and practical application. Lectures will introduce key mathematical concepts, while problem-based and project-based learning will enhance critical thinking and problem-solving skills. Hands-on coding using a tool like Python will bridge theory with AI applications. The classroom approach will encourage active participation, and collaborative learning will foster teamwork. Visualization techniques will simplify complex topics, and case studies will provide real-world insights.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All

	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Properties of exponents (product, power, and quotient rules) Negative and zero exponents
Week 2	Square roots and higher-order radicals, Conversion between radicals and fractional exponents, Solving radical equations.
Week 3	Definition and properties of factorials. Introduction to permutations and combinations. Applications in probability and counting problems.
Week 4	Summation notation and properties, Arithmetic and geometric series, Practical applications in finance and data analysis
Week 5	Converting between standard and scientific notation. Operations with numbers in scientific notation.
Week 6	Scalars vs. vectors. Operations on scalars.
Week 7	Scalars vs. vectors. Operations on scalars.
Week 8	Vector addition, subtraction, and scalar multiplication. Dot product and cross product.
Week 9	Matrix addition, multiplication, and inverses
Week 10	Basics of tensors and their ranks
Week 11	Singular Value Decomposition (SVD) Understanding the decomposition. Applications in image compression and data analysis.
Week 12	Principal Component Analysis (PCA). Steps of PCA. Eigenvalues/eigenvectors in PCA.
Week 13	Derivatives Basic differentiation rules. Partial derivatives.
Week 14	Vector/Matrix Calculus. Gradient, divergence, and curl. Jacobian and Hessian matrices.
Week 15	Gradient Algorithms. Gradient descent and variants (e.g., stochastic, batch).
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Equations, Linear Equations.
Week 2	Systems of Equations
Week 3	Exponentials, Radicals, and Logs

Week4	Standard Form for Polynomials
Week 5	Factors of Polynomial Expressions
Week 6	Quadratic Equations, Functions
Week 7	**Midterm**
Week 8	Linear Rate of Change
Week 9	Vectors, Vector Multiplication
Week 10	Matrices and Matrix Notation (Adding Matrices, Subtracting Matrice, Matrix Transposition)
Week 11	Differentiation and Derivatives
Week 12	Critical Points and Optimization
Week 13	Partial Derivatives
Week 14	Integration
Week 15	Data and Data Visualization
Week 16	**Final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Linear Algebra and its Applications** by David C. Lay	NO
Recommended Texts	**Numerical Linear Algebra** by Lloyd N. Trefethen and David Bau	NO
Websites	1) **Linear Algebra" by Gilbert Strang (MIT OpenCourseWare)** • Comprehensive video lectures and notes. 2) **Khan Academy** • Covers exponents, radicals, summations, and calculus with interactive examples. 3) **3Blue1Brown (YouTube)** • Excellent visual explanations of linear algebra, eigenvalues, and SVD.	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Algorithms and Structured Programming (2)** الخوارزميات والبرمجة المهيكلة(٢)			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**UOMAI205**			☒ **Lecture**	
ECTS Credits	**8**			☒ **Lab**	
SWL (hr/sem)	**200**			☐ **Tutorial**	
				☒ **Practical**	
				☐ **Seminar**	
Module Level	UGI – 5		**Semester of Delivery**	Two (2)	
Administering Department	Artificial Intelligence		**College**	**Computer Science and Mathematics**	
Module Leader	Baydaa Sulaiman Bahnam		**e-mail**	baydaa_sulaiman@uomosul.edu.iq	
Module Leader's Acad. Title	Assist. Prof.		**Module Leader's Qualification**	MSc.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date	10/10/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Algorithms and Structured Programming (١)**	**Semester**	١
Co-requisites module	None	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Improve Problem-Solving Skills: Enable students to analyze problems, break them down into smaller components, and design appropriate solutions using a systematic approach. 2. Master Advanced C++ Programming: Teach students the advanced data types, control structures, and functions of the C++ programming language. 3. Code Modularity Concepts: Teach students how to write modular code using different concepts like functions, libraries, and object-oriented programming principles. 4. Promote Effective Programming Practices: Instill good programming habits, such as code documentation, proper naming conventions, and writing readable and maintainable code. 5. Apply Programming Skills to Real-World Problems: Provide opportunities for students to apply their programming knowledge to solve practical problems and develop software applications. 6. Operating System Programming: Teach student how to connect their programmer to operating system and how to work with files and directories. 7. Cultivate Collaboration and Teamwork: Encourage students to work collaboratively on programming projects, fostering effective communication, problem-solving, and collaboration skills. 8. Report Writing and Presentation: Prepare the student on how to write reports and present their work for the class. 9. Decision Making: Communicate design decisions for the selection, storage and manipulation of data. 10. Prepare for Future Courses: Prepare students for upcoming courses in the collage, with related to programming.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 10. Practice professional C++ programming. 11. Summarize code modularity and reusage. 12. Communicate and Document Code. 13. Work collaboratively in teams. 14. Apply programming skills to Real-World scenarios. 15. Prepare for future programming concepts.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Part A – function: Definition of functions, Examples, Definition of default argument, Definition of recursive functions, Definition of call by reference functions [20 hrs]

	Part B – arrays: Definition of 1D, Examples, Definition of 2D, main and second diagonal, examples [20 hrs] Part C – string: Definition of string, read and write string, Definition of string function, examples [15 hrs] Part D- structures: Definition of structures, read structure, write structures, examples, Definition of nested structure, examples [20 hrs] Part E - files: Definition files, Open files, closing files, file Input/Output Operations[20 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	٩٣	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	٦
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	١٠٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	٧
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	٢٠٠		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative	**Quizzes**	٢	10% (10)	5 and 10	LO #1, #2 and #10, #11

assessment	**Assignments**	٢	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	١	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Review of the Introduction to Problem Solving and Programming (1)
Week 2	Functions (Function Declaration, Function types , Default argument function, Function Call , Return types, Local and global variables).
Week 3	Functions (Function, Passing Parameters (Passing by Value, Passing by Reference), Recursive function
Week 4	Arrays (Array of One Dimension (Declaration of Arrays, Initializing Array Elements, Accessing Array Elements, Read / Write / Process Array Elements)
Week 5	Arrays (Array of One Dimension (Declaration of Arrays, Initializing Array Elements, Accessing Array Elements, Read / Write / Process Array Elements)
Week 6	Array of Two Dimension (Declaration of 2D-Arrays, Initializing 2D-Array Elements, Read / Write / Process Array Elements))
Week 7	Array of Two Dimension (Declaration of 2D-Arrays, Initializing 2D-Array Elements, Read / Write / Process Array Elements))
Week 8	Array of Two Dimension (Declaration of 2D-Arrays, Initializing 2D-Array Elements, Read / Write / Process Array Elements))
Week 9	String (Read / Write / Process Array Elements, Member Function of String, cstdlib Library)
Week 10	String (Read / Write / Process Array Elements, Member Function of String, cstdlib Library)
Week 11	String (Read / Write / Process Array Elements, Member Function of String, cstdlib Library)
Week 12	Structures (The Three Ways for Declare the Structure, Array of Structures)
Week 13	Structures (The Three Ways for Declare the Structure, Array of Structures)

Week 14	Files (opening and closing files, file Input/Output Operations)
Week 15	Files (file Input/Output Operations)
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Additional application and review of Problem Solving and Programming (1) Default argument functions
Week 2	Lab 2: Function types according to whether it take arguments and/or return a value or not.
Week 3	Lab 3: Call by reference function
Week 4	Lab 4: Recursive function
Week 5	Lab 5: One-Dimensional Arrays
Week 6	Lab 6: Two-Dimensional Arrays
Week 7	Lab 7: Two-Dimensional Arrays and Arrays Manipulation with Functions
Week 8	Lab 8: Two-Dimensional Arrays and Arrays Manipulation with Functions
Week 9	Lab 9: Strings (Character Arrays)
Week 10	Lab 10: String Manipulation with functions
Week 11	Lab 11: String Manipulation with functions
Week 12	Lab 12: Structures and Arrays of structures
Week 13	Lab 13: Nested structures and Arrays of structures
Week 14	Lab 14: File Operations: Open/Close and Input/Output Operations with files
Week 15	Lab 15: File Operations: Open/Close and Input/Output Operations with files

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Mastering C++ by Sorhan Sami & Oqeli Saleh 2002	Yes
Recommended Texts	Practical C++ programming C++ from control structures through objects, eighth edition, by Tony Gaddis	No
Websites	https://books.google.iq/books?hl=en&lr=&id=-6fdDwAAQBAJ&oi=fnd&pg=PT3&dq=complete+guide+programming+in+c%2B%2B&ots=xYG363hrHS&sig=O0nZEquCDPXc8SDIQliLS3nWeuc&redir_esc=y#v=onepage&q=complete%20guide%20programming%20in%20c%2B%2B&f=false	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C – Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

Module Information					
Module Title	**English Language**			**Module Delivery**	
Module Type				☒**Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐**Practical** ☐**Seminar**	
Module Code					
ECTS Credits					
SWL (hr/sem)					
Module Level		UGI – ٦	**Semester of Delivery**		Two (2)
Administering Department		Artificial Intelligence	**College**	Computer Science and Mathematics	
Module Leader	Dr. Zeyad Abd-Algfoor Hasan		**e-mail**	drzeyad@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		PhD
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date		10/10/2024	**Version Number**		1.0

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	1. To be able to speak English fluently and accurately. 2. To think in English and then speak. 3. To be able to talk in English. 4. To be able to compose freely and independently in speech and writing. 5. To be able to read books with understanding.
Module Learning Outcomes	1. To address grammar issues that students encounter in their daily speech, writing, reading, and listening. 2. To address the issue of grammatical errors that affect effective communication. 3. To improve your reading skills through the practice of vocabulary enrichment, reading comprehension exercises, speed reading strategies, written responses, discussions, and reflections. 4. Recognize the structure and organization of paragraphs. 5. Use strategies to think critically about reading and use appropriate technology to enhance reading comprehension, reading speed, and vocabulary development. 6. Develop the writing skill.

Indicative Contents	**Indicative content includes the following:** **Introduction: about new headway pre-intermediate plus [5 hrs]** **Tenses: past-present-future, wh- questions. Vocabulary- using a bilingual dictionary, reading (communication). Everyday English (social expressions) [5 hrs]** **Grammar: Review about tenses, Present tenses, have and have got. Vocabulary: about (daily life), listening and match between verb and nouns. Practices about simple present and present continuous, Reading: about living in the USA. Social expressions about every day English [10 hrs]** **Past tenses, simple past and past continuous, practice, Reading and listening, regular and irregular verbs. Vocabulary: about N.- V.- Adj. endings. Everyday English (time expressions) [10hrs]** **Grammar: the quantities, also about Something/someone/somewhere, practices. Reading: about markets, practices [12 hrs]**

Learning and Teaching Strategies	
Strategies	**The main strategy that will be adopted in developing the four skills:** **The skill of speaking,** **The skill of reading,** **The skill of writing,** **The skill of listening,** **Also, enable the students for the use of grammar correctly.**

Student Workload (SWL)			
Structured SWL (h/sem)	33	**Structured SWL (h/w)**	2
Unstructured SWL (h/sem)	17	**Unstructured SWL (h/w)**	1
Total SWL (h/sem)	**50**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	١٠% (١٠)	5, 10 and 12	LO #1, #2 and #10, #11
	Assignments	2	20% (20)	2,5 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0	0% (0)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	**Introduction**
Week 2	**Speaking, reading, and listing**
Week 3	**Speaking, reading, and listing**
Week 4	**Meeting People and Jobs in IT**
Week 5	**schedules, spelling and industry**
Week 6	**past simple tense and present simple tense**
Week 7	**past simple tense and present simple tense**
Week 8	**working in the IT**
Week 9	**Prepositions of time**
Week 10	**Computer systems**
Week 11	**Computer hardware**
Week 12	**computer software**
Week 13	**working with computers**
Week 14	**Comparatives, Present continuous**
Week 15	**Comparatives, Present continuous**
Week 16	**Final Exam**

Learning and Teaching Resources		
	Text	**Available in the Library?**
Required Texts	• **English for information technology, 1 vocational English, course book, Maja Olejniczak, series editor David Bonamy** • **Headway pre-intermediate plus student's book. (John and Liz Soars)**	Yes
Recommended Texts	**Headway pre-intermediate plus work's book**	Yes
Websites	https://www.youtube.com/watch?v=WOVu22J_sN8	

Grading Scheme				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Computer Organization تركيب الحاسوب			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**UOMAI203**			☒ **Lecture**	
ECTS Credits	**6**			☒ **Lab**	
SWL (hr/sem)	**150**			☐ **Tutorial**	
				☐ **Practical**	
				☐ **Seminar**	
Module Level	UGI – 2	**Semester of Delivery**	One (1)		
Administering Department	Artificial Intelligence	**College**	**Computer Science and Mathematics**		
Module Leader	Dr. Ban Shareef Mustafa	**e-mail**	banmustafa66@uomosul.edu.iq		
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.		
Module Tutor	Name (if available)	**e-mail**	E-mail		
Peer Reviewer Name	Name	**e-mail**	E-mail		
Scientific Committee Approval Date	10/10/2024	**Version Number**	1.0		

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To understand the difference between computer architecture and organization. 2. Describe the different types of computers. 3. To understand the organization of computers and their various units. 4. Describe the bus structures in detail and their interconnections.

	5. Describe the input/output interface and devices. 6. Explain the significance of I/O channels and processors. 7. Understand the characteristics of memory systems. 8. Explain memory system design and hierarch. 9. Understand the architecture of 8086/8088. 10. Impart the knowledge about the instruction set. 11. To understand the basic idea of data transfer schemes and their applications. 12. Develop Skills in simple program writing for 8086 and applications. 13. To develop problem-solving skills and an understanding of circuit theory through the application of techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of the course, students will be able to: 1. Demonstrate computer architecture concepts related to the design of modern processors, memories, and I/Os. 2. Analyze the performance of commercially available computers. 3. Understand the optimal usage of registers of processors in programming. 4. Apply knowledge and demonstrate programming proficiency using the target microprocessor and microcontroller's various addressing modes and data transfer instructions. 5. Demonstrate programming proficiency using the target Arithmetic instruction and logic instructions. 6. To Develop a report to generate a code for applications using assembly language programming to meet societal requirements.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Unit I: Computer Fundamentals: Comparison of Computer Organization &Architecture, Computer Components Functions, Interconnection Structures, basic Operational concepts, Processor Organization and Register Organization, Instruction Cycle, Bus Structures, Input / Output: I/O Module, Von Neumann Architecture, Microprocessors and Microcomputers, General Architecture of a Microcomputer System. [15 hrs] UNIT II: Memory Concepts and Hierarchy: Classification and design parameters, Memory Hierarchy, Multilevel Memory, Internal Memory: RAM, SRAM and DRAM, ROM chips, Interleaved and Associative Memory. Cache Memory, Virtual Memory, External Memory: Magnetic Discs, Optical Memory, Flash Memories. [5 hrs] UNIT III: Processor Organization: Introduction to Microprocessors and Microcomputers, the Software architecture of 8088/8086 microprocessors, Memory Address Space & Data Organization, Assembly Language Programming Development on the PC, Instruction set architecture, Addressing mode, The PC & its DEBUG Program, Examining & Modify the Contents of Memory, Debugging Program (Assemble Command), Data transfer instructions, Arithmetic instructions, Logic Instructions, The Architecture of the Intel 8088/8086 CPU Architecture, Inside the 8086 Microprocessor, Fetch and Execute, Reading/Writing Data. [50 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the discussions, while at the same time refining and expanding their critical thinking skills. This will be achieved through: 1. Lectures - aim to deliver concepts and fundamental knowledge relation. 2. Tutorial sessions - are deployed to illustrate the application of fundamental knowledge of assembly language programming to different practical

	problems. 3. Assignments - are arranged to provide the opportunity for students to search for information, analyze problems and model their programs, with knowledge obtained, and present the completed tasks. 4. Computer sessions - to develop actual computer codes to solve simple experiments, and thus the use of assembly language to implement different instructions is an important part of the subject.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	٨٧	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 11	LO #3, #4, #9 and #10
	Assignments	2	10% (10)	5, 12, 13, 15	LO #4, #11, #12 and #14
	Projects / Lab.	1	10% (1٠)	Continuous	All
	Report	١	10% (1٠)	١٣	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	٥0% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Functional units, basic Operational concepts, Bus structures
Week 2	Software, Performance, Multiprocessors, Multicomputer
Week 3	Data Representation: Signed number representation, fixed and floating-point Representations
Week 4	Computer Arithmetic: Addition and subtraction, multiplication Algorithms, Division Algorithms
Week 5	Error detection and correction codes

Week 6	Register Transfer Language and Micro Operations: RTL- Registers, Register transfers, Bus and memory transfers
Week 7	Micro operations: Arithmetic, Logic, and Shift microoperations, Arithmetic logic shift unit.
Week 8	Basic Computer Organization and Design: Computer Registers, Computer instructions, Instruction cycle.
Week 9	Instruction codes, Timing and Control, Types of Instructions: Memory Reference Instructions, Input – Output and Interrupt.
Week 10	Central Processing Unit: General Register Organization, Stack organization, Instruction formats, Addressing modes, Data Transfer and Manipulation, Program Control, CISC and RISC processors
Week 11	Control unit design: Design approaches, Control memory, Address sequencing, micro program example, design of CU. Micro Programmed Control.
Week 12	Memory Organization: Semiconductor Memory Technologies, Memory hierarchy, Interleaving, Main Memory-RAM and ROM chips, Address map, Associative Memory-Hardware organization.
Week 13	Match logic. Cache memory-size vs. block size, Mapping functions Associate, Direct, Set Associative mapping.
Week 14	Replacement algorithms, write policies. Auxiliary memory.
Week 15	Input –Output Organization: Peripheral devices, Input-output subsystems, I/O device interface, I/O Processor, I/O transfers–Program controlled, Interrupt driven, and DMA, interrupts and exceptions. I/O device interfaces – SCII.
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: The PC & its DEBUG Program
Week 2	Lab 2: Examining & Modify the Contents of Memory (Dump command, Data Entry Commands)
Week 3	Lab 3: Move & compare commands
Week 4	Lab 4: debugging program (assemble command and unassembled command, trace command)
Week 5	Lab 5: General purpose registers, Pointer register & instruction pointer
Week 6	Lab 6: Registers commands & flag register
Week 7	Lab 7: Registers commands & flag register
Week 8	Lab 8: Write & execute the program in the debugger by applying MOV inst.
Week 9	Lab 9: Write & execute the program in the debugger by applying MOV inst.
Week 10	Lab 10: Use data transfer instructions in programming
Week 11	Lab 11: Use data transfer instructions in programming
Week 12	Lab 12: Use Arithmetic instruction programming
Week 13	Lab 13: Use Arithmetic instruction programming
Week 14	Lab 14: Use Arithmetic instruction programming
Week 15	Lab 15: Exam

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• Computer Organization – Carl Hamacher, Zvonks Vranesic, SafeaZaky, Vth Edition, McGraw Hill. • Computer Systems Architecture – M.Moris Mano, IIIrd Edition, Pearson/PHI	yes
Recommended Texts	Barry B. Brey, "8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium 4, and Core2 with 64-Bit Extensions Architecture, Programming, and Interfacing", Eighth Edition 2009.	Yes
Websites	https://www.tutorialspoint.com/computer_organization/index.asp	

Grading Scheme
مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Web Development**			**Module Delivery**	
Module Type	**Supportive**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOMAI204**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	UGI – 3		**Semester of Delivery**	Two (2)	
Administering Department	Artificial Intelligence		**College**	**Computer Science and Mathematics**	
Module Leader	Dr. Alyaa Qusay Ahmed		**e-mail**	Dr.alyaa@uomosul.edu.iq	
Module Leader's Acad. Title			**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	02/01 /2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	19. Understanding Web Technologies: To provide students with a foundational understanding of web technologies, including HTML, CSS, and JavaScript, and their role in building websites and web applications. 20. Website Structure and Design: To teach students how to create well-structured and visually appealing websites using HTML and CSS, focusing on concepts such as layout, typography, color schemes, and responsive design. 21. Interactive Web Elements: To enable students to incorporate interactive elements into websites using JavaScript. 22. Client-Server Communication: To introduce students to the basics of client-server communication in web development, including sending and receiving data from a server using HTTP requests and APIs. 23. Web Accessibility: Apply principles of web accessibility, teach the student how design simple and efficient website, that allows users to quickly find the information they need, and looks visually pleasing. 24. Collaboration and Communication: To promote teamwork and effective communication skills by encouraging students to work collaboratively on group projects. 25. Problem-Solving and Debugging: To enhance students' problem-solving skills and teach them how to debug and troubleshoot common issues in web development.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowledge of Web Technologies: Gain a solid understanding of web technologies, including HTML, CSS, and JavaScript, and their role in web development. 2. Website Creation: Design and develop well-structured websites using HTML and CSS, considering factors such as layout, typography, color schemes, and responsive design. 3. Interactive Elements: Implement interactive features on websites using JavaScript, such as form validation, event handling, and dynamic content manipulation. 4. Client-Server Communication: Understand the basics of client-server communication in web development, including making HTTP requests and working with APIs to retrieve and send data. 5. Use of Web Development Tools: Utilize popular web development tools, such as text editors, version control systems, and debugging tools, to enhance productivity and efficiency in web development projects. 6. Project Development: Develop a complete web project, applying the knowledge and skills acquired throughout the course, from planning and design to implementation and deployment. 7. Collaboration and Communication: Collaborate with team members, for project requirements to design and implement websites efficiently.

Indicative Contents المحتويات الإرشادية	The indicative contents for Web Development 1 may include: 1. Introduction to Web Technologies: • Overview on internet, web development concepts and technologies • Understanding the client-server architecture and how the web works 2. HTML Fundamentals: • HTML syntax and structure • Working with tags, attributes, and elements • Creating hyperlinks, lists, tables, and forms 3. CSS Basics: • Introduction to Cascading Style Sheets (CSS) • Applying styles to HTML elements • Managing layout, typography, and colors 4. JavaScript Fundamentals: • Introduction to JavaScript programming language • Variables, data types, and operators • Conditional statements and loops 5. Responsive Web Design: • Designing websites that adapt to different screen sizes and devices • Implementing responsive layouts and navigation menus 6. Web Accessibility: • Understanding the importance of web accessibility and • Accessibility principles and techniques 7. Introduction to Server-side Technologies: • Overview of server-side programming languages and frameworks • Introduction to databases and server-side scripting 8. Introduction to Version Control: • Understanding the concept of version control and its importance in web development 9. Web Project Development: • Planning and organizing a web development project • Implementing the project using HTML, CSS, and JavaScript 10. Deployment and Maintenance:

	• Introduction to hosting a website on a server • Performing maintenance tasks and updates • Testing and troubleshooting common issues Please note that the above contents are indicative and may vary depending on the specific curriculum and institution offering the course

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: In-class lectures can be used to introduce and explain key concepts, programming languages, and techniques related to web development. The instructor can provide examples and demonstrations to illustrate the concepts. 2. Hands-on Practice: Students can engage in practical exercises and coding activities during the class or in dedicated lab sessions. T 3. Teach the student how to apply the knowledge gained and practice coding HTML, CSS, and JavaScript. 4. Project-based Learning: Assigning small projects or tasks related to web development can provide students with real-world scenarios to apply their skills and knowledge. 5. Group Discussions and Peer Learning: Encouraging group discussions and peer learning can enhance understanding and knowledge retention. Students can discuss challenges, exchange ideas, and collaborate on problem-solving. This fosters a collaborative learning environment and allows students to learn from each other's experiences. 6. Online Resources and Tutorials: Providing students with online resources, tutorials, and documentation can supplement classroom learning. These resources can include video tutorials, coding exercises, interactive websites, and documentation of programming languages and frameworks. 7. Code Reviews and Feedback: Conducting code reviews and providing feedback on student projects or assignments can help improve their coding skills. Feedback can be provided by the instructor or through peer code reviews. 8. Guest Speakers and Industry Insights: Inviting guest speakers from the industry or web development professionals to provide valuable insights and real-world experiences to students. They can share their expertise, industry trends, and challenges in web development, inspiring students and bridging the gap between academia and industry. 9. Assessment and Evaluation: Assessments can include quizzes, assignments, projects, and exams to evaluate students' understanding and progress. This allows the instructor to gauge their knowledge and provide constructive feedback for improvement. It is worth noting that the selection and implementation of these strategies may vary based on the specific educational institution, class size, resources available, and the preferences of the instructor.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Internet, Web concept and Web Sites classifications

Week 2	Introduction to Web technologies, Web design Editors, HTML Basics (Elements, Attributes, Headings, Paragraphs, Styles)
Week 3	HTML formatting, HTML Tables, HTML Entities, Links, Images
Week 4	HTML Lists, HTML Internal Frames, HTML Media (video, audio)
Week 5	Creating stylish Websites. HTML Layout, HTML Forms (form elements, Input types, Input attributes, files).
Week 6	Website Structure and Hosting
Week 7	Introduction to CSS Basics & Properties, Applying CSS styles to HTML elements
Week 8	Color System, Backgrounds, and Borders
Week 9	Fonts, Text in CSS, Links by CSS and Pseudo class
Week 10	Box Models (outlines, Padding, Margins), Dimensions, and Overflow
Week 11	Web application development process
Week 12	Introduction JavaScript Programming for web design and JavaScript frameworks
Week 13	JavaScript Programing, syntax, conditional statements and loops
Week 14	Programming Technologies. Front-end framework and Back-end frameworks
Week 15	Programming using API and Creating and Testing Web Applications
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to HTML, HTML editor and web design programing
Week 2	HTML Basics (Elements, Attributes, Headings, Paragraphs, and Styles).
Week 3	HTML formatting, HTML Tables. HTML Entities, Links, Images
Week4	HTML Lists, HTML Internal Frames, HTML Media (video, audio)
Week 5	Creating stylish Websites. HTML Layout, HTML Forms (form elements, Input types, Input attributes, files)
Week 6	Introduction to CSS Basics & Properties

Week 7	CSS Syntax, Links by CSS, Links with HTML
Week 8	Color System, Backgrounds, and Borders, Fonts, Text in CSS
Week 9	Design pages in CSS. Box Models (outlines, Padding, Margins), Dimensions, and Overflow
Week 10	Creating and styling navigation menus and Implementing CSS layouts and positioning
Week 11	Introduction to Bootstrap Framework. Using Bootstrap CSS classes and components for rapid web development
Week 12	Introduction to Java Script, Document Object Model (DOM). Exploring the features and functionalities of JavaScript frameworks (e.g React)
Week 13	JavaScript Programing, syntax, conditional statements
Week 14	JavaScript variables, arithmetic operations, if condition, loops and Popup Boxes in JavaScript
Week 15	Design a complete website project including project testing, debugging, and evaluation
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Learning Web Design: A Beginner's Guide to HTML, CSS, JavaScript, and Web Graphics, by Jennifer Robbins.	NO
Recommended Texts	"HTML &CSS" by "Thomas A. Powell "	NO
Websites	World Wide Web Consortium (W3C), http://www.w3c.org	

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.