MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Algorithms and Structured Programming (1)** الخوارزميات والبرمجة المهيكلة (1)			**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 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

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
	Midterm Exam	2hr	10% (10)	7	LO #1 - #7

Summative assessment	**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	**Arabic Language**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM101**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		UGI – 6	**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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Artificial Intelligence** **الذكاء الاصطناعي**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOMAI107**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
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 اسبوعا			
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, 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 Texts	• *Artificial Intelligence Structures and Strategies for Complex Problem Solving* ***by*** George F Luger. • *Artificial Intelligence A Guide to Intelligent Systems*. Second Edition, by M ichael Negnevitsky.	Yes
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
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
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	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** الحاسوب			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM1031**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
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 أهداف المادة الدراسية	1. Understand the two essential components of a computer system: hardware and software. 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 اسبوعا			
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) 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)	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

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	**Democracy & Human Rights**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM1040**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
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	1. Introducing the student to human rights and basic freedoms as well as the basic principles of democracy 2. 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 3. Making the student able to influence others positively in a manner consistent with the principles of human rights 4. 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	1. Human rights strategies revolve around three basic matters: 2. 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. 3. 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 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** **Regular weekly student load**	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** **Irregular student load per week**	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	All
	Assignments	2	20% (20)	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	**Discrete Structure** **الهياكل المتقطعة**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOMAI106**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
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 اسبوعا			
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) 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

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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Logic Design** **التصميم المنطقي**			**Module Delivery**	
Module Type	**Core**			☒ **Theory**	
Module Code	**UOMAI102**			☒ **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. 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 اسبوعا			
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 • Switching Theory and Logic Design, by M. V. Sabramanyam	yes
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.