MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Programming Fundamentals** **اساسيات البرمجة**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**UoMCS101**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGI-1	**Semester of Delivery**		1
Administering Department		Computer Science	**College**		Computer Science and Mathematics
Module Leader	Sedeeq Hasan Albanaa Al-khazraji		**e-mail**		sedeeq.alkhazraji@uomosul.edu.iq
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Amera Istiqlal Badran		**e-mail**		amera_istiqlal@uomosul.edu.iq
Peer Reviewer Name		Rayan Yousif Yacob	**e-mail**		rayan@uomosul.edu.iq
Scientific Committee Approval Date			**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 Aims 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 problem-solving strategies into Flowchart and implement it 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. Get Exposure to Basic Object-Oriented Programming (OOP) Basics: Introduce students to the principles of OOP, For example: classes, objects, and inheritance. 9. Master Console Application Coding: Develop code writing skills. 10. 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	1. Recognize how read and design algorithms and flowchart. 2. Analyze and break down problems. 3. Practice professional C# programming. 4. Debug and troubleshoot C# code. 5. Demonstrate efficient programming skills. 6. Understand basic OOP concepts. 7. Read and write professional C# console applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Problem Solving • Problem solving strategies [10 hrs] • The role of algorithms in the problem-solving process [20 hrs] • Implementation strategies for algorithms [20 hrs]

	Constructs of C# [20 hrs] • Basic syntax and semantics of higher-level language • Variables, types, expressions, and assignment • Simple I/O • Conditional • Iterative control structure Data Structures [14 hrs] • Representation of numeric data • Range, precision. and rounding errors

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures: Use lectures that 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			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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.				
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hrs	10% (10)	7	LO # 1-7
	Final Exam	3 hrs	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Problem Solving and Programming. Cover course overview and expectations
Week 2	Input-process-output model
Week 3	Algorithm and flowchart design
Week 4	Advanced flowchart and examples
Week 5	Software Development Methods
Week 6	Introduction to C#
Week 7	**Mid-term Exam**
Week 8	C# Variables
Week 9	Operators in C#
Week 10	If statement in C#
Week 11	Switch statement in C#
Week 12	For loop and nested for loop
Week 13	While and do while loop
Week 14	Operators Precedence
Week 15	Type Conversion
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Visual Studio installation
Week 2	Lab 2: Basic printing operations
Week 3	Lab 3: Transfer flowchart to program
Week 4	Lab 4: Writing basic program
Week 5	Lab 5: Program debugging
Week 6	Lab 6: Additional examples
Week 7	Lab 7: Mid-term Exam
Week 8	Lab 8: Programming variables in C#
Week 9	Lab 9: Programming operators in C#
Week 10	Lab 10: Programming If statement in C#
Week 11	Lab 11: Programming switch statement in C#
Week 12	Lab 12: Programming for loop in C#
Week 13	Lab 13: Programming while loop in C#
Week 14	Lab 14: Writing codes about operator precedence
Week 15	Lab15: Additional examples and review
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Paul Deitel Deitel & Deitel Deitel, Visual C# How to Program, 6th edition, Pearson, 2021	Yes
Recommended Texts		
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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Logic Circuits Design** **تصميم الدوائر المنطقية**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS102**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UG I - 1	**Semester of Delivery**		One (1)
Administering Department		Computer Science	**College**		Computer Science and Mathematics
Module Leader	Dr. Amera Istiqlal Badran		**e-mail**		amera_istiqlal@uomosul.edu.iq
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	None		**e-mail**		None
Peer Reviewer Name		Rayan Yousif Yacob	**e-mail**		rayan@uomosul.edu.iq
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. To learn the basic techniques and methodologies for designing and analyzing digital systems and how to apply these techniques to build specific circuits. 2. Define the problem (Inputs and Outputs), write its functions 3. Implement functions using Combinational digital circuit. 4. Minimize functions using any type of minimizing algorithms (Boolean algebra, Karnaugh-Map or Tabulation Method). 5. Have knowledge in analyzing and designing procedures of Combinational digital circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning about the different number systems. 2. Learning the arithmetic operations related to different number systems. 3. Learning the different logic gates of computer system and their work. 4. Ability to design, simplify and implement different logical and arithmetic circuits that considered the basic of digital system. 5. Ability to design, simplify and implement different sequential circuits, counters and shift registers.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part 1: Different Number Systems, 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	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 type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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)	4, 10	LO #1, 2, 3 and 10
	Assignments	2	10% (10)	2, 12	LO # 6, 8, 12 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report				# 4, 5 and 13
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Numbering Systems
Week 2	Arithmetic Operations
Week 3	BCD and Excess 3 Code
Week 4	Logic Gates
Week 5	Simplification and Boolean Functions
Week 6	Karnauph Map
Week 7	**Mid Term Exam**
Week 8	Digital Circuit Design

Week 9	Combinational Circuits
Week 10	Binary Full and Half Adder
Week 11	Binary Subtractor
Week 12	Multiplexer and Demultiplexer
Week 13	Decoder and Encoder
Week 14	Sequential Circuits
Week 15	Flip-Flops
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Logic Gates
Week 2	Lab 2: NOT & AND & OR Gate
Week 3	Lab 3: NOR & NAND gate
Week 4	Lab 4: XOR & XNOR gate
Week 5	Lab 5: Combinational Circuits
Week 6	Lab 6: Adders
Week 7	Lab 7: Subtractor
Week 8	Lab 8: Multiplexer & Demultiplexer
Week 9	Lab 9: Encoder
Week 10	Lab 10 : Decoder
Week 11	Lab 11 : Flops Flip

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	• Digital Fundamentals, by Floyd • Switching Theory and Logic Design, by M. V. Sabramanyam.	Yes
Recommended Texts	Digital Principles and Applications, by Malvino And Leach	No
Websites	https://books.google.iq/books/about/Switching_Theory_and_Logic_Design.html?id=xqXTQwAACAAJ&redir_esc=y	

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	System Analysis and Design النظام تحليل وتصميم			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☒**Seminar**	
Module Code	UoMCS103				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UGI-1	**Semester of Delivery**		1
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Ban Ghanim		**e-mail**	ban_ghanm2019@uomousl.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Master
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Rayan Yousif Yacob	**e-mail**	rayan@uomosul.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Database fundamentals UoMCS202	**Semester**	3

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The main objectives of the course are as follows: Understanding Systems: The course aims to introduce students to the concept of systems and their role in organizations. Students learn to identify various types of systems, including manual and computer-based systems, and understand their components, relationships, and interactions. System Development Life Cycle: Students are familiarized with the System Development Life Cycle (SDLC), which is a systematic approach to developing information systems. Requirements Gathering and Analysis: Students learn techniques and methods for gathering and analyzing system requirements. System Design: The course focuses on system design principles and methodologies. Students learn to translate user requirements into a conceptual design, create system models and diagrams (e.g., data flow diagrams, entity-relationship diagrams), design user interfaces, and select appropriate hardware and software components. System Implementation: Students gain knowledge about system implementation strategies, including system testing, deployment, and conversion. System Maintenance and Evaluation: The course covers the ongoing maintenance and evaluation of information systems. Students learn about system maintenance activities, such as bug fixing, updates, and enhancements. Project Management: The course may also include project management concepts and techniques, as system analysis and design often involve managing resources, schedules, and budgets.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	a student will be able to: 1. Enhanced problem-solving skills: provide a structured approach to problem-solving, emphasizing critical thinking and analytical skills. 2.Proficiency in system development life cycle (SDLC): System analysis and design courses typically cover the SDLC, which is a standardized process for developing and maintaining information systems. 3.Ability to gather and document requirements: One crucial aspect of system analysis is gathering requirements from stakeholders. 4.Designing efficient and scalable systems: System design involves creating blueprints for software and hardware components, databases, user interfaces, and system architecture. 5.Improved communication and collaboration: emphasize the importance of effective communication with stakeholders, including users, developers, and project managers. 6.Increased employability: Organizations across various industries require professionals who can analyze, design, and implement effective information systems. 7.Knowledge of emerging technologies: cover emerging technologies and trends in the field. 8.Improved project management skills: touch upon project management methodologies and techniques.
Indicative Contents المحتويات الإرشادية	System Analysis (Introduction) Data vs. Information, Defining A System, System Type System Development Life Cycle, Planning Phase, Analysis Phase, Design Phase, Implementation Phase. [6 hrs.] Systems Development Methodologies Methodology Types, Categories of the System Development Methodologies.

	[6 hrs] System Planning Phase Project Initiation, System Request, Feasibility Analysis Project Management Project Management, Creating the Work Plan, Staffing The Project. [6 hrs] Information Gathering, Interviews, Joint Application design (JAD), Questionnaire, Document Analysis, Observation. [6 hrs] Process Modeling and Data Flow Diagramming Data flow diagramming (DFD), Using a DFD to Define Business Processes, DFD Levels, Use Case. [6 hrs] Data Modeling Logical data models (LDMs), Physical data models (PDMs), Normalization. [6 hrs.] Design Phase Design phase steps, Design Strategies, selecting a Design Strategy, Moving from Logical to Physical Model. [6 hrs.] Architecture Design The Purpose of Architecture Design, Functions (Software) of Architectural Components, Operational Requirements, Performance Requirements Security Requirements, Network Model. [6 hrs.] User Interface Design and Navigation Design User Interface Design Fundamental Parts, Principles for User Interface Design, User Interface Design Process, Basic Principles of Navigation Design. [6 hrs] Data Storage Design Data Storage Formats, Database Types, Optimizing Data Storage. [6 hrs] Program Design Top-Down Modular Approach, Structure Chart, Structure Chart Elements, Building the Structure Chart, Program Specification. [6 hrs] Implementation Phase Construction, Installation, Post – Implementation Evaluation, System Maintenance. [3 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Assign individual or group projects that involve analyzing and designing systems from start to finish. Break down larger projects into smaller milestones to provide a sense of accomplishment and gradual progress. Provide regular feedback and guidance throughout the project to ensure students stay on track and learn from their experiences. Practical Examples and Case Studies: Utilize real-life case studies to illustrate the application of system analysis and design principles in various industries and contexts. Discuss success stories and challenges faced by organizations during system implementation, highlighting the importance of effective analysis and design. Encourage students to analyze and critique existing systems, identifying their strengths, weaknesses, and potential improvements. Collaborative Learning:Foster a collaborative learning environment where students can work together, exchange ideas, and learn from each other's experiences. Incorporate group discussions, peer reviews, and presentations to encourage active participation and knowledge sharing. Assign group projects that require students to work in teams, promoting teamwork and effective communication skills. Continuous Assessment: Conduct regular assessments, quizzes, or exams to evaluate students' understanding of the concepts and principles of system analysis and design. Provide constructive feedback to help students identify their strengths and areas for improvement. Offer opportunities for students to reflect on their learning progress and set personal goals. Stay Updated:

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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				
	Projects	1	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	System Analysis Fundamentals: Introduction, concepts, Roles of system analyst.
Week 2	Systems Development Methodologies
Week 3	System Planning Phase
Week 4	Project Management
Week 5	Information Gathering
Week 6	Process Modeling and Data Flow Diagramming
Week 7	**Mid Term Exam**
Week 8	Data Modeling
Week 9	Design Phase
Week 10	Architecture Design
Week 11	User Interface Design and Navigation Design
Week 12	Data Storage Design
Week 13	Designing data
Week 14	Program Design
Week 15	Implementation Phase
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	No laboratory required

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Systems Analysis and Design – Forth Edition By: Alan Dennis, Barbara Haley Wixom, and Roberta M. Roth, John Wiley & Sons, Inc., 2009	Yes
Recommended Texts	System analysis and design,8th edition By: Alan Dennis, Barbara Haley Wixom, and Roberta M. Roth, John Wiley & Sons, Inc., 2021	No
Websites	https://www.tutorialspoint.com /system analysis and design	

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
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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 Mathematics** **رياضيات متقطعة**			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS104**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGI		**Semester of Delivery**	1	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Dr. Omar Muayad Abdullah		**e-mail**	omaraldewachy@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	Rayan Yousif Yacob		**e-mail**	rayan@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. To develop problem solving skills of the fundamentals of discrete mathematics through understanding the concepts of propositional logic.

	2. To understand the logical equivalence between tow 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 actually 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 are through understanding its symbols and strings and all the applied operations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize and understanding the outline of proposition and not proposition terms and their equations and truth table construction. 2. Describe the equations of that satisfies 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. Identify the applications of the combination in the real life. 11. . Understanding the permutation term and its applications.
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 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	Type something like: 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 type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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	5	10% (10)	1,3, 6,10, 12	LO # 2,3, 4, 6 and 8
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 11
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to propositional logic, compound proposition and its classification
Week 2	Logical equivalence concepts
Week 3	Definition of Predicate and Quantifier and their types
Week 4	Definition and types of Functions
Week 5	Introduction to Trees, tree traversal, rooted m-ary tree, vertices, edges, and the outline terminologies
Week 6	Definition of the lists, the graphical representation, operations and programming examples about it
Week 7	**Mid-term Exam**
Week 8	Tuples operations, graphical representation, and programming languages examples
Week 9	Strings construction, alphabet symbols, concatenation, and reverse and concatenation operations
Week 10	Language definition, language construction and applied language operations
Week 11	Isomorphism properties, graphs layout, object degree, vertices, edges, and applications

Week 12	Planar, plane graph construction, its properties, plane graph to regions segmentation
Week 13	Algebraic structures, Binary operations on a set, properties and types
Week 14	Permutation definition, n-objects permutation, circle permutation and applications
Week 15	Combination definition, no. of items selection and applications
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Discrete structures , logic and compatibility, James L. Hein, 2017.	Yes
Recommended Texts	Mathematics of discrete structures for computer sciences	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
	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	**Linear Algebra / جبر خطي**			**Module Delivery**	
Module Type	**Support**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS105**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		1	**Semester of Delivery**		2
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	منى محسن محمد علي فرح حازم محمد		**e-mail**	Monamoh74@uomosul.edu.iq farahalkadoo@uomosul.edu.iq	
Module Leader's Acad. Title		أستاذ مساعد مدرس	**Module Leader's Qualification**		Ph.D M.SC.
Module Tutor			**e-mail**		
Peer Reviewer Name		منى محسن محمد علي فرح حازم محمد	**e-mail**	Monamoh74@uomosul.edu.iq farahalkadoo@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	١. التعرف على فضاء المتجهات والمفاهيم المتعلقة بها ٢. التعرف على الفضاء الجزئي والخواص الجبرية له ٣. معرفة التحويلات الخطية وتطبيقاتها
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١- فهم وتطبيق مجموعة متنوعة من الأساليب الرياضية: يتعلم الطلاب مجموعة متنوعة من الطرق والأساليب الرياضية المختلفة التي يمكن استخدامها لحل المسائل الرياضية المعقدة. ٢- تطوير مهارات التفكير النقدي: يتم تعزيز مهارات التحليل والتركيب والتفكير النقدي عندما يتعلم الطلاب طرقًا رياضية متنوعة. يتم تشجيع الطلاب على التفكير بشكل منهجي والتحليل العميق للمسائل الرياضية. ٣- القدرة على حل المسائل الرياضية المعقدة: يتعلم الطلاب كيفية تحليل وفهم المسائل الرياضية المعقدة وتطبيق الأساليب والتقنيات الرياضية المناسبة لحلها بشكل صحيح. ٤- التفكير الإبداعي والابتكار: يشجع تعلم طرق رياضية متنوعة الطلاب على التفكير الإبداعي والابتكار في مجال حل المسائل الرياضية. يتعلم الطلاب كيفية تطوير حلول جديدة وفريدة باستخدام الأساليب الرياضية.
Indicative Contents المحتويات الإرشادية	يتضمن المحتوى الارشادي مايلي : ١- فضاء المتجهات والفضاءالجزئي (١٥ ساعة) ٢- التركيب الخطي (١٥ ساعة) ٣- القاعدة والبعد (١٥ ساعة) ٤- فضاء الجداء الداخلي (١٥ ساعة) ٥- التحويلات الخطية (10 ساعة)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع مشاركة الطلاب في التمارين ، وفي الوقت نفسه تقوم بتحسين وتوسيع مهارات التفكير الناقد. سيتم تحقيق ذلك من خلال الفصول الدراسية ، والدروس التفاعلية ، ومن خلال النظر في نوع من التجارب البسيطة التي تنطوي على بعض أنشطة أخذ العينات المثيرة للاهتمام للطلاب.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	130		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	7 , 12 , 15	LO #1 – 4
	Assignments	3	10% (10)	2 , 6 , 12	LO # 1 , 2 , 3
	Projects / Lab.	0	0	Continuous	
	Report	1	10% (10)	13	LO # 1 , 2
Summative assessment	**Midterm Exam**	1 hr	10% (10)	11	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**فضاء المتجهات والمبرهنات المتعلقة بها**
Week 2	**متجه الوحدة والطول**
Week 3	**الزاوية بين متجهين**
Week 4	**الفضاء الجزئي والمبرهنات المتعلقة به**
Week 5	**التركيب الخطي**
Week 6	**الاستقلال الخطي والتركيب الخطي**
Week 7	**امتحان يومي**
Week 8	**القاعدة والبعد**

Week 9	**فضاء الجداء الداخلي**
Week 10	**امتحان نصف الكورس الثاني**
Week 11	**التحويلات الخطية**
Week 12	**امتحان يومي**
Week 13	**امثلة على التحويلات الخطية**
Week 14	**التحويل الصفري والتحويل الذاتي**
Week 15	**امتحان يومي**
Week 16	**امتحان نهائي الكورس الثاني**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
	No Labs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1) **Stoll .R. R. and Wong .E. T. Linear Algebra, London, 1968.** 2) **Strang . G., Linear Algebra and Its Application, New York, 2nd ,1980.** 3) **Mostow . G. D. and Sampson. J .H., Linear Algebra, London, 1969.** 4) **جورج ضايف السبتي ، الجبر الخطي ، جامعة البصرة – العراق ، ١ ، ١٩٨٨ .** 5) **خالد احمد السامرائي وسعد ابراهيم مهدي ، مقدمة في الجبر الخطي ، جامعة بغداد – العراق ، الجزئيين الاول والثاني ، ١٩٨٩.** **يحيى عبد الستار ونزار حمدون شكر ، الجبر الخطي ، جامعة الموصل – العراق ، ١ ، ١٩٨٨.**	Yes
Recommended Texts		No
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.

Module Information
معلومات المادة الدراسية

Module Title	**English Language 1** **اللغة الإنكليزية ١**	**Module Delivery**	
Module Type	**Support**	☐**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**UoMCS106**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		

Module Level	UGI	**Semester of Delivery**	1
Administering Department	Computer Science	**College**	Computer Science and Mathematics
Module Leader	Zainab Qusay Ahmed Taqi	**e-mail**	Zainab.q@uomosul.edu.iq
Module Leader's Acad. Title	Asst. lecturer	**Module Leader's Qualification**	MSc.
Module Tutor		**e-mail**	
Peer Reviewer Name	Rayan Yousif Yacob	**e-mail**	rayan@uomosul.edu.iq
Scientific Committee Approval Date		**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 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.

مخرجات التعلم للمادة الدراسية	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 المحتويات الإرشادية	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 استراتيجيات التعلم والتعليم	
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) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	44	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	6	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.5
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**	3	10% (10)	4,9 and 11	LO #1, #2 and #5
	Assignments	3	10% (10)	2,10 and 13	LO #3, #4 and #6
	Report	1	10% (10)	13	LO #1, #4
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO #1 - #5
	Final Exam	2 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction: new headway pre-intermediate plus
Week 2	Grammar: Tenses, wh- questions, practices.
Week 3	Vocabulary- how to use a bilingual dictionary, reading about (communication)
Week 4	Everyday English (social expressions), listening, practices.
Week 5	Grammar: Present tenses, have and have got, practices.
Week 6	Vocabulary about (daily life), listening and match between vocabularies, practices.
Week 7	**Mid-term Exam.**
Week 8	simple present and present continuous, practices, reading about living in the USA.
Week 9	Social expressions about every day English, practices.
Week 10	Grammar: simple past and past continuous tenses, practices.

Week 11	Reading and listening, regular and irregular verbs, practices.
Week 12	Vocabulary: about N.- V.- Adj. endings, practices, Everyday English (time expressions), practices.
Week 13	Grammar: quantity (some, many, any, much, few,….), practice.
Week 14	Grammar: about Something/someone/somewhere, practices.
Week 15	Reading: about markets, practices.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
	No Labs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Headway pre-intermediate plus student's book. (John and Liz Soars)	Yes
Recommended Texts	Headway pre-intermediate plus work's book	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
	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	**Programming Fundamentals** **اساسيات البرمجة**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**UoMCS101**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGI-1	**Semester of Delivery**		1
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Sedeeq Hasan Albanaa Al-khazraji		**e-mail**	sedeeq.alkhazraji@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Amera Istiqlal Badran		**e-mail**	amera_istiqlal@uomosul.edu.iq	
Peer Reviewer Name		Rayan Yousif Yacob	**e-mail**	rayan@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims 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 problem-solving strategies into Flowchart and implement it 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. Get Exposure to Basic Object-Oriented Programming (OOP) Basics: Introduce students to the principles of OOP, For example: classes, objects, and inheritance. 9. Master Console Application Coding: Develop code writing skills. 10. 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	1. Recognize how read and design algorithms and flowchart. 2. Analyze and break down problems. 3. Practice professional C# programming. 4. Debug and troubleshoot C# code. 5. Demonstrate efficient programming skills. 6. Understand basic OOP concepts. 7. Read and write professional C# console applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Problem Solving • Problem solving strategies [10 hrs] • The role of algorithms in the problem-solving process [20 hrs] • Implementation strategies for algorithms [20 hrs]

	Constructs of C# [20 hrs] • Basic syntax and semantics of higher-level language • Variables, types, expressions, and assignment • Simple I/O • Conditional • Iterative control structure Data Structures [14 hrs] • Representation of numeric data • Range, precision. and rounding errors

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures: Use lectures that 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			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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.				
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hrs	10% (10)	7	LO # 1-7
	Final Exam	3 hrs	40% (40)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Problem Solving and Programming. Cover course overview and expectations
Week 2	Input-process-output model
Week 3	Algorithm and flowchart design
Week 4	Advanced flowchart and examples
Week 5	Software Development Methods
Week 6	Introduction to C#
Week 7	**Mid-term Exam**
Week 8	C# Variables
Week 9	Operators in C#
Week 10	If statement in C#
Week 11	Switch statement in C#
Week 12	For loop and nested for loop
Week 13	While and do while loop
Week 14	Operators Precedence
Week 15	Type Conversion
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Visual Studio installation
Week 2	Lab 2: Basic printing operations
Week 3	Lab 3: Transfer flowchart to program
Week 4	Lab 4: Writing basic program
Week 5	Lab 5: Program debugging
Week 6	Lab 6: Additional examples
Week 7	Lab 7: Mid-term Exam
Week 8	Lab 8: Programming variables in C#
Week 9	Lab 9: Programming operators in C#
Week 10	Lab 10: Programming If statement in C#
Week 11	Lab 11: Programming switch statement in C#
Week 12	Lab 12: Programming for loop in C#
Week 13	Lab 13: Programming while loop in C#
Week 14	Lab 14: Writing codes about operator precedence
Week 15	Lab15: Additional examples and review
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Paul Deitel Deitel & Deitel Deitel, Visual C# How to Program, 6th edition, Pearson, 2021	Yes
Recommended Texts		
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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Logic Circuits Design** **تصميم الدوائر المنطقية**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS102**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UG I - 1	**Semester of Delivery**		One (1)
Administering Department		Computer Science	**College**		Computer Science and Mathematics
Module Leader	Dr. Amera Istiqlal Badran		**e-mail**		amera_istiqlal@uomosul.edu.iq
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	None		**e-mail**		None
Peer Reviewer Name		Rayan Yousif Yacob	**e-mail**		rayan@uomosul.edu.iq
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. To learn the basic techniques and methodologies for designing and analyzing digital systems and how to apply these techniques to build specific circuits. 2. Define the problem (Inputs and Outputs), write its functions 3. Implement functions using Combinational digital circuit. 4. Minimize functions using any type of minimizing algorithms (Boolean algebra, Karnaugh-Map or Tabulation Method). 5. Have knowledge in analyzing and designing procedures of Combinational digital circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning about the different number systems. 2. Learning the arithmetic operations related to different number systems. 3. Learning the different logic gates of computer system and their work. 4. Ability to design, simplify and implement different logical and arithmetic circuits that considered the basic of digital system. 5. Ability to design, simplify and implement different sequential circuits, counters and shift registers.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part 1: Different Number Systems, 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	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 type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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)	4, 10	LO #1, 2, 3 and 10
	Assignments	2	10% (10)	2, 12	LO # 6, 8, 12 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report				# 4, 5 and 13
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Numbering Systems
Week 2	Arithmetic Operations
Week 3	BCD and Excess 3 Code
Week 4	Logic Gates
Week 5	Simplification and Boolean Functions
Week 6	Karnauph Map
Week 7	**Mid Term Exam**
Week 8	Digital Circuit Design

Week 9	Combinational Circuits
Week 10	Binary Full and Half Adder
Week 11	Binary Subtractor
Week 12	Multiplexer and Demultiplexer
Week 13	Decoder and Encoder
Week 14	Sequential Circuits
Week 15	Flip-Flops
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Logic Gates
Week 2	Lab 2: NOT & AND & OR Gate
Week 3	Lab 3: NOR & NAND gate
Week 4	Lab 4: XOR & XNOR gate
Week 5	Lab 5: Combinational Circuits
Week 6	Lab 6: Adders
Week 7	Lab 7: Subtractor
Week 8	Lab 8: Multiplexer & Demultiplexer
Week 9	Lab 9: Encoder
Week 10	Lab 10 : Decoder
Week 11	Lab 11 : Flops Flip

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	• Digital Fundamentals, by Floyd • Switching Theory and Logic Design, by M. V. Sabramanyam.	Yes
Recommended Texts	Digital Principles and Applications, by Malvino And Leach	No
Websites	https://books.google.iq/books/about/Switching_Theory_and_Logic_Design.html?id=xqXTQwAACAAJ&redir_esc=y	

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	System Analysis and Design النظام تحليل وتصميم			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☒**Seminar**	
Module Code	UoMCS103				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UGI-1	**Semester of Delivery**		1
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Ban Ghanim		**e-mail**	ban_ghanm2019@uomousl.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Master
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Rayan Yousif Yacob	**e-mail**	rayan@uomosul.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Database fundamentals UoMCS202	**Semester**	3

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The main objectives of the course are as follows: Understanding Systems: The course aims to introduce students to the concept of systems and their role in organizations. Students learn to identify various types of systems, including manual and computer-based systems, and understand their components, relationships, and interactions. System Development Life Cycle: Students are familiarized with the System Development Life Cycle (SDLC), which is a systematic approach to developing information systems. Requirements Gathering and Analysis: Students learn techniques and methods for gathering and analyzing system requirements. System Design: The course focuses on system design principles and methodologies. Students learn to translate user requirements into a conceptual design, create system models and diagrams (e.g., data flow diagrams, entity-relationship diagrams), design user interfaces, and select appropriate hardware and software components. System Implementation: Students gain knowledge about system implementation strategies, including system testing, deployment, and conversion. System Maintenance and Evaluation: The course covers the ongoing maintenance and evaluation of information systems. Students learn about system maintenance activities, such as bug fixing, updates, and enhancements. Project Management: The course may also include project management concepts and techniques, as system analysis and design often involve managing resources, schedules, and budgets.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	a student will be able to: 1. Enhanced problem-solving skills: provide a structured approach to problem-solving, emphasizing critical thinking and analytical skills. 2.Proficiency in system development life cycle (SDLC): System analysis and design courses typically cover the SDLC, which is a standardized process for developing and maintaining information systems. 3.Ability to gather and document requirements: One crucial aspect of system analysis is gathering requirements from stakeholders. 4.Designing efficient and scalable systems: System design involves creating blueprints for software and hardware components, databases, user interfaces, and system architecture. 5.Improved communication and collaboration: emphasize the importance of effective communication with stakeholders, including users, developers, and project managers. 6.Increased employability: Organizations across various industries require professionals who can analyze, design, and implement effective information systems. 7.Knowledge of emerging technologies: cover emerging technologies and trends in the field. 8.Improved project management skills: touch upon project management methodologies and techniques.
Indicative Contents المحتويات الإرشادية	System Analysis (Introduction) Data vs. Information, Defining A System, System Type System Development Life Cycle, Planning Phase, Analysis Phase, Design Phase, Implementation Phase. [6 hrs.] Systems Development Methodologies Methodology Types, Categories of the System Development Methodologies.

	[6 hrs] System Planning Phase Project Initiation, System Request, Feasibility Analysis Project Management Project Management, Creating the Work Plan, Staffing The Project. [6 hrs] Information Gathering, Interviews, Joint Application design (JAD), Questionnaire, Document Analysis, Observation. [6 hrs] Process Modeling and Data Flow Diagramming Data flow diagramming (DFD), Using a DFD to Define Business Processes, DFD Levels, Use Case. [6 hrs] Data Modeling Logical data models (LDMs), Physical data models (PDMs), Normalization. [6 hrs.] Design Phase Design phase steps, Design Strategies, selecting a Design Strategy, Moving from Logical to Physical Model. [6 hrs.] Architecture Design The Purpose of Architecture Design, Functions (Software) of Architectural Components, Operational Requirements, Performance Requirements Security Requirements, Network Model. [6 hrs.] User Interface Design and Navigation Design User Interface Design Fundamental Parts, Principles for User Interface Design, User Interface Design Process, Basic Principles of Navigation Design. [6 hrs] Data Storage Design Data Storage Formats, Database Types, Optimizing Data Storage. [6 hrs] Program Design Top-Down Modular Approach, Structure Chart, Structure Chart Elements, Building the Structure Chart, Program Specification. [6 hrs] Implementation Phase Construction, Installation, Post – Implementation Evaluation, System Maintenance. [3 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Assign individual or group projects that involve analyzing and designing systems from start to finish. Break down larger projects into smaller milestones to provide a sense of accomplishment and gradual progress. Provide regular feedback and guidance throughout the project to ensure students stay on track and learn from their experiences. Practical Examples and Case Studies: Utilize real-life case studies to illustrate the application of system analysis and design principles in various industries and contexts. Discuss success stories and challenges faced by organizations during system implementation, highlighting the importance of effective analysis and design. Encourage students to analyze and critique existing systems, identifying their strengths, weaknesses, and potential improvements. Collaborative Learning:Foster a collaborative learning environment where students can work together, exchange ideas, and learn from each other's experiences. Incorporate group discussions, peer reviews, and presentations to encourage active participation and knowledge sharing. Assign group projects that require students to work in teams, promoting teamwork and effective communication skills. Continuous Assessment: Conduct regular assessments, quizzes, or exams to evaluate students' understanding of the concepts and principles of system analysis and design. Provide constructive feedback to help students identify their strengths and areas for improvement. Offer opportunities for students to reflect on their learning progress and set personal goals. Stay Updated:

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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				
	Projects	1	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	System Analysis Fundamentals: Introduction, concepts, Roles of system analyst.
Week 2	Systems Development Methodologies
Week 3	System Planning Phase
Week 4	Project Management
Week 5	Information Gathering
Week 6	Process Modeling and Data Flow Diagramming
Week 7	**Mid Term Exam**
Week 8	Data Modeling
Week 9	Design Phase
Week 10	Architecture Design
Week 11	User Interface Design and Navigation Design
Week 12	Data Storage Design
Week 13	Designing data
Week 14	Program Design
Week 15	Implementation Phase
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	No laboratory required

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Systems Analysis and Design – Forth Edition By: Alan Dennis, Barbara Haley Wixom, and Roberta M. Roth, John Wiley & Sons, Inc., 2009	Yes
Recommended Texts	System analysis and design,8th edition By: Alan Dennis, Barbara Haley Wixom, and Roberta M. Roth, John Wiley & Sons, Inc., 2021	No
Websites	https://www.tutorialspoint.com /system analysis and design	

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 Mathematics** **رياضيات متقطعة**			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS104**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGI		**Semester of Delivery**	1	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Dr. Omar Muayad Abdullah		**e-mail**	omaraldewachy@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	Rayan Yousif Yacob		**e-mail**	rayan@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. To develop problem solving skills of the fundamentals of discrete mathematics through understanding the concepts of propositional logic.

	2. To understand the logical equivalence between tow 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 actually 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 are through understanding its symbols and strings and all the applied operations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize and understanding the outline of proposition and not proposition terms and their equations and truth table construction. 2. Describe the equations of that satisfies 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. Identify the applications of the combination in the real life. 11. . Understanding the permutation term and its applications.
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 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	Type something like: 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 type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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	5	10% (10)	1,3, 6,10, 12	LO # 2,3, 4, 6 and 8
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 11
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to propositional logic, compound proposition and its classification
Week 2	Logical equivalence concepts
Week 3	Definition of Predicate and Quantifier and their types
Week 4	Definition and types of Functions
Week 5	Introduction to Trees, tree traversal, rooted m-ary tree, vertices, edges, and the outline terminologies
Week 6	Definition of the lists, the graphical representation, operations and programming examples about it
Week 7	**Mid-term Exam**
Week 8	Tuples operations, graphical representation, and programming languages examples
Week 9	Strings construction, alphabet symbols, concatenation, and reverse and concatenation operations
Week 10	Language definition, language construction and applied language operations
Week 11	Isomorphism properties, graphs layout, object degree, vertices, edges, and applications

Week 12	Planar, plane graph construction, its properties, plane graph to regions segmentation
Week 13	Algebraic structures, Binary operations on a set, properties and types
Week 14	Permutation definition, n-objects permutation, circle permutation and applications
Week 15	Combination definition, no. of items selection and applications
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Discrete structures , logic and compatibility, James L. Hein, 2017.	Yes
Recommended Texts	Mathematics of discrete structures for computer sciences	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
	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	**Linear Algebra / جبر خطي**			**Module Delivery**	
Module Type	**Support**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS105**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		1	**Semester of Delivery**		2
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	منى محسن محمد علي فرح حازم محمد		**e-mail**	Monamoh74@uomosul.edu.iq farahalkadoo@uomosul.edu.iq	
Module Leader's Acad. Title		أستاذ مساعد مدرس	**Module Leader's Qualification**		Ph.D M.SC.
Module Tutor			**e-mail**		
Peer Reviewer Name		منى محسن محمد علي فرح حازم محمد	**e-mail**	Monamoh74@uomosul.edu.iq farahalkadoo@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	١. التعرف على فضاء المتجهات والمفاهيم المتعلقة بها ٢. التعرف على الفضاء الجزئي والخواص الجبرية له ٣. معرفة التحويلات الخطية وتطبيقاتها
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	١- فهم وتطبيق مجموعة متنوعة من الأساليب الرياضية: يتعلم الطلاب مجموعة متنوعة من الطرق والأساليب الرياضية المختلفة التي يمكن استخدامها لحل المسائل الرياضية المعقدة. ٢- تطوير مهارات التفكير النقدي: يتم تعزيز مهارات التحليل والتركيب والتفكير النقدي عندما يتعلم الطلاب طرقًا رياضية متنوعة. يتم تشجيع الطلاب على التفكير بشكل منهجي والتحليل العميق للمسائل الرياضية. ٣- القدرة على حل المسائل الرياضية المعقدة: يتعلم الطلاب كيفية تحليل وفهم المسائل الرياضية المعقدة وتطبيق الأساليب والتقنيات الرياضية المناسبة لحلها بشكل صحيح. ٤- التفكير الإبداعي والابتكار: يشجع تعلم طرق رياضية متنوعة الطلاب على التفكير الإبداعي والابتكار في مجال حل المسائل الرياضية. يتعلم الطلاب كيفية تطوير حلول جديدة وفريدة باستخدام الأساليب الرياضية.
Indicative Contents المحتويات الإرشادية	يتضمن المحتوى الارشادي مايلي : ١- فضاء المتجهات والفضاءالجزئي (١٥ ساعة) ٢- التركيب الخطي (١٥ ساعة) ٣- القاعدة والبعد (١٥ ساعة) ٤- فضاء الجداء الداخلي (١٥ ساعة) ٥- التحويلات الخطية (10 ساعة)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	الإستراتيجية الرئيسية التي سيتم تبنيها في تقديم هذه الوحدة هي تشجيع مشاركة الطلاب في التمارين ، وفي الوقت نفسه تقوم بتحسين وتوسيع مهارات التفكير الناقد. سيتم تحقيق ذلك من خلال الفصول الدراسية ، والدروس التفاعلية ، ومن خلال النظر في نوع من التجارب البسيطة التي تنطوي على بعض أنشطة أخذ العينات المثيرة للاهتمام للطلاب.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	130		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	7 , 12 , 15	LO #1 – 4
	Assignments	3	10% (10)	2 , 6 , 12	LO # 1 , 2 , 3
	Projects / Lab.	0	0	Continuous	
	Report	1	10% (10)	13	LO # 1 , 2
Summative assessment	**Midterm Exam**	1 hr	10% (10)	11	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**فضاء المتجهات والمبرهنات المتعلقة بها**
Week 2	**متجه الوحدة والطول**
Week 3	**الزاوية بين متجهين**
Week 4	**الفضاء الجزئي والمبرهنات المتعلقة به**
Week 5	**التركيب الخطي**
Week 6	**الاستقلال الخطي والتركيب الخطي**
Week 7	**امتحان يومي**
Week 8	**القاعدة والبعد**

Week 9	**فضاء الجداء الداخلي**
Week 10	**امتحان نصف الكورس الثاني**
Week 11	**التحويلات الخطية**
Week 12	**امتحان يومي**
Week 13	**امثلة على التحويلات الخطية**
Week 14	**التحويل الصفري والتحويل الذاتي**
Week 15	**امتحان يومي**
Week 16	**امتحان نهائي الكورس الثاني**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
	No Labs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1) **Stoll .R. R. and Wong .E. T. Linear Algebra, London, 1968.** 2) **Strang . G., Linear Algebra and Its Application, New York, 2nd ,1980.** 3) **Mostow . G. D. and Sampson. J .H., Linear Algebra, London, 1969.** 4) **جورج ضايف السبتي ، الجبر الخطي ، جامعة البصرة – العراق ، ١ ، ١٩٨٨ .** 5) **خالد احمد السامرائي وسعد ابراهيم مهدي ، مقدمة في الجبر الخطي ، جامعة بغداد – العراق ، الجزئيين الاول والثاني ، ١٩٨٩.** **يحيى عبد الستار ونزار حمدون شكر ، الجبر الخطي ، جامعة الموصل – العراق ، ١ ، ١٩٨٨.**	Yes
Recommended Texts		No
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.

Module Information
معلومات المادة الدراسية

Module Title	**English Language 1** **اللغة الإنكليزية ١**	**Module Delivery**	
Module Type	**Support**	☐**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**UoMCS106**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		

Module Level	UGI	**Semester of Delivery**	1
Administering Department	Computer Science	**College**	Computer Science and Mathematics
Module Leader	Zainab Qusay Ahmed Taqi	**e-mail**	Zainab.q@uomosul.edu.iq
Module Leader's Acad. Title	Asst. lecturer	**Module Leader's Qualification**	MSc.
Module Tutor		**e-mail**	
Peer Reviewer Name	Rayan Yousif Yacob	**e-mail**	rayan@uomosul.edu.iq
Scientific Committee Approval Date		**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 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.

مخرجات التعلم للمادة الدراسية	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 المحتويات الإرشادية	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 استراتيجيات التعلم والتعليم	
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) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	44	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	6	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.5
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**	3	10% (10)	4,9 and 11	LO #1, #2 and #5
	Assignments	3	10% (10)	2,10 and 13	LO #3, #4 and #6
	Report	1	10% (10)	13	LO #1, #4
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO #1 - #5
	Final Exam	2 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction: new headway pre-intermediate plus
Week 2	Grammar: Tenses, wh- questions, practices.
Week 3	Vocabulary- how to use a bilingual dictionary, reading about (communication)
Week 4	Everyday English (social expressions), listening, practices.
Week 5	Grammar: Present tenses, have and have got, practices.
Week 6	Vocabulary about (daily life), listening and match between vocabularies, practices.
Week 7	**Mid-term Exam.**
Week 8	simple present and present continuous, practices, reading about living in the USA.
Week 9	Social expressions about every day English, practices.
Week 10	Grammar: simple past and past continuous tenses, practices.

Week 11	Reading and listening, regular and irregular verbs, practices.
Week 12	Vocabulary: about N.- V.- Adj. endings, practices, Everyday English (time expressions), practices.
Week 13	Grammar: quantity (some, many, any, much, few,….), practice.
Week 14	Grammar: about Something/someone/somewhere, practices.
Week 15	Reading: about markets, practices.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
	No Labs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Headway pre-intermediate plus student's book. (John and Liz Soars)	Yes
Recommended Texts	Headway pre-intermediate plus work's book	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
	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	**Advanced Programming** برمجة متقدمة			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS107**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Sedeeq Al-khazraji		**e-mail**	Sedeeq.Alkhazraji@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Ahmed Salih Hasan		**e-mail**	Ahmed_salih_h@uomosul.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Programming Fundamentals	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims 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 program 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 the 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	1. Demonstrate problem solving skills. 2. Practice professional C# programming. 3. Summarize code modularity and reusage. 4. Communicate and Document Code 5. Work collaboratively in teams. 6. Apply programming skills to Real-World scenarios 7. Prepare for future programming concepts.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Arrays [20 hrs] • One dimensional Arrays • Multi-dimensional arrays Functions [20 hrs] • Methods • Calles • Recursive Functions Strings [20 hrs] • Functions to manipulate strings

	Structures [10 hrs] • ArrayList • Hashtable • SortedList • Stack • Queue • BitArray Pointers [7 hrs] Files [7 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures: Use lectures that 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			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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.				
	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	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Arrays in C#
Week 2	One-Dimensional Array in C#
Week 3	Practical examples about One-Dimensional Array in C#
Week 4	Two-Dimensional Array in C#
Week 5	Practical examples about Two-Dimensional Array in C#
Week 6	Methos in C#
Week 7	**Mid-term Exam**
Week 8	String in C#
Week 9	String built in functions
Week 10	Recursion in C#
Week 11	Files programming
Week 12	File system and directory programming
Week 13	Collections programming
Week 14	Exception Handling in C#
Week 15	Practical examples about and project presentation
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Recap programming basics in C#
Week 2	Lab 2: Programming one-dimensional array in C#
Week 3	Lab 3: Practical examples about one-dimensional array in C#
Week 4	Lab 4: Programming two-dimensional array in C#
Week 5	Lab 5: Practical examples about two-dimensional array in C#
Week 6	Lab 6: Programming methods and method call in C#
Week 7	Lab 7: Mid-term
Week 8	Lab 8: Programming string in C#
Week 9	Lab 9: Programming string built in functions in C#
Week 10	Lab 10: Examples about recursion in C#
Week 11	Lab 11: Examples about files programming in C#
Week 12	Lab 12: Examples about file system and directory programming
Week 13	Lab 13: Collections programming in C#
Week 14	Lab 14: Exception handling in C#
Week 15	Lab 15: Course recap and additional examples C#
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Paul Deitel Deitel & Deitel Deitel, Visual C# How to Program, 6th edition, Pearson, 2021	no
Recommended Texts		
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
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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	**Principles of Computer Organization** مبادئ ركيب الحاسوب			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UoMCS108				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGI 1	**Semester of Delivery**		2
Administering Department		Computer sciences	**College**	Computer sciences and mathematics	
Module Leader	Alyaa M. Abdul Majeed Haleem		**e-mail**	alyaahaleem@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		MSc.
Module Tutor	Dhafer Sami Hammadi Marwa jassim Mohammad		**e-mail**	dhafer_un@uomosul.edu.iq marwamaster@uomosul.edu.iq	
Peer Reviewer Name		Ahmed salih hasan	**e-mail**	Ahmed_salih_h@uomosul.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Logic Circuits Design	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims 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: • Demonstrate computer architecture concepts related to the design of modern processors, memories, and I/Os. • Analyze the performance of commercially available computers. • Understand the optimal usage of registers of processors in programming • Apply knowledge and demonstrate programming proficiency using the target microprocessor and microcontroller's various addressing modes and data transfer instructions. • demonstrate programming proficiency using the target Arithmetic instruction and logic instructions. • 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			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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, 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% (15)	Continuous	
	Report				
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction To Computer Organization and Architecture, Basic Organization of Computer - CPU Structure, Input-Output Organization
Week 2	Von Neumann Model, Introduction to Microprocessors and Microcomputers, General Architecture of a Microcomputer System
Week 3	Memory System, Basic concepts semiconductor RAMs, read-only memories, Cache memories performance considerations, Virtual memories, secondary storage.
Week 4	System Buses Structure and Expansion Cards, CPU Fetch and Execute cycle
Week 5	The Evolution of Intel X86 Architecture, Software architecture of 8088/8086 microprocessors, Software Model of the 8088/8086 Microprocessor, Memory address space& data organization 8086.
Week 6	Segment Registers and Memory Segmentation, Instruction Pointer, Data Registers, Pointer, and Index Registers.
Week 7	**Mid-term Exam**
Week 8	Status Register, Generating a Memory Address
Week 9	Introduction to Assembly Language Programming, Instruction Set Architecture (ISA), The MOV instruction, 80X86 Addressing Modes
Week 10	80X86 Addressing Modes
Week 11	Data Transfer instructions
Week 12	Arithmetic Instructions
Week 13	Arithmetic Instructions
Week 14	Logic Instructions
Week 15	8088/8086 CPU Architecture, Inside the 8086 Microprocessor, Fetch and Execute, Reading/Writing Data
Week 16	**The preparatory week before the 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: Mid-term Exam
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 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 logic instruction programming
Week 15	Lab 15: **The preparatory week before the Final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required 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
Recommended Texts	"Computer Organization and Architecture: Designing for Performance", 10th Edition by William Stallings, Pearson Education, 2016.	No
Websites	https://youtube.com/@alyaahaleem9359	

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	**Computation Theory** **النظرية الاحتسابية**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**UOMCS109**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGI-1	**Semester of Delivery**		2
Administering Department		Computer Science	**College**	College of Computer Science and Math.	
Module Leader	Mohammed Chachan Younis محمد جاجان يونس		**e-mail**	mohammed.c.y@uomosul.edu.iq	
Module Leader's Acad. Title		Associate Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Ahmed Salih Hasan	**e-mail**	ahmed_salih_h@uomosul.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UOMCS104	**Semester**	UGI- 1
Co-requisites module	UOMCS210	**Semester**	UGII-2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Through this course, students will learn about different models of computation. The learning objectives of the course are to: 1. Familiarity with the basic concepts of computational theory, the basics of language theory, and general concepts in building programming languages in a mathematical manner. 2. Knowing and distinguishing the different operations that take place on languages and machines that each language recognizes. 3. Knowledge of the basics of automata theory and regular expressions as mathematical models that help in defining programming languages and formal languages. 4. The ability to use the concepts of computational theory as basic tools in building programming languages and how to derive them in a logical manner, as its tools represent an important part of the stages of building compilers for each programming language. 5. Acquisition of basic skills as an introduction to building languages and problem-solving. 6. Acquisition of theoretical concepts to know the various processes that take place on languages.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon successful completion of the module, students will have achieved the following: 1. Demonstrate advanced knowledge of formal computation and its relationship to languages 2. Distinguish different computing languages and classify their respective types 3. Recognise and comprehend formal reasoning about languages 4. Understand, use and work with grammars of various forms 5. Understand Finite Automata: DFA, NFA, and many more! 6. Specify and be able to simulate various types of automata 7. Able to extract computational model from a real-world problem 8. Be able to describe languages according to formal systems such as automata and context-free grammars 9. Learn Chomsky and Greibach Normal Forms problems 10. Master the fundamentals of Push Down Automata 11. Master the fundamentals of Turing machines
Indicative Contents المحتويات الإرشادية	The indicative content of this module includes the following: <u>Part A - Language Theory</u> Basic Concept – Alphabet, Strings (words), Some Important Notations, String Operations, Operations on Languages, Specifying languages, Regular Expressions, Specifying languages by grammars, The Chomsky hierarchy of languages (Type-0, Type-1, Type-2, Type-3 Grammars), Languages theory problems. [10 hrs] Revision problem classes. [2 hrs]

	Part B - Finite Automata (FA) Deterministic (DFA) and Non-Deterministic Finite Automata (NDFA), Graphical Representation of DFA and NDFA, Acceptors (Recognizer) & Classifiers and Transducers, Problems (Finite Automata as an Acceptor), NDFA to DFA Conversion, Converting NDFA to DFA problems, FA with Output (Moore Machine and Mealy Machine), Moore Machine problems, Mealy Machine problems. [13 hrs] Revision problem classes. [2 hrs] Part C - Context-Free Grammar (CFG) Introduction to CFG, Generation of Derivation Tree, Representation Technique (Top-down and Bottom-up Approaches), Leftmost and Rightmost Derivation of a String, Left and Right Recursive Grammars. Ambiguity in CFGs, Unambiguous Grammar, Simplification of CFG (Removal of Useless Symbols, Removal of Null Productions, and Removal of Unit Productions), Simplification of CFG problems. [12 hrs] Revision problem classes. [2 hrs] Part D - Chomsky Normal Form (CNF) and Greibach Normal Form (GNF) Introduction to CNF, Converting CFG into CNF problems, Introduction to Greibach Normal Form (GNF), Converting CFG into GNF problems. Closure Properties of CFG (Union, Concatenation, Kleene Closure, Intersection and complementation). [15 hrs] Revision problem classes. [2hrs] Part E - Pushdown Automata (PDA) and Turing Machine (TM) Definition of PDA, Fundamentals of PDA, PDA Components (Input tape, Finite control, and Stack), Power of PDA, PDA problems, A Graphical Notation for PDA's problems, CFG to PDA Conversion problems. Definition of TM, Fundamentals of TM, Basic Model of TM, Comparison TM with the previous automaton, Designing a TM, Language accepted by TM, TM problems. [15 hrs] Revision problem classes. [2 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to understand which problems can be solved using computational devices and how efficiently those problems can be solved. 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			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.1
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)	6, 9	LO # 1-4, and 8
	Assignments	4	10% (10)	6, 10, 13, 15	LO # 2, 5, 6 and 8
	Projects / Lab.	0	0	0	
	Report	1	10% (10)	13	LO # 3, 4, 7 and 8
Summative assessment	**Midterm Exam**	1 hr	10% (20)	7	LO # 1-6
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic concepts, Set, Strings, alphabets and language
Week 2	Regular expressions
Week 3	Grammars: Definition, Specifying languages by grammars, The Chomsky hierarchy of languages
Week 4	Finite state automata: Acceptors, Classifiers, and Transducers
Week 5	Deterministic and nondeterministic finite state automata
Week 6	Finite State Automata with Output: Moor machine and Mealy machine
Week 7	**Mid Term Exam**

Week 8	Context Free Grammar and Languages
Week 9	Generation of Derivation Tree
Week 10	Simplification of context-free grammars, Ambiguity and Unambiguity in Context Free Grammars
Week 11	Properties of context free languages, closure properties of context free languages (union, concatenation, Kleene closure and substitutions
Week 12	Chomsky normal forms, converting Context Free Grammer into Chomsky Normal Form
Week 13	Greibach Normal Form, Converting Chomsky Normal Form into Greibach Normal Form
Week 14	Pushdown Automata (PDA), Convert Context Free Grammar to Push Down Automata
Week 15	Turing Machine (TM) Model, Technique for Turing machine construction
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	No lab

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Introduction to Computer Theory, 2nd Edition, by Daniel I. A. Cohen John Wiley & Sons, Inc 1997. ISBN 0-471-13772-3.	No
Recommended Texts	- Introduction to Automata Theory, Languages, and Computation, 2/E, by John E. Hopcroft, Rajeev M., Jeffrey D. Ullman, Addison-Wesley 2001. ISBN 0-201-44124-1. - Introduction to the Theory of Computation, 2nd Edition, Boston, MA: Course Technology, by Michael Sipser 2006. ISBN: 0534950973.	No
Websites	- PDA & Context-Free Grammar (tutorialspoint.com) - Automata Tutorial - GeeksforGeeks	

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	**Web Programming** برمجة الانترنت			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**UoMCS110**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UG I - 1	**Semester of Delivery**		2
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	م. عائشة صديق شاهين		**e-mail**	Aeeshashaheen_1965@uomosul.edu.iq	
Module Leader's Acad. Title		lecturer	**Module Leader's Qualification**		MSc.
Module Tutor	منتهى طارق		**e-mail**	muntahatariq@uomosul.edu.iq	
Peer Reviewer Name		Ahmed Salih Hasan	**e-mail**	ahmed_salih_h@uomosul.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Programming Fundamentals	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. HTML (Hypertext Markup Language): HTML is the foundation of web development. Learn the basic structure of HTML, including tags, elements, attributes, and how to create the structure and content of web pages. 2. CSS (Cascading Style Sheets): CSS is used to style and format HTML elements. Learn how to apply styles, change colors, adjust layouts, and make web pages visually appealing. 3. JavaScript: JavaScript is a programming language that adds interactivity to web pages. Start with the fundamentals, such as variables, data types, operators, and control structures. 4. Responsive Web Design: Learn how to create websites that adapt and look good. Understand the concepts of fluid layouts, media queries, and responsive frameworks like Bootstrap.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding of Web programming Principles: Learn the fundamentals of web development, including concepts like client-server architecture, HTTP protocol, web standards. 2. Proficiency in HTML: Gain a thorough understanding of HTML and its syntax, allowing to create the structure and content of web pages effectively. 3. Problem-Solving and Debugging Skills: Develop the ability to identify and solve web programming issues, debug code, and troubleshoot common errors. 4. Collaboration: Learn to work collaboratively with other students. 5. Competence in CSS: Develop skills in CSS to style web pages, control layout, and apply visual design concepts to enhance the appearance of websites. 6. JavaScript: Acquire a solid foundation in JavaScript, enabling you to add interactivity, manipulate the Document Object Model (DOM), handle events, and implement dynamic functionality on web pages. 7. Deployment and Hosting: Gain the knowledge to understanding the basics of web hosting. 8. Continuous Learning and Adaptability: Develop a mindset of continuous learning, staying updated with new web technologies, frameworks, and best practices in order to adapt to the evolving field of web programming.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Web Development [6 hrs] • Overview of web technologies • Client-server architecture • Introduction to HTML, CSS, and JavaScript 2. HTML Fundamentals [30 hrs] • HTML structure and syntax

	• Basic HTML tags (e.g., headings, paragraphs, lists) • Working with links and images • Creating forms and input fields 3. CSS Basics [24 hrs] • Introduction to CSS and its role in web design • CSS syntax and selectors • Applying styles to HTML elements (e.g., colors, fonts, backgrounds) • Box model and layout basics 4. JavaScript Essentials [10 hrs] • Introduction to JavaScript and its role in web programming • Variables, data types, and operators • Control flow (conditionals and loops) • Working with functions and events

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Step-by-Step Tutorials: Provide detailed step-by-step tutorials that guide learners through the process of building web pages. Break down complex tasks into smaller, manageable steps, explaining each step clearly. 2. Interactive Coding Exercises: Incorporate interactive coding exercises that allow learners to practice and experiment with code in a controlled environment. Online coding platforms and interactive coding challenges can be valuable resources for this purpose. 3. Pair Programming: Facilitate pair programming, where two learners work together on the same codebase. This promotes collaboration, problem-solving, and sharing of knowledge and ideas. 4. Online Resources and Tutorials: Direct learners to reputable online resources, tutorials, and documentation relevant to web programming. Websites like MDN Web Docs, W3Schools, and tutorials point, offer comprehensive guides and tutorials for beginners. 5. Practice and Repetition: Emphasize the importance of practice and repetition in web programming. Encourage learners to write code regularly, solve coding challenges, and work on mini-projects to reinforce concepts and build coding skills. 6. Hands-on Projects: Encourage learners to work on practical projects right from the beginning. Projects help apply theoretical concepts in a real-world context and provide a sense of accomplishment. Start with small, manageable projects and gradually increase complexity as skills progress. 7. Real-World Examples and Case Studies: Provide real-world examples and case studies that demonstrate how web programming concepts are applied in practical scenarios. This helps learners connect theory to real-world applications. 8. Incremental Learning: Introduce concepts gradually, starting with the basics and building upon them progressively. This helps learners develop a strong foundation and prevents overwhelming them with complex topics too early.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	50	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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 ,5 and 6
	Assignments	4	10% (10)	2, 12	LO # 1,2, 5 and 6
	Projects / Lab.	1	10% (10)	Continuous	
	Report	0	0% (0)		
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-4
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - The Web Programming,
Week 2	Introduction to HTML, Basic HTML tags and document structure, Creating headings, paragraphs
Week 3	HTML-Attributes and Comments
Week 4	HTML - Tables and lists
Week 5	HTML – Adding images to web pages and working with links and anchors
Week 6	HTML – Forms, Creating forms and handling user input
Week 7	**Mid-term Exam**
Week 8	Introduction to CSS and its role in web design

Week 9	CSS selectors and the box model
Week 10	Styling text, colors, and backgrounds
Week 11	CSS - Tables
Week 12	CSS – Borders and lists
Week 13	CSS - Text and Image Effects
Week 14	Introduction to JavaScript for web interactivity
Week 15	Handling events and user interactions with JavaScript
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1-2	Lab 1: Basic HTML tags and document structure, Creating headings, paragraphs
Week 3-4	Lab 2: Attributes and Comments, Tables and lists
Week 5-6-7	Lab 3: images and links and forms
Week 8-9	Lab 4: CSS
Week 10-11	Lab 5: CSS continues
Week 12-13	Lab 6: CSS continues
Week 14-15	Lab 7: java

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	- **HTML, CSS, Bootstrap, Javascript and jQuery,** Meher Krishna Patel (2018) - Webdeenglish.pdf	No
Recommended Texts	The-complete-reference-html-CSS-fifth-edition, Thomas A. Powell	No
Websites	https://www.tutorialspoint.com/html/html_tutorial.pdf	

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	Principles of Statistics مبادئ الاحصاء			**Module Delivery**	
Module Type	S			☒Theory ☒Lecture ☐Lab ☐Tutorial ☐Practical ☐Seminar	
Module Code	UoMCS111				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGI - 1	**Semester of Delivery**		2
Administering Department			**College**		
Module Leader	Khairy Badal Rasheed		**e-mail**	Khairy-stat@uomosul.edu.iq	
Module Leader's Acad. Title		Lecture	**Module Leader's Qualification**		Msc.
Module Tutor	Shaimaa Waleed Mahmood		**e-mail**	shaimaa.waleed@uomosul.edu.iq	
Peer Reviewer Name		Ahmed Salih Hasan	**e-mail**	Ahmed_salih_h@uomosul.edu.iq	
Scientific Committee Approval Date			**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- Give the learner the statistical skills that enable him to work in the fields of statistic, calculating measures of statistic. 2- The subject of statistics is a digital language and an art to express the variables and numbers accurately, and thus enables the student to benefit from this subject in the statistics and the programs that are important to him in most fields of life. 3- Statistics course aims to develop ways and means of thinking and how to deal with various problems. 4- Trying to think in sound ways and methods, specifically in solving problems and thus improving and developing society.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understand the fundamental concepts and principles of statistics, including data types, measurement scales, and sampling methods. 2- Interpret and analyze data using descriptive statistical measures, such as measures of central tendency (mean, median, mode) and measures of variability (range, variance, standard deviation). 3- Apply probability theory to analyze and make predictions about uncertain events, including calculating probabilities and understanding the laws of probability. 4- Utilize basic principles of statistical inference to draw conclusions about a population based on sample data, including hypothesis testing and confidence intervals. 5- Apply appropriate statistical techniques for analyzing relationships between variables, including correlation analysis and simple linear regression. 6- Understand and interpret the results of statistical software output and graphical representations. 7- Communicate statistical findings and interpretations effectively, both orally and in written form. 8- Develop critical thinking and problem-solving skills in the context of statistical analysis and interpretation.
Indicative Contents المحتويات الإرشادية	1- familiarize students with the basics of statistics, its fields of application. [10 hrs] 2- the statistical method in scientific research, methods of data collection. [20 hrs] 3- classification and presentation for the purpose of obtaining the necessary information to make appropriate decisions and the possibility of using this data in prediction, in addition to developing students. [10 hrs] 4- skills in research design method. [20 hrs] 5- bringing the student to a level where he has the ability to interpret the results and turn them into a practical reality. [8 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 in the statistical methods.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

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 #4
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Report	1	10% (10)	13	All
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Definition and importance of statistics
Week 2	Statistical method in scientific research Statistical Notation Types of statistics
Week 3	Data types and methods of collection
Week 4	Types of Samples
Week 5	Frequency distributions (importance and types)
Week 6	Presentation of data Frequency distribution (Tabular presentation)
Week 7	**Midterm Exam**
Week 8	Cumulative distribution , Graphical presentation
Week 9	Measures of Central tendency for ungrouped data
Week 10	Measures of Central tendency for grouped data
Week 11	Properties of central tendency measures
Week 12	Measures of dispersion (variation) for ungrouped data Measures of dispersion (variation) grouped data
Week 13	Properties of dispersion measurements
Week 14	Pearson and spearman correlation
Week 15	Preparatory week before the final Exam
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1: Statistics Level Prac. 1
Week 3,4	Lab 2: Statistics Level Prac. 2
Week 5,6	Lab 3: Statistics Level Prac. 3
Week 7,8	Lab 4: Statistics Level Prac. 4
Week 9,10	Lab 5: Statistics Level Prac. 5
Week 11,12	Lab 6: Statistics Level Prac. 6
Week 13,14,15	Lab 7: Statistics Level Prac. 7

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Elementary Statistics (2007), Allan Bluman.	Yes
Recommended Texts	Basics of Statistics (1995), Jarkko Isolalo.	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
	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 Skills** مهارات الحاسوب			**Module Delivery**	
Module Type	**Elective**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS112**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		UGI -1	**Semester of Delivery**		2
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Dr. Basim Mohammed Mahmood		**e-mail**	bmahmood@uomosul.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Ahmed Salih Hasan	**e-mail**	ahmed_salih_h@uomosul.edu.iq	
Scientific Committee Approval Date		17/06/2023	**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 Aims أهداف المادة الدراسية	This course aims to provide the following: 1- Use computers and devices to carry out essential everyday tasks. 2- Involve students with a variety of operating systems and their peripherals and software. 3- Involve students with office applications. 4- Involve students with multi-purpose applications (e.g., file management, backups, and other related applications). 5- Involve students with the main concepts and configurations of networks. 6- Provide students with the most used web applications and cloud services. 7- Provide students with knowledge related to networks. 8- Present the most frequent security issues related to the regular use of computers and the internet.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will be able to: 1. Understand the key concepts relating to ICT, computers, devices, and software 2. Identify the different settings and options of an operating system and use the built-in help 3. Recognize good practice in file management and be able to organize files and folders efficiently 4. Understand network concepts and connection options and be able to connect to a network 5. Recognize considerations relating to green IT, accessibility, and user health
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Understand the key concepts relating to ICT, computers, devices, and software. [6 hrs] Identify the different settings and options of an operating system and use the built-in help. [10 hrs] Recognize good practice in file management and be able to organize files and folders efficiently. [14 hrs] Understand network concepts and connection options and be able to connect to a network. [8 hrs] Recognize considerations relating to green IT, accessibility, and user health. [4 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy used in this course is to learn students with the most needed computer skills in the job markets aiming to have them more qualified for jobs.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	44	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	6	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.4
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**	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.				
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	2 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to computer skills
Week 2	Computer and devices (hardware and software)
Week 3	Operating systems (Windows, Macintosh, Linux, Unix)

Week 4	Outputs: working with texts using Microsoft office applications (Microsoft Word)
Week 5	Microsoft PowerPoint
Week 6	Microsoft Outlook
Week 7	**Midterm Exam**
Week 8	Microsoft Excel
Week 9	File Management (Files and folders, storage and compression)
Week 10	Network and Web Principles
Week 11	Network Administration Concepts
Week 12	Protecting Data and Devices
Week 13	Malware and other related security issues
Week 14	Safe use of websites
Week 15	Health and Green IT
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1: Windows and Linux practices
Week 3, 4	Lab 2: Macintosh and Unix practices
Week 5, 6	Lab 3: Microsoft Word
Week 7, 8	Lab 4: Microsoft Outlook
Week 9, 10	Lab 5: Microsoft Excel
Week 11, 12	Lab 6: File management and related applications
Week 13, 14, 15	Lab 7: Network administration, security, and safe use of websites.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	ICDL Online Modules	Online
Recommended Texts	https://icdl.org/workforce/icdl-workforce/	Online

Websites	https://icdl.org/workforce/computer-essentials/

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	**Digital Image Processing** معالجة الصور الرقمية			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**UoMCS401**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIV-4		**Semester of Delivery**	7	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Dr. Zohair Al-Ameen		**e-mail**	qizohair@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Melad jader		**e-mail**	meladjader@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. To provide a solid foundation in the basic concepts and principles of digital image processing. This includes understanding image formation, representation, color models, pixel visualization, and mathematical operations. 2. To implement the basic methods in digital image processing. 3. To teach students how to filter an image using different techniques. This includes spatial and frequency domain methods, histogram equalization, contrast stretching, and spatial filtering. 4. To teach students how to restore degraded images affected by noise, blurring, or other distortions. 5. To provide students with knowledge and skills to analyze and interpret images in terms of content and visible quality. 6. To provide hands-on experience in implementing image processing algorithms and conducting experiments by including practical sessions using MATLAB.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the necessary fundamentals for image processing. 2. Know the required mathematical operations. 3. Familiarize the students with the available color spaces. 4. Recognize the difference between scripts, functions, and p-codes. 5. Provide a hands-on solution for discrete Fourier transform questions. 6. Explain the filtration process in image processing. 7. Perform logical and neighborhood-based filtration processes. 8. Explain the convolution-based filters. 9. Describe the most famous image processing enhancement and restoration methods. 10. Describe the important image attributes. 11. Explain how to measure the quality of digital images using different methods. 12. Perform some important image morphological operations.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: ▪ Basics of image processing: representation, negation, cropping, attributes, histogram, colors [10 hrs]. ▪ Basics of operations: add, divide, subtract, multiply, convolution, complex numbers, Fourier operations [15 hrs]. ▪ Color spaces: RGB, HSV, HSI, YCbCr, CMYK [5 hrs]. ▪ Filtering: thresholding, mean, median [5 hrs]. ▪ Filtering: Robert, Prewitt, Laplace [5 hrs]. ▪ Contrast Enhancement: normalization, histogram equalization, log-transform, power-law transform [10 hrs].

	▪ Image Deblurring: Weiner, Van-Cittert [5 hrs]. ▪ Image Denoising: noise reduction [5 hrs]. ▪ Quality Assessment: Objective, subjective, FR, NR, RR, MSE, PSNR, RCE, EI, CFN [14 hrs]. ▪ Morphological Operations: dilation and erosion [10 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	▪ Class delivery. ▪ Online tutorials. ▪ Lab experiments. ▪ Class activities. ▪ Self-study.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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**	1	5% (5)	5	LO # 1-4
	Assignments	1	10% (10)	14	All
	Lab	1	15% (15)	Continuous	All
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction
Week 2	DIP Fundamentals
Week 3	DIP Basic Mathematical Operations
Week 4	Scripts, Functions & P-Codes
Week 5	Color Spaces
Week 6	Discrete Fourier Transform
Week 7	**Scheduled Exam**
Week 8	Image Filtering (Thresholding, Mean, and Median)
Week 9	Edge Detection / Image Sharpening
Week 10	Contrast Enhancement
Week 11	Image Deblurring
Week 12	Image Denoising
Week 13	Quality Assessment
Week 14	Image Quality Assessment Methods
Week 15	Morphological Operations
Week 16	**Revisions for the Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Lab 1:** MATLAB Basics
Week 2	**Lab 2:** Dealing with Images using MATLAB
Week 3	**Lab 3:** Applying the Basic Mathematical Operations with MATLAB
Week 4	**Lab 4:** Programming Functions & P-Codes with MATLAB
Week 5	**Lab 5:** Exploring Color Spaces with MATLAB
Week 6	**Lab 6:** Implementing Discrete Fourier Transform with MATLAB
Week 7	**Scheduled Exam**
Week 8	**Lab 7:** Applying Thresholding, Mean, and Median Filters using MATLAB
Week 9	**Lab 8:** Applying Edge Detection & Image Sharpening using MATLAB

Week 10	**Lab 9:** Implementing Different Contrast Enhancement Methods with MATLAB
Week 11	**Lab 10:** Applying a Selected Image Deblurring Algorithm with MATLAB
Week 12	**Lab 11:** Applying a Selected Image Denoising Algorithm with MATLAB
Week 13	**Lab 12:** Applying Some Basic Image Quality Assessment Methods with MATLAB
Week 14	**Lab 13:** Applying Some Advanced Image Quality Assessment Methods with MATLAB
Week 15	**Lab 14:** Applying Selected Morphological Operations with MATLAB
Week 16	**Revisions for the Final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Gonzalez, R. C., Woods, R. E., & Eddins, S. L. (2020). Digital image processing using MATLAB. 3rd Edition. Knoxville: Gatesmark Publishing	No
Recommended Texts	Burger, W., & Burge, M. J. (2022). Digital Image Processing: An Algorithmic Introduction. Springer Nature. Thiruvikraman, P. K. (2019). A Course on Digital Image Processing with MATLAB®. IOP Publishing.	No
Websites	https://www.imageprocessingplace.com/	

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 is required but credit awarded
	F – Fail	راسب	(0-44)	A 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 Networks شبكات الحاسوب			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**UoMCS402**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	4		**Semester of Delivery**	7	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Name: Ahmed Salih Hasan		**e-mail**	E-mail: ahmed_salih_hasan@uomoul.edu.iq	
Module Leader's Acad. Title	Lecture		**Module Leader's Qualification**	Master	
Module Tutor			**e-mail**		
Peer Reviewer Name	Melad jader		**e-mail**	meladjader@uomosul.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Network Lab.	**Semester**	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course aims to: 1- Introduce students to the concept of computer networks. 2- Provide them with the necessary information about the types of computer networks 3- How the networks are work. 4- The infrastructure and the designing of Networks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will be able to: 1. Understand the key concepts of computer networks, types, models and how networks are works. 2. Understand the transmission Media types: Guided media: UTP, STP, Coaxial Unguided media: wireless, IR, Satellite, and Bluetooth. 3. Understand the Networking Devices, Hub, Switch, and Router. 4. Recognize the seven layers of the OSI model with their tasks. 5. Recognize the layers of the TCP/IP with their tasks. 6. Understand Networks addressing, IP addresses, Mac address and port address. 7. Understand The IP addresses and its types: classless and classful. 8. Understand the Special Addresses, Private Addresses.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. ❖ Understand the concepts Computer Networks, types, Models, connecting devices and transmission media [15 hrs] ❖ Identify the layers of OSI Model and TCP/IP with their tasks. [10 hrs] ❖ Identify the network devices and where they relate to network layers. [10 hrs] ❖ Understand the network addresses, which are IP address, MAC address and Port address. [5 hrs] ❖ Define the IP addresses Types classless, classes (Classful) and their Categories such as Special Addresses, Private Addresses, etc. [10 hrs] ❖ Teach the students the techniques of subnetting and supernetting. [10 hrs] ❖ Identify the class of IP address and its rang.[10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy used in this course is to learn students with the concepts of computer networks and aiming to have them more qualified for jobs in the fields of communication companies.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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)	1, 2,4 and 11	LO #1, 2, 6 and 7
	Assignments	2	10% (10)	2, 3 and 11	LO # 2, 3, and 7
	Projects / Lab.	0	0		
	Report	1	10% (10)	2 and 3	LO # 2 and 3
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Computer Networks Definition, types, Models
Week 2	Transmission Media-1 Guided media: UTP, STP, Coaxial.
Week 3	Transmission Media-2 Unguided media: wireless, IR, Satellite, Bluetooth.
Week 4	Networking Devices: Hub, Switch and Router.

Week 5	OSI Model: State the seven layers of the OSI model with their tasks
Week 6	TCP/IP: State the layers of the TCP/IP with their tasks.
Week 7	**Mid-term Exam.**
Week 8	Network addresses which are: IP address, MAC address and Port address.
Week 9	IP addresses: Types and classes (Classful).
Week 10	Special Addresses, Private Addresses: Special addresses types and specifications and private addresses
Week 11	Subnetting- Importance of Subnetting and how it works
Week 12	Subnetting Examples.
Week 13	Supernetting.
Week 14	Classless IP Addresses.
Week 15	Classless Examples.
Week 16	**Revision week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
	No Lab.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	TCP/IP Protocol Suite / Behrouze Forzan	Yes
Recommended Texts	Data communication and Networking / Behrouze Forozan	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
	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	**Graduation Project (1)** مشروع التخرج ١			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS403**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIV - 4		**Semester of Delivery**	7	
Administering Department	Computer Science		**College**	College of Computer Science and Mathematics	
Module Leader	Dr. Basim Mohammed Mahmood		**e-mail**	bmahmood@uomosul.edu.iq	
Module Leader's Acad. Title	Associate Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Melad jader		**e-mail**	meladjader@uomosul.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	Graduation Project (2)	**Semester**	8

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	By taking a graduation project, which is core, students will learn from their projects a lot of things that are required in the job market. Therefore, the aim of the graduation project are to: 1- Prepare students for the job market. 2- Develop students' skills in the fields they are interested in. 3- Prepare students to work in teams.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students become more experienced in the practical side of computer science.
Indicative Contents المحتويات الإرشادية	Projects steps guided by the advisor [58 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Presentations, seminars, and practical training

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	58	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**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				
	Assignments				
	Projects				
	Report, seminars, presentations	2	40% (40)	5, 10	
Summative assessment	Midterm Exam	0	0		
	Final Exam (final presentation)	2 hr	60% (60)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Depends up on the project and the advisor
Week 2	
Week 3	
Week 4	
Week 5	Presentation, report, seminar
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	Presentation, report, seminar
Week 11	
Week 12	
Week 13	
Week 14	

Week 15	
Week 16	**Final Presentation**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-15	Project parts

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Depends up on the project and the advisor	Online
Recommended Texts	Depends up on the project and the advisor	Online
Websites	Depends up on the project and the advisor	

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	Distributed Systems أنظمة موزعة			**Module Delivery**	
Module Type	Base			☒**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☐**Practical** ☒**Seminar**	
Module Code	UoMCS404				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		**UGIV**	**Semester of Delivery**		7
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Rawaa Putros Polos		**e-mail**	rawa_qasha@uomosul.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Melad jader	**e-mail**	meladjader@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. Understanding Distributed Computing: The primary aim of a distributed systems course is to provide students with a comprehensive understanding of the fundamental concepts, principles, and techniques involved in distributed computing. This includes studying distributed algorithms, communication protocols, resource management, and synchronization mechanisms. 2. Designing Distributed Systems: The course aims to equip students with the knowledge and skills necessary to design and develop distributed systems. 3. Distributed Systems Models and Paradigms: The course aims to familiarize students with various models and paradigms used in distributed systems. This includes client-server architectures, peer-to-peer networks, distributed databases, cloud computing, and grid computing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding of Distributed Systems Concepts: Students will gain a solid understanding of the fundamental concepts, principles, and models used in distributed systems. 2. Knowledge of Distributed Algorithms and Techniques: Students will learn about various algorithms and techniques used in distributed systems. 3. Awareness of the virtualization technologies and Code migration techniques. 4. Understanding of Networking and Communication: Students will gain knowledge of networking principles and communication protocols used in distributed systems. This includes understanding network topologies, message passing, remote procedure calls (RPC), and data serialization techniques. 5. Recognizing the concepts of Distributed File Systems and how to deal with the files on modern systems. 6. Understanding the importance of the Synchronization for the distributed systems and how different algorithms are designed and used.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Fundamentals of Distributed Systems</u> - Introduction, Common types of Distributed Systems, Architecture Style [8 hrs] - Threads and Multithreaded Clients and Servers [9 hrs] <u>Part B - Virtualization and Code Migration Techniques</u> - Virtualization Techniques [8 hrs] - Code Migration in Distributed Systems [10 hrs]

	Part C - Communications for Distributed Systems - Layard Protocols and Types of Communications [6 hrs] - Remote Procedure Calls, Message oriented communications and Stream oriented communications [12 hrs] Part D - Distributed File Systems and Synchronization - DFS Naming and DNS Name Space [9 hrs] - Synchronization and Synchronization Algorithms [9 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	In this course, a number of strategies will be adopted. These strategies aim to enhance the learning experience and promote effective teaching practices. 1- Active Learning: Encourage active participation and engagement from students. Instead of passive listening, incorporate activities such as group discussions, case studies, problem-solving exercises, and hands-on experiments to promote active learning. 2- Collaborative Learning: Foster collaboration among students by incorporating group projects, team-based assignments, and peer-to-peer learning activities. This encourages teamwork, communication, and the sharing of knowledge and perspectives. 3- Technology Integration: Utilize technology tools and resources to support learning. Incorporate multimedia materials, online discussion forums, virtual simulations, and educational software to enhance student engagement and provide opportunities for interactive learning. 4- Real-World Applications: Connect theoretical concepts to real-world applications to make the content more relevant and meaningful. Use examples, case studies, and practical exercises that relate to industry practices or current events, allowing students to see the practical implications of what they are learning.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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 and 4
	Assignments	2	10% (10)	6, 9	LO # 3 and 5
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 3, 4 and 6
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-3
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction: Definition and characteristics of distributed systems, Challenges and benefits of distributed computing, Overview of distributed systems architectures and models Examples of distributed systems in practice.
Week 2	Common types of Distributed Systems: Types of distributed systems, clusters and grid computing systems, distributed information systems.
Week 3	Architecture Style: Architecture style, system architecture, centralized and decentralized architecture.
Week 4	Threads and Multithreaded: Processes, threads implementation
Week 5	Clients and Servers: multithreaded server, clients, servers, distributed servers.
Week 6	Virtualization: Virtualization technologies, the architecture of virtual machines. Code Migration: Code migration concepts, Code migration on distributed systems
Week 7	**Midterm Exam**
Week 8	Layard Protocols: Communications, layered protocols, types of communications.
Week 9	Remote Procedure Calls: Remote procedure calls, clients and server stubs, asynchronous RPC.
Week 10	Message-oriented communications: Message-oriented communications, message queuing model, channels.
Week 11	Stream-oriented communications: Stream-oriented communications, quality of service, multicast communications.
Week 12	Distributed File System naming: DFS names, identifiers, structured naming.

Week 13	DNS Name Space: The Implementation of a Name Space, The DNS Name Space.
Week 14	Synchronization: Synchronization, Global Positioning System.
Week 15	Synchronization Algorithms: Clock Synchronization Algorithms, Network Time Protocol.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Andrew S. Tanenbaum and Maarten Van Steen, Distributed Systems: Principals and Paradigms, 2nd ed., Upper Saddle River, New Jersey, USA: Prentice Hall, 2007.	Yes
Recommended Texts	Marten Van Steen and Andrew S. Tanenbaum, Distributed System, 3rd Edition 2017.	No
Websites	https://www.coursera.org/courses?query=distributed%20systems	

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	**Games Design** تصميم الالعاب			**Module Delivery**	
Module Type	Support			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**UoMCS405**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UGIV -4	**Semester of Delivery**		**7**
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Zeyad Abd-Algfoor Hasan		**e-mail**	**drzeyad@uomosul.edu.iq**	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		**Ph.D.**
Module Tutor			**e-mail**		
Peer Reviewer Name		Melad jader	**e-mail**	**meladjader@uomosul.edu.iq**	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1- Understanding Game Design Principles: The module aims to provide students with a comprehensive understanding of the fundamental principles and concepts of game design. 2- Developing Creativity and Innovation: The module aims to foster creativity and innovation in game design. 3- Enhancing Technical Skills: The module aims to enhance students' technical skills in game design and development. They will gain proficiency in industry-standard game development tools, software, and programming languages. Students will learn to implement gameplay features, create interactive environments, and utilize audiovisual elements effectively. 4- Applying Design Theory: The module aims to enable students to apply design theory and principles in practical game design projects. 5- Collaboration and Teamwork: The module aims to cultivate collaborative and teamwork skills among students. They will work in teams to develop game projects, learning to communicate effectively, delegate tasks, and work towards a common goal. Students will gain experience in the collaborative aspects of game development. 6- User-Centered Design: The module aims to emphasize the importance of user-centered design in game development. Students will learn to conduct user research, analyze player feedback, and iterate their designs based on user testing. They will focus on creating games that cater to the needs and preferences of the target audience. 7- Project Management: The module aims to develop students' project management skills in the context of game design. They will learn to plan and organize game development projects, set realistic goals, allocate resources effectively, and meet project deadlines. Students will gain experience in project scoping, scheduling, and risk management.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Demonstrate a comprehensive understanding of the fundamental principles and concepts of game design, including gameplay mechanics, level design, storytelling, aesthetics, and user experience. 2- Generate creative and innovative game concepts that exhibit unique and engaging gameplay mechanics, demonstrating the ability to think outside the box in game design.

	3- Apply technical skills in game design and development, utilizing industry-standard game development tools, software, and programming languages to implement gameplay features, create interactive environments, and utilize audiovisual elements effectively. 4- Collaborate effectively in a team setting, demonstrating strong communication skills, task delegation, and the ability to work towards a common goal in game development projects. 5- Demonstrate project management skills in game design, including project planning, organization, resource allocation, and meeting project deadlines in a game development context. 6- Demonstrate an understanding of ethical considerations in game design, including inclusivity, representation, cultural sensitivity, and social impact, and apply these considerations in the design of games that promote positive values and avoid harmful stereotypes.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Unity Scripting Fundamentals:</u> Understanding game objects and components in Unity. Accessing and manipulating game object properties and components through C# scripts. Using the Unity API and Scripting Reference. Transformations and movements in 3D and 2D space. Input handling (keyboard, mouse, touch). Unity Events and Lifecycles: Understanding Unity's event system and event-driven programming. Working with common Unity events (Start, Update, OnTriggerEnter, etc.). Managing object instantiation and destruction. **[30 hrs]** <u>Part B - C# script</u> Introduction to C# in Unity: Understanding the role of C# scripting in Unity game development. Setting up Unity and the development environment. Creating a new C# script in Unity. C# Basics: Variables, data types, and operators in C#. Control flow statements (if-else, switch, loops). Arrays and collections. Functions and methods. Object-oriented programming (classes, objects, inheritance, polymorphism). **[30 hrs]** <u>Part C - Introduction to AR and VR</u> Understanding the concepts of AR and VR. Differentiating between augmented reality and virtual reality experiences. Exploring the potential applications and use cases of AR and VR. Setting up Unity for AR and VR: Installing the necessary plugins or SDKs for AR and VR development in Unity 5. Configuring Unity's project settings for AR and VR experiences. Creating a new AR or VR project in Unity. **[24 hrs]**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	For undergraduate students interested in learning game design with Unity software, there are several effective strategies to consider. Firstly, take advantage of the vast resources available online, including Unity's official tutorials, documentation, and video guides. These resources provide a solid foundation in Unity's features and functionalities, enabling you to grasp the essentials of game design. Additionally, consider enrolling in online courses or attending workshops specifically tailored for beginners, as they provide structured learning and hands-on experience. Collaborating with fellow students through group projects or joining game development clubs can enhance your learning experience by fostering teamwork and exposing you to diverse perspectives. Building a portfolio of game design projects throughout your undergraduate years will showcase your skills and creativity to potential employers or graduate programs. Lastly, actively participate in game development communities and forums to network with industry professionals, gain insights, and seek feedback on your designs. By following these strategies, undergraduate students can develop a strong foundation in game design with Unity and pave the way for a successful career in the industry.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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	
	Report				
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Describe fundamental aspects of video game history
Week 2	Geography and representation
Week 3	Types of rules in video games world
Week 4	Perspective, Dimensions, Space types
Week 5	Understanding game objects and components in Unity
Week 6	Transformations and movements in 3D and 2D space
Week 7	**Midterm exam**
Week 8	Input handling (keyboard, mouse, touch)
Week 9	Understanding the role of C# scripting in Unity game development
Week 10	Learning Variables, data types, and operators in C#
Week 11	Object-oriented programming (OOP)
Week 12	Classes and Objects
Week 13	Inheritance and polymorphism
Week 14	Useful libraries I
Week 15	Useful libraries II
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر		
	Material Covered	
Week 1,2	Lab Lecture 1: Introduction to Unity 4,	• Overview of Unity 4 software and its capabilities in game design. • Familiarization with the Unity 4 interface, tools, and features. • Creating a basic game project in Unity 4.
Week 3,4	Lab Lecture 2: Game Objects and Components	• Understanding game objects and their roles in game design. • Exploring various components in Unity 4, such as transforms, colliders, rigidbodies, and scripts. • Creating and manipulating game objects

		using Unity 4's component system.
Week 5,6,7	Lab Lecture 3: Scripting in Unity 4	• Introduction to scripting in Unity 4 using C#. • Writing and implementing scripts to control game objects and behaviors. • Creating interactive gameplay features through scripting in Unity 4.
Week 8,9	Lab Lecture 4: Level Design and Environment Creation	• Designing game levels using Unity 4's level editor. • Building interactive environments by placing and manipulating assets. • Applying lighting, materials, and textures to enhance the visual aesthetics of game levels.
Week 10,11	Lab Lecture 5: Physics and Simulations	• Utilizing Unity 4's physics engine for realistic object interactions and simulations. • Applying physics properties to game objects, such as gravity, collisions, and forces. • Creating physics-based gameplay mechanics and puzzles.
Week 12,13	Lab Lecture 6: User Interface and Menus	• Designing user interfaces (UI) for games using Unity 4's UI system. • Implementing buttons, sliders, text fields, and other UI elements. • Creating menus, options screens, and HUDs to enhance player experience.
Week 14,15	Lab Lecture 7: Sound and Effects	• Incorporating audio elements into games using Unity 4's audio system. • Adding sound effects, background music, and voice-overs to enhance immersion. • Implementing visual effects, particle systems, and shaders to create stunning visual experiences.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Clara Fernández-Vara, *Introduction to Game Analysis*. 2014	No
Recommended Texts	Simon Egenfeldt-Nielsen, Jonas Heide Smith, Susana Pajares Tosca, *Understanding Video Games the Essential Introduction*. 2007	No
Websites	https://www.shiksha.com/online-courses/game-design-and-development-1-2d-shooter-course-courl3453	

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	**Academic Writing** الكتابة الاكاديمية			**Module Delivery**	
Module Type	**Elective**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS406**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		UGIV - 4	**Semester of Delivery**		7
Administering Department		Computer Science	**College**	College of Computer Science and Mathematics	
Module Leader	Dr. Basim Mohammed Mahmood		**e-mail**	bmahmood@uomosul.edu.iq	
Module Leader's Acad. Title		Associate Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Melad jader	**e-mail**	meladjader@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	By the end of the course, students will be able to: 1. Demonstrate and apply knowledge of basic essay structure, including introduction, body, and conclusion. 2. Employ the various stages of the writing process, including pre-writing, writing, and re-writing 3. Employ descriptive, narrative, and expository modes; 4. Demonstrate ability to write for an academic audience 5. Demonstrate understanding of and apply the principles of effective paragraph structure; 6. Write concise sentences; 7. Employ quotation, paraphrase and summary; 8. Introduce, position and integrate source material into the body of an essay; 9. Recognize and correct basic grammatical errors, specifically errors of subject/verb agreement, verb tense, pronoun agreement, usage of prepositions and articles; 10. Improve academic and idiomatic vocabulary; 11. Employ socially appropriate language 12. Read, analyze and respond to assigned readings with an understanding of structure and mechanics; 13. Identify effective writing techniques in his or her own work and in peer writing. 14. Employ correct MLA or APA citation style, including parenthetical, in-text citation and works-cited pages. 15. Evaluate sources for relevance and reliability 16. Avoid plagiarism
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. This course is designed to reinforce essay composition skills and introduce students to the practice of writing for academic purposes. 2. It will prepare students for work in high-level English courses in which research writing is a requirement. 3. It introduces basic research writing skills including conducting research, note taking, paraphrasing, summary, direct quotation, positioning, and MLA or APA style citation. 4. The course will place equal or greater emphasis on macro-level composition skills such as essay structure, paragraph structure, coherence, and unity; and micro-level skills such as sentence structure, grammar, vocabulary, spelling, and mechanics.
Indicative Contents المحتويات الإرشادية	Basic knowledge on essay structure. [5 hrs] Employ the various stages of the writing process. [6 hrs] Write concise sentences. [3 hrs]

	Read, analyze and respond to assigned readings with an understanding of structure and mechanics. [6 hrs] Employ correct MLA or APA citation style. [6 hrs] Evaluate sources for relevance and reliability. [6 hrs] Plagiarism concepts and avoidance. [6 hrs] Academic structure issues. [4 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The strategy of this course is designed to reinforce essay composition skills and introduce students to the practice of writing for academic purposes. It will prepare students for work in high-level English courses in which research writing is a requirement. It introduces basic research writing skills including conducting research, note taking, paraphrasing, summary, direct quotation, positioning, and MLA or APA style citation. The course will place equal or greater emphasis on macro-level composition skills such as essay structure, paragraph structure, coherence, and unity; and micro-level skills such as sentence structure, grammar, vocabulary, spelling, and mechanics.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	44	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	6	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.5
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**	2	10% (10)	5, 10	LO #1, 2, 3 and 4
	Assignments	2	10% (10)	2, 6, 10, 13	LO #1, 2, 3 and 4
	Projects	1	10% (10)	Continuous	
	Report	0	0% (0)		
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1 and 2
	Final Exam	2 hr	60% (60)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Paragraph structure (topic sentence, supporting examples, transition sentence)
Week 2	Basic rhetorical modes (narration, description, exposition)
Week 3	Writing process (pre-writing, writing, re-writing)
Week 4	Effective use of quotation, paraphrase, and summary
Week 5	Stylistics (vocabulary, conciseness)
Week 6	Correct paper formatting
Week 7	**Mid-term Exam**
Week 8	Grammar & mechanics as needed
Week 9	Reading and responding to assigned readings
Week 10	Writing research project I
Week 11	Writing research project II
Week 12	Writing research project III
Week 13	Formulating your method and results
Week 14	Two Port Networks, Admittance, Impedance, Hybrid, and Transmittance Parameters
Week 15	Two Port Networks, Admittance, Impedance, Hybrid, and Transmittance Parameters
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
	No Labs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Bailey, Stephen. *Academic writing: A handbook for international students*. Routledge, 2017.	Online
Recommended Texts	Hartley, James. *Academic writing and publishing: A practical handbook*. Routledge, 2008.	Online
Websites	https://www.coursera.org/learn/introduction-to-academic-writing	

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	Computer Networks Lab مختبر شبكات			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	UoMCS407				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UG IV - 4	**Semester of Delivery**		8
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Ahmed Salih Hasan		**e-mail**	ahmed_salih_hasan@uomoul.edu.iq	
Module Leader's Acad. Title		Lecture	**Module Leader's Qualification**		Master
Module Tutor	Name (if available)		**e-mail**		
Peer Reviewer Name			**e-mail**		
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Computer Network	**Semester**	7
Co-requisites module	None	**Semester**	0

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course aims to : 1-introduce students to the concept of computer networks 2-Teching the students the communication concepts, connection techniques and the infrastructure of internet. 3-Provide the students with the necessary information about the types of computer networks and the protocols that used in each one 4- Involve students with the main concepts and configurations of interconnecting devices, such as route, switch, etc. 5-Teaching the students the techniques that used to diagnosing and troubleshooting of networks
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding computer networks, types, models. 2. Understanding how internet and computer networks are works. 3. Understanding the protocols that used in TCP/IP Model in general. 4. Understanding the protocols of the network layer 5. Understanding the protocols of the Data link layer. 6. Understanding the interconnecting devices
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. ❖ Understand the concepts Computer Networks, types, Models, connecting devices and transmission media. [15 hrs] ❖ Identify the layers of OSI Model with their protocols in general. [10 hrs] ❖ Identify network layers protocols. [10 hrs] ❖ Identify Datalink layers protocols.. [5 hrs] ❖ Identify the interconnecting devices that used for forwarding the information through the networks. [15 hrs] ❖ Identify the configuration of the interconnecting devices. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy used in this course is to learn students with the concepts of computer networks and aiming to have them more qualified for jobs in the fields of communication companies.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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)	1, 2,4 and 6	LO #1, 2,3 and 6
	Assignments	2	10% (10)	2, 3 and 7	LO # 2, 3, and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	0	0	2 and 3	LO # 2 and 3
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Computer Networks Definition, types, Models
Week 2	OSI Model: State the seven layers of the OSI model with their tasks
Week 3	TCP/IP: State the layers of the TCP/IP with their tasks.
Week 4	Network Criteria

Week 5	ARP protocol
Week 6	ARP Protocol four cases
Week 7	**Midterm Exam**
Week 8	DHCP
Week 9	ICMP protocol -1-
Week 10	ICMP protocol -2-
Week 11	IP routing and delivery -1-
Week 12	IP routing and delivery -2-
Week 13	IP routing and delivery -3-
Week 14	DNS Protocol -1
Week 15	DNS Protocol -2
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Introduction to packet tracer
Week 3,4,5	Introduction to programming a router
Week 6,7	Create a simple network
Week 8,9	Programming router interfaces
Week 10,11	Examples of Designing Networks
Week 12,13	Testing commands
Week 14,15	Static and dynamic routing protocols

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	TCP/IP Protocol Suite / Behrouze Forzan	Yes
Recommended Texts	CCNA cisco Courses	no
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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Network Security** امنية الشبكات			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	**UoMCS408**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGIV (4)	**Semester of Delivery**		8
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Mafaz Mohsin Khalil		**e-mail**	mafazmhalanezi@uomosul.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name			**e-mail**	E-mail	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	The aim of this module is to provide students with a critical understanding of security threats against network and cloud computing systems and the security measures designed to protect such systems. The module will explicitly develop students' knowledge and experience in the design and application of network and cloud security solutions. The module will also equip students for further academic study and future employability in the area of computer security. The curriculum provides an introduction to the core security concepts and skills needed for the installation, troubleshooting, and monitoring of network devices to maintain the integrity, confidentiality, and availability of data and devices.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the OSI security architecture and the three key objectives of computer security. List and briefly define categories of passive and active security attacks. List and briefly define categories of security services. List and briefly define categories of security mechanisms. 2. List and briefly define the fundamental security design principles. Identify the two major elements of network security. understand the concepts of trust and trustworthiness. 3. Identify the concept of a key hierarchy. Understand the issues involved in using asymmetric encryption to distribute symmetric keys. Understand how to do Symmetric Key Distribution Using Asymmetric Encryption 4. Present an overview of approaches to public-key distribution and analyze the risks involved in various approaches. Present an overview of public-key infrastructure concepts. 5. Present an overview of techniques for remote user authentication using symmetric encryption. Give a presentation on Kerberos. Describe the use of Kerberos in multiple realms. 6. Present an overview of techniques for remote user authentication using asymmetric encryption. Understand the need for a federated identity management system. 7. Overview 8. Summarize Web security threats and Web traffic security approaches. Present an overview of Transport Layer Security (TLS). Understand the differences between Secure Sockets Layer and Transport Layer Security. 9. Present an overview of HTTPS (HTTP over SSL). Present an overview of Secure Shell (SSH). 10. Present an overview of security threats and countermeasures for wireless networks. Understand the unique security threats posed by the use of mobile devices with enterprise networks. Describe the principal elements in a mobile device security strategy. 11. Summarize the key functional components of the Internet mail architecture. Explain

	the basic functionality of SMTP, POP3, and IMAP. 12. Present an overview of IP security (IPsec). Explain the difference between transport mode and tunnel mode. Understand the concept of security association. Explain the difference between the security association database and the security policy database. Summarize the traffic processing functions performed by IPsec for outbound packets and for inbound packets. Present an overview of Encapsulating Security Payload. 13. Explain the role of firewalls as part of a computer and network security strategy. List the key characteristics of firewalls. Understand the relative merits of various choices for firewall location and configurations. Understand the basic principles of and requirements for intrusion detection. Discuss the key features of intrusion detection systems. 14. Describe some of the main categories of malicious software. Present an overview of the key elements of malware defense. Discuss the nature of a distributed denial of service attack. 15. Present an overview of cloud computing concepts. List and define the principal cloud services. List and define the cloud deployment models. Explain the NIST cloud computing reference architecture. Understand the unique security issues related to cloud computing. Describe Cloud Security as a Service. Understand the OpenStack security module for cloud security.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A -Information and Network Security Concepts</u> [8 hrs] I. Describe the key security requirements of confidentiality, integrity, and availability. Discuss the types of security threats and attacks that must be dealt with and give examples of the types of threats and attacks that apply to different categories of computer and network assets. II. Provide an overview of keyless, single-key, and two-key cryptographic algorithms. Provide an overview of the main areas of network security. Describe a trust model for information security. <u>Part B - Cryptographic Key Management and Distribution</u> [8 hrs] I. Explain why man-in-the-middle attacks are ineffective on the secret key distribution protocol. What is the difference between a session key and a master key? What is a key distribution center? What is one role that nonces play in key distribution using public-key cryptography? List four requirements for the distribution of public keys using the public-key certificates scheme. Discuss the potential security issues that arise due to a public-key–directory-based system. II. What is a public-key certificate? What are the requirements for the use of a public-key certificate scheme? What is a certificate revocation list? <u>Part C - User Authentication</u> [8 hrs] I. Give examples of replay attacks. List three general approaches to dealing with replay attacks. What is a suppress-replay attack? What problem was Kerberos designed to address? In Kerberos, what is the purpose of the centralized authentication server? Which approach to secure user authentication in a distributed environment does Kerberos support? In the context of Kerberos, explain the concept of realm. What are the principal differences between version 4 and version 5 of Kerberos? II. Present an overview of techniques for remote user authentication using

asymmetric encryption. Understand the need for a federated identity management system.

Part D – Transport-Level Security [8 hrs]

I. What are the advantages of each of the three approaches shown in Figure 17.1? What protocols comprise TLS? What is the difference between a TLS connection and a TLS session? List and briefly define the parameters that define a TLS session state. List and briefly define the parameters that define a TLS session connection. What services are provided by the TLS Record Protocol? What steps are involved in the TLS Record Protocol transmission?

II. Briefly discuss the different levels of awareness of a connection in HTTPS. Which protocol was replaced by SSH and why? Which version is currently in the process of being standardized? List and briefly define the SSH protocols.

Part E – Wireless Network Security [4 hrs]

What is the basic building block of an 802.11 WLAN? List and briefly define threats to a wireless network. List and briefly define IEEE 802.11 services. List some security threats related to mobile devices. How is the concept of an association related to that of mobility?

Part F – Electronic Mail Security [4 hrs]

What types of interoperability issues are involved in Internet mail architecture and how are they handled? Briefly explain the protocol(s) that are recommended to enhance threat reduction.

Part G – IP Security [4 hrs]

List and briefly describe some benefits of IPsec. List and briefly define different categories of IPsec documents. What is the key concept of the security association (SA) in an IP Security Policy? What is the difference between transport mode and tunnel mode? What are the types of secret key algorithms used in IPsec? Why does ESP include a padding field?

Part H – Network Endpoint Security [8 hrs]

I. List three design goals for a firewall. List four techniques used by firewalls to control access and enforce a security policy. What information is used by a typical packet filtering firewall? What are some weaknesses of a packet filtering firewall? What is the difference between a packet filtering firewall and a stateful inspection firewall? What is an application-level gateway? What is a circuit-level gateway? What is a DMZ network and what types of systems would you expect to find on such networks? What is the difference between an internal and an external firewall? Explain the difference between host-based and network-based intrusion detection systems. What are the main logical components of an IDS? What are the two main approaches to intrusion detection?

II. List the main categories of malicious software. Explain the difference between network traffic analysis, payload analysis, and endpoint behavior analysis. What is a distributed denial-of-service system?

Part I – Cloud Security [4 hrs]

What are the essential characteristics of cloud computing? List and briefly define the deployment models of cloud computing. What is the cloud computing reference architecture? Describe some of the main cloud-specific security threats. What is OpenStack?

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم	
Strategies	Type something like: 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 type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	59	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**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)	1-2, 3-6	LO #1, 2, 3, 4, 5 and 6
	Assignments	2	10% (10)	2, 12	LO # 3, 4 and 5
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 8, 10, 12 and 13
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Cybersecurity, Information Security, and Network Security, The OSI Security Architecture, Security Attacks.
Week 2	Security Services, Security Mechanisms, Network Security (Communications Security and Device Security), Trust and Trustworthiness.
Week 3	Symmetric Key Distribution Using Symmetric Encryption, Symmetric Key Distribution Using Asymmetric Encryption
Week 4	Distribution of Public Keys, Public-Key Infrastructure
Week 5	Remote User-Authentication Principles: The NIST Model for Electronic User Authentication, Means of Authentication, Multifactor Authentication, Mutual Authentication, Kerberos.
Week 6	Remote User-Authentication Using Asymmetric Encryption: Mutual Authentication, One-Way Authentication. Federated Identity Management: Identity Management, Identity Federation
Week 7	**Mid-term Exam + Overview**
Week 8	Web Security Considerations: Web Security Threats, Web Traffic Security Approaches. Transport Layer Security: TLS Architecture, TLS Record Protocol, Change Cipher Spec Protocol, Alert Protocol, Handshake Protocol, SSL/TLS Attacks
Week 9	HTTPS: Connection Initiation, Connection Closure. Secure Shell (SSH): Transport Layer Protocol, User Authentication Protocol, Connection Protocol.
Week 10	Wireless Network Security: Wireless Network Threats, Wireless Security Measures. Mobile Device Security: Security Threats, Mobile Device Security Strategy.
Week 11	Internet Mail Architecture: Email Components, Email Protocols. Email Threats and Comprehensive Email Security
Week 12	IP Security Overview: Applications of IPsec, IPsec Documents, IPsec Services. Encapsulating Security Payload
Week 13	Network Endpoint Security. Firewalls: Firewall Characteristics, Types of Firewalls, DMZ Networks. Intrusion Detection Systems: Basic Principles, Approaches to Intrusion Detection, Host-Based Intrusion Detection Techniques, Network-Based Intrusion Detection Systems.
Week 14	Network Endpoint Security. Malicious Software: Types of Malwares, Malware Defense. Distributed Denial of Service Attacks: DDoS Attack Description, Constructing the Attack Network, DDoS Countermeasures.
Week 15	Cloud Security Concepts. Cloud Security Risks and Countermeasures. Cloud Security as A Service. An Open-Source Cloud Security Module
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
	No Labs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Stallings, William. "*Cryptography and network security principles and practices*." (2020).	Yes
Recommended Texts	Stallings, William. *Computer security principles and practice*. 2020.	Yes
Websites	https://www.coursera.org/learn/network-security	

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	**Graduation Project (2)** مشروع تخرج ٢			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS409**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIV - 4		**Semester of Delivery**	8	
Administering Department	Computer Science		**College**	College of Computer Science and Mathematics	
Module Leader	Dr. Basim Mohammed Mahmood		**e-mail**	bmahmood@uomosul.edu.iq	
Module Leader's Acad. Title	Associate Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name			**e-mail**	meladjader@uomosul.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Graduation Project (1)	**Semester**	7
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	By taking a graduation project, which is core, students will learn from their projects a lot of things that are required in the job market. Therefore, the aim of the graduation project are to: 1- Prepare students for the job market. 2- Develop students' skills in the fields they are interested in. 3- Prepare students to work in teams.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students become more experienced in the practical side of computer science.
Indicative Contents المحتويات الإرشادية	Projects steps guided by the advisor [58 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Presentations, seminars, and practical training

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	58	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	92	**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				
	Assignments				
	Projects				
	Report, seminars, presentations	2	40% (40)	5, 10	
Summative assessment	Midterm Exam	0	0		
	Final Exam (final presentation)	2 hr	60% (60)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Depends up on the project and the advisor
Week 2	
Week 3	
Week 4	
Week 5	Presentation, report, seminar
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	Presentation, report, seminar
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	Final Presentation

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1-15	Project parts

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Depends up on the project and the advisor	Online
Recommended Texts	Depends up on the project and the advisor	Online
Websites	Depends up on the project and the advisor	

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	**Data Science** علم البيانات			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**UoMCS410**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGVI - 4		**Semester of Delivery**	8	
Administering Department	Computer Science		**College**	College of Computer Science and Mathematics	
Module Leader	Dr. Basim Mohammed Mahmood		**e-mail**	bmahmood@uomosul.edu.iq	
Module Leader's Acad. Title	Associate Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Ban ghanim		**e-mail**	Ban_ghanm2019@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	At the end of the course, a student should be able to: 1. Acquire data through web-scraping and data APIs 2. Clean and reshape messy datasets 3. Use exploratory tools such as clustering and visualization tools to analyze data 4. Perform linear regression analysis 5. Use methods such as logistic regression, nearest neighbors, decision trees, support vector machines, and neural networks to build a classifier 6. Apply dimensionality reduction tools such as principal component analysis 7. Perform basic analysis of network data 8. Evaluate outcomes and make decisions based on data 9. Effectively communicate results
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students will develop relevant **programming** abilities. 2. Students will demonstrate proficiency with statistical **analysis of data**. 3. Students will develop the ability to build and assess data-based **models**. 4. Students will execute statistical analyses with professional statistical **software**. 5. Students will demonstrate skill in **data management**. 6. Students will apply data science concepts and methods to **solve** problems in real-world contexts and will **communicate** these solutions effectively
Indicative Contents المحتويات الإرشادية	Acquire data through web-scraping and data APIs, Clean and reshape messy datasets. [20 hrs] Use exploratory tools such as clustering and visualization tools to analyze data. [14 hrs] Use the basic skills of the methods such as logistic regression, nearest neighbors, decision trees, support vector machines, and neural networks to build a classifier. [20 hrs] Apply dimensionality reduction tools such as principle component analysis. Perform basic analysis of network data. Evaluate outcomes and make decisions based on data. [20 hrs] Effectively communicate results. [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Lectures contain both theoretical knowledge and technical components to give you the skills to successfully complete homework assignments and projects. Lectures will often consist of a short presentation and live coding, followed by time to complete some exercises with the help of the instructors. Lecture topics and times are announced on the schedule. You are expected to bring

	your own computer with the necessary software installed in all labs. Class activities are designed to help you master the relevant materials, work on your homework in groups, and to help you start your project.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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	4	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report		0% (0)		
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to data science
Week 2	Introduction to data analysis tools in Python
Week 3	Data structures with Pandas
Week 4	Web scraping and data acquisition via APIs
Week 5	Data visualization

Week 6	Clustering methods, Dimensionality reduction, including principle component analysis
Week 7	**Midterm Exam**
Week 8	Network analysis
Week 9	Rating, ranking, and elections
Week 10	Cleaning and reformatting messy datasets using regular expressions or dedicated tools such as open refine
Week 11	Data testing
Week 12	Cloud-based data storage
Week 13	Cloud-based computations
Week 14	Big data platforms
Week 15	Ethics of big data
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1,2	Lab 1: Python libraries for data analysis
Week 3,4	Lab 2: Web scraping
Week 5,6	Lab 3: Data visualization
Week 7,8	Lab 4: Network Analysis techniques
Week 9,10	Lab 5: Data cleaning and testing techniques
Week 11,12	Lab 6: Cloud Storage and processing
Week 13,14,15	Lab 7: Big data platforms

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython	No
Recommended Texts	Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems	No
Websites	**Data Science from Scratch: First Principles with Python**, Joel Grus O'Reilly Media (2015)	

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	**Robotics /علم الروبوتات**			**Module Delivery**	
Module Type	**Support**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**UoMCS411**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UGIV	**Semester of Delivery**		Eight
Administering Department		Computer Science	**College**		Compuyer Science and Mathematics
Module Leader	Haleema Essa Solayman		**e-mail**		Haleema_essa@uom.edu.iq
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Ban ghanim	**e-mail**		Ban_ghanm2019@uomosul.edu.iq
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	By the end of the course, students should be able to: 1. Understand the basic principles of robotics and its applications. 2. Identify the key components of a robot and their functions.

	3. Analyze and design robot kinematics and motion control systems. 4. Utilize sensors and perception techniques for robot environment interaction. 5. Implement control algorithms for robot manipulation and locomotion. 6. Program robots using appropriate programming languages and frameworks. 7. Work effectively in teams to design and build robots for specific tasks. 8. Apply problem-solving skills to overcome challenges in robotics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After successful completion of this module, students will: 1. Be able to understand sensor motor coordination and apply the concept to a robot platform. 2. Be able to control a robot arm, being aware of the kinematic aspects. 3. Be able to navigate a simple mobile robot and robot middleware. 4. Be able to understand robotic mobility, including dynamic localization and mapping aspects.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Introduction to Robotics [15 hrs] Robot Components and Architecture [15 hrs] Sensors and Perception [15 hrs] Robot Programming [15 hrs] Robot Applications [10 hrs] Robot Design and Project [14 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 improving hands-on skills and getting acquainted with the languages that adopt work on Robotics, and the extent to which they can be used. This will be achieved through classes and group work in the laboratory.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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	5% (5)	Continuous	
	Report	1	5% (5)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Robotics- Definition and history of robotics
Week 2	Robotics applications and impact on society
Week 3	Classification of robots
Week 4	Robot Components and Architecture
Week 5	Robot anatomy: actuators, sensors, controllers, and effectors
Week 6	Robot communication interfaces: wired and wireless
Week 7	**Mid-term Exam**
Week 8	Programming languages for robotics
Week 9	Robot operating systems (ROS) and frameworks
Week 10	Industrial robots and automation
Week 11	Mobile robots and autonomous navigation
Week 12	Social and service robots
Week 13	Robot design principles and considerations
Week 14	Team-based robot project with a specific task
Week 15	Project development, testing, and evaluation
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1,2	Lab 1: Introduction to I/O Interface
Week 3,4	Lab 2: Control a robot arm
Week 5,6	Lab 3: Robotics Sensing and Actuating
Week 7,8	Lab 4: Mobile Robot Workspace
Week 9,10	Lab 5: Discussion of command languages and planning of job assignments
Week 11,12	Lab 6: Design practical robotics systems
Week 13,14,15	Lab 7: Design practical robotics systems- continue

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Springer Handbook of Robotics, Bruno Siciliano, Oussama Khatib, 2020	No
Recommended Texts	Peter Corke, Robotics, Vision and Control, Springer, 2011	No
Websites	Teaching ROBOTC for Innovation First Robots, Carnegie Mellon Robotics Academy website: http://www.robotc.net/vex_full/.	

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	**IT Project Management** إدارة مشاريع تكنولوجيا المعلومات			**Module Delivery**	
Module Type	**Elective**			☒**Theory** ☒**Lecture** ☐**Lab** ☐**Tutorial** ☐**Practical** ☐ **Seminar**	
Module Code	**UoMCS412**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	UGIV - 4		**Semester of Delivery**	8	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Zeyad Abd-Algfoor Hasan		**e-mail**	drzeyad@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	not available		**e-mail**	**E-mail**	
Peer Reviewer Name	Ban ghanim		**e-mail**	**Ban_ghanm2019@uomosul.edu.iq**	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	This course teaches the discipline of projects in all aspects from project manager to project workers in the aspect of traditional project management approach. After this course is completed, students will be aware of what a project is and how to behave when they are a member of any project team. This course is aimed to apply the

	thoughts of project management on IT projects.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- An ability to analyze a problem and identify and define the computing requirements appropriate to its solution. 2- An ability to design, implement, and evaluate a computer based system, process, component, or program to meet desired needs. 3- An ability to function effectively in teams to accomplish a common goal. 4- An understanding of professional, ethical, legal, security, social, and economic issues, and responsibilities. 5- An ability to analyze the local and global impact of computing on individuals, organizations, and society. 6- An ability to use current techniques, skills, and tools necessary for computing practice. 7- An ability to use and apply current technical concepts and practices in the core information technologies of human computer interaction, information management, programming, networking, web systems and technologies. 8- An ability to identify and analyze user needs and take them into account in the selection, creation, evaluation and administration of computer based systems. 9- An ability to effectively integrate IT based solutions into the user environment. 10- An ability to apply problem solving skills, core IT concepts, best practices and standards to information technologies. 11- An ability to identify and evaluate organizational requirements and current and emerging technologies. 12- An ability to select, design, integrate and administer IT based solutions into the organizational environment.
Indicative Contents المحتويات الإرشادية	Planning fundamentals and overview. [2 hrs] Work content and scope management. [4 hrs] Work Breakdown Structure (WBS). [4 hrs] Time and cost estimation and project budgeting. [8 hrs] Resource management. [4 hrs] Project monitoring and control and earned value. [10 hrs] IT tools for project planning and control and change control. [8 hrs] Quality systems and post project reviews. [4 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 type of simple experiments involving some

	sampling activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	44	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	6	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.5
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**	2	20% (20)	5, 10	LO #1, 2, 10 and 11
	Assignments	0	0% (0)		
	Projects	1	10% (10)	2-12	LO # 2- 12
	Report	0	0% (0)		
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	2 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Course introduction, what is a project?
Week 2	Introduction to project management, what is a program?
Week 3	The scope Triangle, Creeps, Project Classes
Week 4	Fundamental of project management
Week 5	Five process groups
Week 6	The nine knowledge areas
Week 7	**Midterm Exam**
Week 8	Scoping process group I
Week 9	Scoping process group II
Week 10	Planning process group I
Week 11	Planning process group II

Week 12	Lunching process
Week 13	Monitoring and controlling
Week 14	Closing project
Week 15	Revision week
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

No laboratory required

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Robert K. Wysocki. Effective Project Management, Traditional, Adaptive, Extreme, 2009.	No
Recommended Texts	Schwalbe, Kathy. *Information technology project management*. Cengage Learning, 2015.	No
Websites	None	

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	**Operating Systems Concepts** مفاهيم نظم التشغيل			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS301**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	Five	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Nadia Tarik Saleh		**e-mail**	nadia_tarik@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	Haleema Essa Solayman		**e-mail**	Haleema_essa@uom.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. This course illustrates the concepts of operating systems. 2. how to design Operating Systems and install. 3. To describe the operational and practical behavior. 4. Processes and methods of scheduling between them.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Role and purpose of the operating system. 2. History of operating system development. 3. Functionality of typical operating systems. 4. Structuring methods(monolithic, layered, modular, micro kernel models) 5. Device organization 6. Interrupt: methods and implementations 7. Concept of user/system state and protection ,transition to kernel mode 8. Process 9. Schedulers and policies 10. Preemptive and non-preemptive scheduling.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Concepts Introduction to operating system, Types of Operating Systems, Computer system structures, Operating System Structure and services, System Structure Types. [30 hrs] Revision problem classes [5 hrs] Part B - Process Interprocess communication, CPU Scheduling, basic concepts, scheduling criteria, Scheduling algorithms, FSFC, SJF, Priority scheduling, Round robin, Multilevel queue scheduling, multilevel feedback queues scheduling. [35 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This module will be offered as a contact module, as students will require to attend learning opportunities and lectures using the traditional timetable. However, Google Classroom will be used to accommodate a blend of learning and teaching methods to facilitate learning. Learning material (PowerPoints and readings) will be made available to students at least one week before a contact session. Students will be engaged with case studies and work examples to apply the theoretical knowledge and theories to these case studies. This will be dealt with in group work skills.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	5% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	5% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	Introduction, what is an operating system.
Week 2	Types of Operating Systems
Week 3	Computer system structures.
Week 4	Operating System Structure
Week 5	Operating system services
Week 6	System Structure Types
Week 7	**Mid-term Exam**
Week 8	Process
Week 9	Interprocess communication

Week 10	CPU Scheduling
Week 11	Scheduling algorithms, FSFC, SJF.
Week 12	Scheduling algorithms, Priority scheduling.
Week 13	Scheduling algorithms, Round robin.
Week 14	Multilevel queue scheduling
Week 15	Multilevel feedback queues scheduling
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1: Windows OS: an overview
Week 3,4,5	Lab 2: C# Language: Review
Week 6,7	Lab 3: Windows Task Manager
Week 8,9	Lab 4: Process Explorer
Week 10,11	Lab 5: Processes Viewer in C#: Monitoring
Week 12,13	Lab 6: Processes Viewer in C#: Creation
Week 14,15	Lab 7: Processes Viewer in C#: Termination

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	A. Silberschatz, P. B. Galvin, and G. Gagne, Operating System Concepts, 9th ed., USA: John Wiley & Sons, Inc., 2013.	No
Recommended Texts	Tanenbaum, Andrew S. Modern Operating Systems, 5th ed., Prentice Hall, 2022.	No
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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Introduction to Artificial Intelligence** **مقدمة في الذكاء الاصطناعي**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☒**Practical** ☐**Seminar**	
Module Code	**UOMCS302**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	Five	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Dr.Baydaa Ibraheem Khaleel		**e-mail**	baydaaibraheem@uomosul.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Hanaa Mohammed Osman		**e-mail**	Hanaosman@uomosul.edu.iq	
Peer Reviewer Name	Haleema Essa Solayman		**e-mail**	haleema_essa@uom.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	**Data Structure**	**Semester**	3
Co-requisites module	**Intelligent Techniques**	**Semester**	6

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. to give a thorough understanding of AI principles, algorithms, and methods. 2. To gain practical experience in creating AI systems. 3. to cover a wide range of subjects and provide an introduction to AI. 4. to go deeper into issues like heuristic and blind search techniques. 5. Investigating inference rules and proof methodologies, predicate logic, propositional logic, and semantic networks, Conceptual graphs and Frames as models and representations of knowledge 6. to successfully use intelligent systems, such as reasoning engines and expert systems and understanding of artificial neural networks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the underlying ideas and fundamental concepts of artificial intelligence. 2. Use and apply search algorithms by use heuristic and blind techniques. 3. Create and use knowledge representation in intelligent systems. 4. List representation and arithmetic operator notation 5. Representing a non-deterministic automata in simulation. 6. Evaluate and assess the performance of artificial intelligence 7. Design Expert system. 8. Learn about artificial neural networks.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – problem solving Introduction to AI, How to solve problem , 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[10hrs] Heuristic search such as Generated and Testing method, Hill-Climbing algorithm, Best-First Search Algorithm and A* search method, properties of Heuristic function such as Admissibility, Monotonicity, informedness. [15 hrs] Knowledge Representation - Introduction to Logic Representation , proposition logic, predicate logic, and Clauses, Unification, Reasoning with knowledge, Production representation use Fact and Rule. [10hrs] Part B - Retrieving structured information from a database Doing data abstraction Network Knowledge Representation, Semantic network, Conceptual graphs and Frames Network ,Expert Systems [8hrs] Algorithms for State Space Search, Blind search , Heuristic Search , Knowledge Representation , Expert Systems. [9 hrs] Data representation – Knowledge representation in production rules, tree, Definitions, Frame representation ,List representation , relational. [15 hrs] Expert system - Definition, Architecture of ES,ES elements, Expert System types [6 hrs]. ANN - Introduction to artificial neural networks, Definitions, Architecture of ANN, Applications of ANN.[5 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	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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	5% (5)	Continuous	All
	Report	1	5% (5)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO #1 - #7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Artificial intelligent AI :Definition, AI tree, Relation between data and knowledge , characteristics of AI, AI Application Areas.
Week 2	Problem Solving :How to solve problem , rules, Structures for state space, State Space represented of problems, State Space Search.

Week 3	Solve of State Space problems, such as , Problem 8-Puzzle, Water Jug Problem, Coins Problem, sliding-tile puzzle.
Week 4	Search Methods : Blind search- Depth-First Search, Depth first search(DFS) algorithm, Some problems for DFS Algorithm.
Week 5	Breadth first search(BFS), Breadth first search(BFS) Algorithm, Comparison between DFS and BFS, problems for BFS Algorithm.
Week 6	Hybrid first search (HFS), Hybrid first search (HFS) algorithm, problems for HFS Algorithm. Heuristic search techniques, Heuristic search methods, Generate and test, Hill climbing search, Hill climbing search algorithm, Problems with hill climbing.
Week 7	**Midterm Exam**
Week 8	Best-first search method, Best-first search algorithm, A star search (A* search).
Week 9	Knowledge Representation: logic representation, Propositional Logic, Predicate Logic,
Week 10	Clauses, Horn Clause. Unification, Reasoning with knowledge, Production representation use Fact and Rule.
Week 11	Network Representation, Semantic Network, Abstract objects.
Week 12	Conceptual graph, Operations on conceptual graphs, Negation of conceptual graph, Representing propositions by conceptual graph.
Week 13	Frame and scripts :Definitions, Frame representation ,List representation , relational, Some problems for frames.
Week 14	Expert System, Definitions of Expert Systems(ES), Architecture of Expert System, Expert System classes.
Week 15	Artificial Neural Networks (ANNs), Introduction for ANNs, Biological Neural Network, Artificial Neuron, Learning in Neural Networks, Properties of A.N.N., important A.N.N. parameters.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction in Python
Week 2	Basics of Python-1, Basics of Python-2. Declarative and procedural meaning of programs
Week 3	Solve of Binary Tree and Family Problems.
Week 4	Water Jug Problem.
Week 5	Coins problem.
Week 6	Traveling Salesperson problem.
Week 7	Applied sliding-tile puzzle.
Week 8	Depth First Search Algorithm, Breadth First Search, Hybrid First Search
Week 10	Hill climbing Algorithm
Week 11	Best First Search algorithm.
Week 12	A* search algorithm.
Week 13	The Predicate Calculus
Week 14	Applied Sematic network problems.
Week 15	Applied Conceptual Graph problems.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Artificial Intelligence Structures and Strategies for Complex Problem Solving ***by*** George F Luger.	Yes
Recommended Texts	Introduction to Artificial intelligence, Rajendra Akerkar. Artificial Intelligence A Guide to Intelligent Systems Second Edition by Michael 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
	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	**Cryptography** علم التشفير			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**UoMCS303**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	Five	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Dr. Saja J. Mohammed		**e-mail**	Sj_alkdo@uomosul.edu.iq	
Module Leader's Acad. Title	Assist. Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Sameera Abbas Fadhel		**e-mail**	sameeraabbasfadhel@uomosul.edu.iq	
Peer Reviewer Name	Haleema Essa Solayman		**e-mail**	Haleema_essa@uom.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. Knowing the concept of cryptography and its basic components and types. 2. Knowing the types of threats that faced the transmitted messages sent by two parties. 3. Knowing the basic types of the encryption algorithms, the difference between these types, and where each type is used 4. The ability to encrypt and decrypt a text message with the most popular classic algorithms. 5. The ability to encrypt and decrypt a text message in the most modern, and simplified algorithms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student should have full knowledge of basic terms related to cryptography and the types of cryptography. 2. The student should have full knowledge of the types of threats that may face the data and distinguish between every type. 3. The ability of the student to encrypt / decrypt any text message in the famous classic algorithms (transposition algorithms). 4. The ability of the student to encrypt / decrypt any text message in the famous classic algorithms (substitution algorithms). 5. The student should have full knowledge of stream cipher and random number generator using the linear feedback shift registers. 6. The student should have full knowledge of stream cipher and random number generator using the non-linear feedback shift registers. 7. The student should have full knowledge of number theory and can calculates the important theory which used in modern algorithms. 8. The students should know the meaning of block cipher algorithms and have a deep idea about simplified one. 9. The students should know the meaning of public key cipher algorithms and decode using the simple encryption methods (RSA).
Indicative Contents المحتويات الإرشادية	1. Cryptography: BASIC terms, Mathematically **representation, CIA triangle, cryptography algorithm types, Symmetric cipher, Asymmetric cipher, Advantages and dis Advantages of each type. (6 hrs)** 2. **The security attack and the cryptoanalysis: Goals of Security, The security attack types, Passive attacks, active attacks, Cryptanalysis: definition, goal , Types. Brute force attack (6 hrs).** 3. **Classical (Traditional) Ciphers: Transposition (or permutation) cipher Technique, Substitution cipher Technique, (definitions and differences). Transposition Cipher: Rail Fence Cipher, Columnar Transposition Technique, Double transposition cipher(6 hrs).** 4. **Substitution cipher: Monoalphabetic cipher algorithms (Caesar cipher, AFFINE CIPHER, PLAYFAIR CIPHER), Polyalphabetic Ciphers (VIGENÈRE CIPHER, Hill cipher) , Product cipher , VERNAM CIPHER (10 hrs).**

	5. **Stream Cipher: HOW IT IS WORK, Stream cipher components, Benefits of Stream ciphers, One time pad key cipher, Confusion and diffusion, Stream Ciphers classifications (10 hrs).** 6. **Stream Cipher : pseudorandom number generator (PRNG), Randomization criteria, PRNG methods, Linear Feedback Shift Registers (10 hrs).** 7. **Stream Cipher: NON LINEAR FEEDBACK SHIFT REGISTER; Linear Feedback Shift Register (LFSR) with combining elements (Hadamard Algorithm, J-K FLIP FLOP ALGORITHM, Police Algorithm, Geffe's Geneator algorithm), Non Linear Feedback Shift Registers (5 hrs).** 8. **Number Theory: Prime numbers, Greater Common Divisor, Euler totient function, Multiplicative Inverse (7 hrs).** 9. **Block Cipher: What is a block cipher? Stream cipher vs block cipher, Permutation box and substitution box, modes of operation in block cipher, Simplified Data Encryption Standard (S-DES) (12 hrs)** 10. **Asymmetric algorithms (Public Key cipher): The Rivest-Shamir-Adleman (RSA) (12 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.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
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)	4, 10	LO # 3,6
	Assignments	3	5% (5)	6,11,12	LO # 4, 7, 8
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	5% (5)		
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hrs	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Cryptography : BASIC terms, **cryptography algorithm types, Symmetric cipher, Asymmetric cipher, Advantages and dis Advantages of each type.**
Week 2	**The security attack and the cryptoanalysis**
Week 3	**Classical (Traditional) Ciphers: Transposition cipher**
Week 4	**Substitution cipher: Monoalphabetic cipher algorithms**
Week 5	**Substitution cipher : Polyalphabetic Ciphers**
Week 6	**Substitution cipher : Polyalphabetic Ciphers**
Week 7	Mid-term Exam
Week 8	**Stream Cipher**
Week 9	**Stream Cipher : pseudorandom number generator (PRNG)**
Week 10	**Stream Cipher: NON LINEAR FEEDBACK SHIFT REGISTER**
Week 11	**Number Theory**
Week 12	**Block Cipher**
Week 13	**Simplified Data Encryption Standard (S-DES)**
Week 14	**Asymmetric algorithms (Public Key cipher)**
Week 15	**The Rivest-Shamir-Adleman (RSA).**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: **Introduction to C# Programming**
Week 2	Lab 2: **ZigZag Cipher**
Week 3	Lab 3: **Columnar Transposition**
Week 4	Lab 4: **Columnar Transposition(cont.)**
Week 5	Lab 5: **Caeser Cipher**
Week 6	Lab 6: **Affine Cipher**
Week 7	Lab 7: **Affine Cipher (cont.)**
Week 8	Lab 8: **Hill Cipher**
Week 9,10	Lab 9: **Hill cipher (cont.)**
Week 11,12	Lab 10: **number theory (GCD)**
Week 13,14,15	Lab 11: **Project evaluating**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	W. Stalling and M. P. Tahiliani, *Cryptography and network security: principles and practice, vol. 6*. 2017.	Yes
Recommended Texts	**Aumasson, Jean-Philippe, *Serious Cryptography: A Practical Introduction to Modern Encryption*, 2017**	No
Websites	https://crypto.stackexchange.com/	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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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	**Algorithms Design and Analysis** تحليل وتصميم الخوارزميات			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS304**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGIII		**Semester of Delivery**	Five	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Ruba Talal Ibrahim		**e-mail**	rubatalal@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	Haleema Essa Solayman		**e-mail**	Haleema_essa@uom.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. To analyze performance of algorithms. 2. To choose the appropriate data structure and algorithm design method for a specified application. 3. To understand how the choice of data structures and algorithm design methods impacts the performance of programs. 4. To solve problems using algorithm design methods such as the greedy method, divide and conquer, dynamic programming, backtracking and branch and bound. 5. This course also focuses on computational complexity theory and how to compute the big O symbol for different algorithms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learn about algorithms and how to analyze them 2. Characteristics of Algorithms, Algorithm Complexity, asymptotic analysis, Asymptotic Notations 3. How to approximate the time taken by the Algorithm, 4. Recurrence Relation, Substitution Method, Iteration Method. 5. Pros and cons of Divide and Conquer Approach, Application of Divide and Conquer approach (finding the Min-Max problem), Binary search algorithm. 6. Components of Greedy Algorithm, Counting coins' problem, Job Sequencing with Deadline, Optimal Merge Pattern. 7. Solving Knapsack problem, Fractional Knapsack. 8. Fibonacci numbers problem. 9. Recursive approach, Iterative approach. 10. Steps of Backtracking Algorithm, Generic problem formulation, Maze problem. 11. Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP - Hard and NP Complete classes.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction and Fundamentals of Algorithms [4 hrs] Asymptotic notation [5 hrs] Complexity of Recursion. [4 hrs] Divide and Conquer algorithms. [4 hrs] Greedy Algorithms [10 hrs] Dynamic Programming. [10 hrs] Backtracking Algorithms. [12 hrs] Branch and Bound. [4hrs] Hard and NP-Complete problems. [3hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Type something like: Visualization, Teamwork and Inquiry-Based Teaching are examples of some of these strategies. The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	59	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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.				
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction of Algorithms
Week 2	Fundamentals of Algorithms
Week 3	Asymptotic notation using a notation for "the order of" and the omega notation

Week 4	Asymptotic notation using the theta notation and the conditional asymptotic notation
Week 5	Complexity of Recursion
Week 6	Divide and Conquer algorithms using Min-Max problem, Binary search algorithm
Week 7	**Mid- term Exam**
Week 8	Greedy Algorithm1 using Counting coins' problem, Job Sequencing with Deadline, Optimal Merge Pattern
Week 9	Greedy Algorithm2 using Minimum cost spanning trees, Single source shortest path problem.
Week 10	Dynamic Programming1 using Fibonacci numbers problem Recursive approach, Iterative approach
Week 11	Dynamic Programming2 0/1 knapsack problem, step-by-step algorthim
Week 12	Backtracking Algorithm1 using Steps of Backtracking Algorithm, General method, applications-n-queen problem, graph coloring
Week 13	Backtracking Algorithm2 graph coloring, Hamiltonian cycles.
Week 14	Branch and Bound: General method, applications - Travelling sales person problem
Week 15	-Hard and NP-Complete problems: Basic concepts, non-deterministic algorithms, NP - Hard and Complete classes
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
	No Labs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	T. H. Cormen, C. E. Leiserson, R. L. Rivest. Introduction to Algorithms The MIT Press, Cambridge, Massachusetts, 3rd edition. (Recommended not required) Available on PDFormat on line	No
Recommended Texts	DIGITAL NOTES ON DESIGN AND ANALYSIS OF ALGORITHMS	No

	Copyright Year: 2018, book.	
Websites	https://ocw.mit.edu/courses/6-046j-design-and-analysis-of-algorithms-spring-2015/pages/lecture-notes/	

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	**Computer Graphics** الرسم بالحاسوب			**Module Delivery**	
Module Type	**Suport**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☒**Practical** ☐**Seminar**	
Module Code	**UoMCS305**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGIII		**Semester of Delivery**	Five	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Yusra Faisal Mohammad		**e-mail**	yusrafaisalcs@uomosul.edu.iq	
Module Leader's Acad. Title	Assist Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Haleema Essa Solayman		**e-mail**	Haleema_essa@uom.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. To introduce the components of a graphics system and become familiar with building approach of graphics system components and algorithms related with them. 2. To understand 2 Dimensional and 3 Dimensional computer graphics concepts. 3. To provide an understanding to the basic geometrical primitives and transformation of geometrical shapes. 4. Provide an understanding of mapping from a world coordinates to device coordinates, clipping, and projections. 5. To make students understand how to implement the computer graphics concepts using programming language.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To implement various algorithms to scan, convert the basic geometrical primitives, transformations and clipping. 2. To define the fundamentals of animation, graphic design and its related technologies. 3. To describe the importance of viewing and projections. 4. To implement Computer Graphics concepts using programming language.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Overview of Graphics Systems**: Graphics applications-CAD, Computer art, Education & Training, Entertainment, Visualization, Video display devices ,Graphics Workstation & Viewing system, Interactive Input devices, Hard copy devices.. [2 hrs] **Geometric Transformations**: Basic 2 Dimensional transformation - translation, rotation and scaling, Matrix representation and homogenous coordinates, Inverse transformation, Composite translate, rotation and scaling, general 2D pivot point rotation, general 2D fixed point scaling. [10 hrs] **Two-Dimensional Viewing**:2 D viewing pipeline, clipping window, Normalization and viewport transformations. 2 D Clipping - Point clipping, Line clipping-Cohen Sutherland Line clipping. [12 hrs] **Geometric Transformations**: Basic 3 Dimensional transformation - translation, rotation and scaling, Matrix representation and homogenous coordinates, Inverse transformation, Composite translate, rotation and scaling, general 3D pivot point rotation, general 3D fixed point scaling. [20 hrs] **Three Dimensional Viewing and Computer animation**: 3-Dimensional Viewing: Overview of 3-D viewing concepts, 3-D viewing pipelining , Visible surface detection

	methods - Back face detection, Depth buffer method, Octrees methods, ray casting method. [25 hrs] **Computer Animation**: Raster methods for Computer Animation, Design of Animation Sequences, Motion specifications, Periodic motions. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course is designed to extend students' knowledge and practice in Graphics hardware, software, and applications. It also provides the knowledge of data structures for graphics, graphics languages, and models for 2D and 3D objects, clipping, hidden surface elimination, depth buffer, raster graphics, shading, and rendering.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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	5% (5)	Continuous	
	Report	1	5% (5)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction:** Advantage of Computer Graphics and Areas of Applications, Hardware and Software for Computer Graphics. (Hard Copy, Display Technologies),
Week 2	Random Scan Display System, Video Controller, Random Scan Display Processor
Week 3	**2-Dimensional transformation**: 2-D Translation, Scaling, Matrix representation and homogenous coordinates.
Week 4	**2-Dimensional transformation**:2-D Rotation, Matrix representation and homogenous coordinates.
Week 5	**2-Dimensional transformation**:2-D Inverse transformation, Composite translate, rotation and scaling,
Week 6	**2-Dimensional transformation**: General 2D pivot point rotation, general 2D fixed point scaling.
Week 7	**Mid-term Exam**
Week 8	**2-Dimensional Viewing**:2 D viewing pipeline, clipping window, Normalization and viewport transformations. 2 D Clipping - Point clipping, Line clipping-Cohen Sutherland Line clipping.
Week 9	**3-Dimensional transformation**: Basic 3 Dimensional transformation - translation, and scaling. Matrix representation and homogenous coordinates.
Week 10	**3-Dimensional Transformations**: Basic 3 Dimensional transformation – rotation, Matrix representation and homogenous coordinates,
Week 11	**3-Dimensional Transformations**: Basic 3 Dimensional Inverse transformation, Composite translate, rotation and scaling.
Week 12	**3-Dimensional Viewing:** Overview of 3-D viewing concepts, 3-D viewing pipelining , Visible surface detection methods - Back face detection.
Week 13	**3-Dimensional Viewing:** Depth buffer method, Octrees methods, ray casting method.
Week 14	**Computer Animation**: Raster methods for Computer Animation, Design of Animation Sequences.
Week 15	**Computer Animation**: Motion specifications, Periodic motions.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction
Week 2	Lab 2: 2-Dimensional transformation
Week 3	Lab 3: 2-Dimensional transformation
Week 4	Lab 4: 2-Dimensional transformation
Week 5	Lab 5: 2-Dimensional viewing

Week 6	Lab 6: 2-Dimensional viewing
Week 7	Lab 7: 3-Dimensional transformation
Week 8	Lab 8: 3-Dimensional transformation
Week 9	Lab 9: 3-Dimensional transformation
Week 10	Lab 10: 3-Dimensional transformation
Week 11	Lab 11: 3-Dimensional viewing
Week 12	Lab 12: 3-Dimensional viewing
Week 13	Lab 13: Animation
Week 14,15	Lab 14: Animation

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Fundamentals of Computer Graphics. Steve Marschner with Michael Ashikhmin	
Recommended Texts	Computer Graphics and Geometric Modeling Implementation and Algorithms Max K. Agoston	
Websites	https://www.coursera.org/browse/computer graphics.	

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** ديمقراطية			**Module Delivery**	
Module Type	**Elective**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS306**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	UGIII		**Semester of Delivery**	Five	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	م.م. عمر دريد ذنون		**e-mail**	Omer.thnon@uomusul.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	M.A.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Haleema Essa solayman		**e-mail**	Haleema_essa@uom.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	١. توضيح المفاهيم السياسية لدى الطلبة وترسيخ الهوية الوطنية فضلا عن تعزيز القيم المشتركة بين افراد المجتمع الواحد ليمارسوا ادوارهم السياسية ومشاركتهم في الانتخابات مما يسهم في تعزيز الوحدة الوطنية ٢. اوان تدريس هذه المادة له اثر كبير في بناء ثقافة المشاركة الواعية واكساب الطلبة مهارة التفكير ٣. تعزيز فكرة العدالة الاجتماعية.. ٤. تسهم في منح مساحة اكبر للحديث عن الديمقراطية وحقوق الانسان والتنمية السياسية ٥. وتتحدث عن الحياة السياسية وتطورها ونشأتها ٦. اعتماد اسلوب الحوار والمناقشة ومالمناظرة في تدريسها ٧. تعزيز سبل التعليم التفاعلي.. ٨. تعزيز **سبل** المشاركة في الشأن العام – المواطنة
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	أ-الاهداف المعرفية تدريس المبادئ الرئيسية للديمقراطية ومصادرها وأنواعها والآليات المستخدمة لحمايتها. اما الجانب السلوكي لابد أن تستهدف مقررات الديمقراطية وترجمة المعارف والخبرات والقيم وأنماط السلوك إلى عمل دائم ونشاط مستمر من أجل الدفاع عنها في الواقع المعاش وتعزيز الجهود الكفيلة بمعالجة قضايا حقوق الإنسان **ب- الأهداف المهاراتية الخاصة بالمقرر** ١.تبني ورعاية وتشجيع صفات التسامح والاحترام والتضامن المتأصلة في الديمقراطية. ٢.التعريف بالديمقراطية من بعديها الإقليمي والدولي. ٣. تنوير الافراد بحقوقهم الشخصية وغرس احترام الاخرين في نفوسهم . ٥.إعطاء العناية الى التنوير بالصلة الوثيقة بين الديمقراطية من جانب والتنمية والسلام بما فيها نزع السلاح من الجانب الاخر ، والحاجة الى اقامة نظام عالمي جديد في الاقتصاد والاجتماع والثقافة لاعانة كل الناس على الاستمتاع بحقوقهم الإنسانية وتطوير ذواتهم. ٦.إعطاء تركيز مناسب للحقوق الاقتصادية والاجتماعية والثقافية والمدنية بالإضافة للحقوق السياسية ، وكذلك الحقوق الفردية والجماعية على اعتبار عدم قابلية هذه الحقوق للتقسيم او التجزئة ج- المهارات العامة والتأهيلية المنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي :في سبيل . تعزيز احترام الديمقراطية والحريات الأساس .الإنماء الكامل للشخصية الإنسانية وإحساسها بالكرامة تعزيز التفاهم والتسامح والمساواة بين الجنسين، والصداقة بين جميع الأمم والسكان الأصليين والمجموعات العرقية والقومية والإثنية والدينية واللغوية.

	تمكين كل الأفراد من المشاركة بفاعلية في مجتمع حر
Indicative Contents المحتويات الإرشادية	المدخل للديمقراطية ،التعريف العام للديمقراطية[5 hrs] انواع الديمقراطية ،خصائص النظام الديمقراطي[5 hrs] مميزات النظام الديمقراطي ،اهم الاستنتاجات عن النظام الديمقراطي[5 hrs] المرتكزات الفكرية للديمقراطية ،قياس الديمقراطية ، نظرة الاسلاميون للديمقراطية[5 hrs] عناصر النمط الديمقراطي ، الاسس العامة للديمقراطية ،عناصر الديمقراطية[5 hrs] المشاركة السياسية ، اهم انماط المشاركة السياسية[5 hrs] الانتخابات ، شروط الانتخابات وشروط الناخب والمنتخب[5 hrs] اهمية الانتخابات ، الرقابة على الانتخابات ، النواب والمسؤولية ، البرلمان ، اهم التي يتمتع بها البرلمان[5 hrs]الصلاحيات المعارضة ، مستويات المعارضة ، اهداف المعارضة ، عناصر تحديد موقع المعارضة ، الفصل بين الحكومة والبرلمان[4hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	محاضرات- ورش عمل - ندوات

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	44	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	6	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.5
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**	2	10% (10)	5, 10	LO #1, 2 and 4
	Assignments	2	10% (10)	2, 12	LO # 6
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 3,5
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-6
	Final Exam	2 hr	60% (60)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	المدخل للديمقراطية ،التعريف العام للديمقراطية
Week 2	انواع الديمقراطية ،خصائص النظام الديمقراطي
Week 3	مميزات النظام الديمقراطي ،اهم الاستنتاجات عن النظام الديمقراطي
Week 4	المرتكزات الفكرية للديمقراطية ،قياس الديمقراطية ، نظرة الاسلاميون للديمقراطية
Week 5	الديمقراطية والشورى ، الديمقراطية والرأسمالية
Week 6	عناصر النمط الديمقراطي ، الاسس العامة للديمقراطية ،عناصر الديمقراطية
Week 7	مراجعة سريعة ، امتحان
Week 8	المشاركة السياسية ، اهم انماط المشاركة السياسية
Week 9	الانتخابات ، شروط الانتخابات وشروط الناخب والمنتخب
Week 10	صفات الانتخابات ، انواع القوانين الانتخابية ، طرق الانتخابات
Week 11	اهمية الانتخابات ، الرقابة على الانتخابات ، النواب والمسؤولية ، البرلمان ، اهم الصلاحيات التي يتمتع بها البرلمان
Week 12	المعارضة ، مستويات المعارضة ، اهداف المعارضة ، عناصر تحديد موقع المعارضة ، الفصل بين الحكومة والبرلمان
Week 13	مبادئ الدستور الديمقراطي ، الشروط العامة للديمقراطية ،الحزب السياسي اشكال وانواع الاحزاب السياسية
Week 14	التداول السلمي والشرعي للسلطة ،احترام مبدأ الاغلبية ،الديمقراطية النيابية
Week 15	الامتحان الفصلي
Week 16	مراجعة قبل الامتحان النهائي

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	أ- الكتب الدراسية والمنهجية المقررة من اللجنة العلمية ولجان الاعتماد والأكاديمي .	Yes
Recommended Texts	ب- المحاضرات المؤرشفة من قبل تدريسي الاختصاص لكل مادة ورقية كانت أم فيدوية	No
Websites	ج- مواقع شبكة الانترنت الرسمية المعتمدة من قبل الجامعة .	

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

ملاحظة : سيتم تقريب العلامات العشرية أعلى أو أقل من ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال ، سيتم تقريب علامة ٥٤.٥ إلى ٥٥ ، في حين سيتم تقريب علامة ٥٤.٤ إلى ٥٤. لدى الجامعة سياسة عدم التغاضي "فشل التمرير القريب" لذا فإن التعديل الوحيد للعلامات الممنوحة بواسطة العلامة (العلامات) الأصلية سيكون التقريب التلقائي الموضح أعلاه

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Operating Systems** نظم التشغيل			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS307**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGIII	**Semester of Delivery**		6
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Nadia Tarik Saleh		**e-mail**	nadia_tarik@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		عائشة صديق	**e-mail**	Aeeshashaheen_1965@uomosul.ed.iq	
Scientific Committee Approval Date			**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UoMCS301	**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The main objective of this course is to introduce students to what a process is. 2. The various techniques of the functions of operating systems, for example, process synchronization and its problem. 3. Examples of solutions to that problem are (Peterson's) algorithm and the use of hardware to solve the problem (Semaphore). 4. This course focuses on reviewing the case of Deadlocks and how to prevent or avoid their occurrence in multi-process processors. 5. Memory management, secondary storage management and I/O management. 6. This course focuses more on the knowledge needed for designers and developers of operating systems. This will leave room for the expansion of accurate theoretical knowledge.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Process 2. Synchronization problem 3. Dead lock handling & prevention 4. Characterization and conditions 5. Introduction to Memory 6. Memory Management 7. RAID Structure 8. Disk Structure
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Synchronization Introduction to operating system, Types of Operating Systems, Computer system structures, Operating System Structure and services, System Structure Types. [20 hrs] Part B - Deadlock Deadlocks: System Model, Deadlock Characterization, Methods for Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection. [15 hrs] Part C - Memory Management Memory management: Swapping, Contiguous Memory Allocation, Segmentation, Paging, Virtual memory: Demand Paging, Copy-on-Write, Page Replacement, Allocation of Frames , Thrashing. [20 hrs] Part C – Disk Management Disk Scheduling, Disk Management, Swap-Space Management, File system interface: File Concept, Access Methods, File-System Structure, File-System Implementation. [15 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	This module will be offered as a contact module, as students will require to attend learning opportunities and lectures using the traditional timetable. However, Google Classroom will be used to accommodate a blend of learning and teaching methods to facilitate learning. Learning material (PowerPoints and readings) will be made available to students at least one week before a contact session. Students will be engaged with case studies and work examples to apply the theoretical knowledge and theories to these case studies. This will be dealt with in group work skills.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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, 6 and 7
	Assignments	2	5% (5)	2, 12	LO # 3, 4, 5 and 8
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	5% (5)	13	LO # 3, 6 and 8
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-5
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction to process
Week 2	Synchronization problem
Week 3	Synchronization Solution By Algorithm

Week 4	Synchronization Solution By Hardware
Week 5	The Deadlock
Week 6	Handling Deadlocks, Deadlock Prevention
Week 7	**Midterm Exam**
Week 8	The Deadlock Detection
Week 9	The Deadlock Recovery
Week 10	Memory Management
Week 11	Swapping and Contiguous Memory
Week 12	Table Segmentation
Week 13	RAID Structure
Week 14	Disk Structure
Week 15	Disk Management
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1: Semaphore implementation
Week 3,4	Lab 2: Deadlock Implemetation
Week 5,6	Lab 3: Deadlock Implemetation
Week 7,8	Lab 4: MMU implemetation
Week 9,10	Lab 5: Page Replacement Algorithms
Week 11,12	Lab 6: Practicing File Systems
Week 13,14,15	Lab 7: Practicing File Systems

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	A. Silberschatz, P. B. Galvin, and G. Gagne, Operating System Concepts, 9th ed., USA: John Wiley & Sons, Inc., 2013.	No
Recommended Texts	Tanenbaum, Andrew S. Modern Operating Systems, 5th ed., Prentice Hall, 2022.	No
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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Information Security** **أمنية معلومات**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☒ **Seminar**	
Module Code	**UoMCS308**				
ECTS Credits	٦				
SWL (hr/sem)	**150**				
Module Level		UGIII	**Semester of Delivery**		6
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Dr. yaseen Hikmat Ismail		**e-mail**	yaseen-hikmat@uomosul.edu.iq	
Module Leader's Acad. Title		Professor Ass.	**Module Leader's Qualification**		Ph.D.
Module Tutor	Muna Jaffer sedeeq		**e-mail**	muna.jaffer@uomosul.edu.iq	
Peer Reviewer Name		عائشة صديق	**e-mail**	aeeshashaheen_1965@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	• Understand the basic concepts and terminology of information security. • Analyze different types of security risks and threats. • Knowing the description of information hiding and its basic components and types. • Explain the types of media used in information hiding. • The ability to embedding and extracting text in image, using different methods. • Information attacks types. • Define intrusion detection system.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student should have full knowledge about information security: attacks, vulnerabilities, and countermeasures. 2. The student should have full knowledge of basic media types used in steganography. 3. The ability of the student to embedding/ extracting any text message in image media, using different methods. 4. The student must be able to distinguish between attacks types and determine the appropriate countermeasures. 5. The student could maintain the computer security defense, including anti-virus program and firewall.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Unit 1: Introduction to Information Security [6 hrs.] • Basic concepts of information security • Threats and vulnerabilities in information security • Fundamentals of risk management Unit 2: Steganography and Information Hiding [12 hrs.] • Introduction to steganography • Methods of information hiding • Detection and prevention of steganography and information hiding Unit 3: Steganography and Information Hiding [16 hrs.] • Introduction to matlab • read image information and save changes to it • Hiding text in image using different methods Unit 4: Steganography and Information Hiding evaluation [8 hrs.] • Evaluation metrics types • How to evaluate image hiding methods • Analysis metrics measurement values Unit 5: matlab Information Hiding evaluation [8 hrs.] • Define and execute different metric functions • Alter stego image information to see its effects in the measurements • executes the metric functions to different embedding methods

	Unit 6: Information attacks types [8 hrs.] • Differentiate between threats and attacks • Active and Passive attacks • Defends against attacks • Define intrusion detection and prevention system Unit 7: Information attacks types [12 hrs.] • Design different attacks and execute them in simulation environment • SETUP different computer application for attacks and defense • SETUP and maintains anti-virus and firewall programs

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, lab's programs, home works, and exams. Also interactive seminar (for student groups) will help to expand the students' knowledge and thinking skills.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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, 14	LO #1, 2, 3, 4 and 5
	Assignments	2	5% (5)	4, 11	LO #1, 2, 3, 4 and 5
	Projects / Lab.	1	5% (5)	Continuous	
	Report	1	10% (10)	12	LO #1, 2, 3, 4 and 5
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1, 2, and 3
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic concepts of information security
Week 2	Threats and vulnerabilities in information security
Week 3	Fundamentals of risk management
Week 4	Introduction to steganography
Week 5-6	Methods of information hiding
Week 7	Mid-term Exam
Week 8-9	Detection and prevention of steganography and information hiding
Week 10-11	Evaluation metrics types
Week 12	How to evaluate image hiding methods
Week 13	Analysis metrics measurement values
Week 14	Differentiate between threats and attacks // Active and Passive attacks
Week 15	Defends against attacks // Define intrusion detection and prevention system
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1: Introduction to matlab read image information and save changes to it
Week 3,4,5	Lab 2: read image information and save changes to it
Week 6,7	Lab 3: Define and execute different metric functions
Week 8,9	Lab 4: Alter stego image information to see its effects in the measurements
Week 10,11	Lab 5: Executes the metric functions to different embedding methods
Week 12,13	Lab 6: Design different attacks and execute them in simulation environment
Week 14,15	Lab 7: SETUP different computer application for attacks and defense SETUP and maintains anti-virus and firewall programs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	W. Stalling and M. P. Tahiliani, Cryptography and network security: principles and practice, vol. 6. 2017.	Yes
Recommended Texts	Information Hiding Techniques for Steganography and Digital Watermarking, Stefan Katzenbeisser ,Fabien A. P. Petitcolas.	No
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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Intelligent Techniques** **تقنيات ذكائية**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**UoMCS309**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGIII	**Semester of Delivery**		6
Administering Department			**College**		
Module Leader	Dr. Fawziya Mahmood Ramo		**e-mail**	fawziyaramo@uomosul.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		عائشة صديق	**e-mail**	aeeshashaheen_1965@uomosul.edu.iq	
Scientific Committee Approval Date			**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 provide a comprehensive overview of neural networks, their applications. 2. To explore different types of neural network architectures. 3. To understand the structure and characteristics of each network. 4. To cover the process of training different types of neural networks. 5. to understand the basic concepts and principles of genetic algorithms. 6. to explore different types of genetic algorithm operators. 7. To Learn how to formulate optimization problems in the context of genetic algorithms, 8. To Study different representation schemes for encoding solutions in genetic algorithms, 9. to understand fuzzy logic conceptual and a mathematical framework that deals with reasoning and decision-making in situations
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. Understanding fundamental concepts and principles behind neural networks 2. Able to build and train neural networks using popular frameworks. 3. Understand how to define network architectures, configure hyper parameters, and implement the backpropagation algorithm. 4. Understand the training process of neural networks. 5. Learn how to evaluate the performance of neural networks using appropriate metrics. 6. Understanding of the fundamental concepts and principles behind GA. 7. Able to build and implement genetic algorithms from scratch using a programming language of choice. 8. Understand how to define problem-specific representations, design fitness functions. 9. Understand fuzzy logic mathematical framework that deals with reasoning and decision-making.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Neural Network What are neural networks and their historical context? Biological inspiration for artificial neural networks, Overview of the basic components of a neural network, Feedforward Neural Networks: [10 hrs] Feedforward Neural Networks: Architecture and structure of feedforward neural networks, Activation functions and their role in neural networks, Forward propagation and the concept of weighted sums , Type of Activation functions [10 hrs] Supervised NN: The concept of backpropagation and its role in training neural networks. Calculation of gradients using chain rule and matrix calculus. Hopfield neural network .perceptron neural network [12 hrs] Unupervised NN: The concept of self-organization map (SOM) and its role in training neural networks. Calculation Winning node chain rule and matrix calculus ,kohenon neural network[12 hrs] Part B – Genetic algorithm Introduction to Genetic Algorithms: Evolutionary computation and its applications. Basic concepts of genetic algorithms (population, individuals, fitness, chromosomes, genes, etc.).Overview of the steps involved in a genetic algorithm. Representation and Initialization: Representation schemes for individuals (binary, real-valued, permutation, etc.). Initialization methods for the initial population. Fitness Evaluation and Selection: Fitness function design and evaluation. Various selection mechanisms (roulette wheel, tournament, rank-based, etc.). Fitness scaling techniques. Genetic Operators: Crossover operators (one-point, two-point, uniform, etc.). Mutation operators (bit-flip, swap, insertion, etc.). [16 hrs]

	Part C – Fuzzy logic Introduction to Fuzzy Logic: Overview, Introduction to fuzzy sets and fuzzy logic, Motivation for using fuzzy logic in handling uncertainty. Fuzzy Set Theory:Definition and properties of fuzzy sets, Fuzzy set operations ,Fuzzy membership functions and their properties Extension principle and fuzzy relations Fuzzy Logic Systems: Fuzzy logic operators (AND, OR, NOT), Fuzzy if-then rules and implications, hedge fuzzy system [1٠ hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy of course specialized educational program that focuses on teaching the principles, theories, and applications of intelligence technicals . It provides you with strategies for a neural network, genetic algorithm, and fuzzy logic.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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				
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 Intelligent systems
Week 2	Neuron Model and Network Architectures, Type of weight and learning rules
Week 3	The perceptron, Multilayer perceptron neural network
Week 4	Bidirectional associative memory neural network
Week 5	Back propagation neural network
Week 6	Kohenon neural network
Week 7	**Midterm Exam**
Week 8	Introduction in Genetic algorithm Basic Ideas and Concepts
Week 9	Type of encoding, selection
Week 10	Crossover methods and muations
Week 11	Genetic algorithm and Genetic programming
Week 12	A Simple Class of GA, Analysis,
Week 13	Fuzzy logic concept, application, types, operators
Week 14	Linguistic variables, fuzzy rules, fuzzy set
Week 15	Stages of fuzzy inference, Built fuzzy inference
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	python Language
Week 3,4	Programming simple neural network
Week 5,6	Programming perceptron NN
Week 7,8	Programming back propagation NN
Week 9,10	Programming unsupervised NN
Week 11,12	Programming complete GA cycle
Week 13,14,15	Programming fuzzy inference system

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1.Artificial Intelligence A Guide to Intelligent Systems Second Edition by Michael Negnevitsky. 2. An introduction to neural networks by *Kevin Gurney* 3. Genetic Algorithms:Theory and Applications by Ulrich Bodenhofer	Yes
Recommended Texts	Neural Network by David Kriesel	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
	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	**Multimedia Technology** تكنولوجيا الوسائط المتعددة			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS310**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UGIII	**Semester of Delivery**		6
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Dr. Zohair Al-Ameen		**e-mail**	qizohair@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		عائشة صديق	**e-mail**	Aeeshashaheen_1965@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. To provide students with a solid understanding of the fundamental concepts and principles of multimedia. 2. To establish a strong foundation in the fundamental concepts of representing multimedia as signals. 3. To understand how to integrate textual elements seamlessly into multimedia. 4. To develop a foundational understanding of sound and acoustics. Students learn about the physical properties of sound, including wavelength, frequency, amplitude, and the characteristics of sound propagation. 5. To deliver an understanding of how digital images are represented and stored in computer systems. Students learn about image formats, color models, resolution, bit-depth, and other image-related principles. 6. To develop an understanding of how digital videos are represented and stored in computer systems. Students learn about video formats, codecs, frame rates, resolution, and other related principles. 7. To develop an understanding of how visual elements (graphics) can be represented on the computer. 8. To deliver knowledge of the fundamental principles of animation. 9. To provide a knowledge of the principles and concepts behind data compression. Students learn about lossless and lossy compression techniques, entropy coding, statistical methods, and so on.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Comprehend the basics of multimedia. 2. Understand the fundamentals of signals concerning multimedia. 3. Know about the use of texts in multimedia. 4. Recognize the basic concepts of audio. 5. Identify the basic concepts of images. 6. Recognize the basic concepts of graphical representation. 7. Acknowledge the basic concepts of videos. 8. Acknowledge the basic concepts of animation. 9. Identify the basic concepts of compression.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: ▪ Multimedia key concepts [10 hrs]. ▪ Signal [10 hrs]. ▪ Text [9 hrs]. ▪ Audio [5 hrs]. ▪ Image [10 hrs]. ▪ Video [10 hrs]. ▪ Graphics [10 hrs]. ▪ Animation [10 hrs].

	▪ Compression [10 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	▪ Class delivery. ▪ Online tutorials. ▪ Lab experiments. ▪ Class activities. ▪ Self-study.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	1	10% (10)	5	LO # 1-4
	Assignments	1	10% (10)	14	All
	Lab	1	10% (10)	Continuous	All
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2 hr	10% (15)	7	LO # 1-6
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Multimedia Technology
Week 2	Signal Fundamentals
Week 3	Signal Processing
Week 4	Audio Fundamentals
Week 5	Audio Processing
Week 6	Text in Multimedia
Week 7	**Scheduled Exam**
Week 8	Image Fundamentals
Week 9	Image Processing
Week 10	Video Fundamentals
Week 11	Video Processing
Week 12	Graphics Fundamentals
Week 13	Graphics Representation
Week 14	Animations in Multimedia
Week 15	Multimedia Data Compression
Week 16	**Revisions for the Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Applying Basic Signal Operations with MATLAB
Week 3,4	Applying Basic Audio Operations with MATLAB
Week 5,6	Text in MATLAB
Week 7,8	Applying Basic Image Operations with MATLAB
Week 9,10	Applying Basic Video Operations with MATLAB
Week 11,12	Drawing Basic Shapes with MATLAB
Week 13,14,15	Applying Selected Compression Methods with MATLAB

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Banerjee, S. (2019). Elements of multimedia. CRC Press. Parekh, R. (2022). 'Fundamentals of Image, Audio, and Video Processing Using MATLAB®' and 'Fundamentals of Graphics Using MATLAB®': Two Volume Set. CRC Press. Abood, S. I. (2020). Digital Signal Processing: A Primer With MATLAB®. CRC Press.	No
Recommended Texts	Information Resources Management Association (Ed.). (2017). *Digital multimedia: Concepts, methodologies, tools, and applications* (3rd ed.). Hershey, PA: IGI Global.	No
Websites	http://ocw.unimas.my/course/view.php?id=38	

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 is required but credit awarded
	F – Fail	راسب	(0-44)	A 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	**Mobile Applications Programming** برمجة تطبيقات المحمول			**Module Delivery**	
Module Type	**Support**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS311**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGIII - 3		**Semester of Delivery**	6	
Administering Department	Computer Science		**College**	College of Computer Science and Mathematics	
Module Leader	Dr. Basim Mohammed Mahmood		**e-mail**	bmahmood@uomosul.edu.iq	
Module Leader's Acad. Title	Associate Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	عائشة صديق		**e-mail**	aeeshashaheen_1965@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	The aims of this course are to: 1. Understand unique aspects of mobile application programming 2. Have knowledge about the environment and tools used in mobile application programming. 3. Design and prototype sophisticated mobile applications 4. Develop Android applications that take advantage of advanced phone features and deploy them in the marketplace.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of the course, students will be able to: 1. Master practical tools, methods and techniques for the design, implementation, and pilot testing of mobile phone software applications. 2. Understand advanced aspects of mobile application development such as memory and process management, user interface design, data handling, network techniques and use of mobile sensing. 3. Evaluate the technical, social, and business dimensions of mobile applications using industrial standards. 4. Critically assess existing mobile applications on their design and implementation. 5. Become a sophisticated mobile application developer familiar with the best coding practices and industry standards in the Android application ecosystem. 6. Design and develop a professional-quality Android mobile application that addresses a real-world problem in an innovative way. 7. Complete a working application, from inception to deployment in the market. 8. Present and demonstrate effectively to peers as well as prospective users the design choices and usability of an application. 9. Consistently apply an excellent level of technical proficiency in written English, using an advanced application of scholarly terminology, that demonstrates the ability to deal with complex issues both systematically and with sophistication. 10. Work to develop an app in a team (optional).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Understand unique aspects of mobile application programming [20 hrs] Have knowledge about the environment and tools used in mobile application programming. [19 hrs] Design and prototype sophisticated mobile applications [20 hrs] Develop Android applications that take advantage of advanced phone features and deploy them in the marketplace. [25 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This course offers the fundamentals for understanding mobile application design and development. For practice, the course builds upon the Android development platform. The course covers UX design, data management, network techniques and use of mobile sensing (e.g., GPS and accelerometers). Students are expected to design and develop a high-quality mobile application that addresses a real-world problem in an innovative way. Coursework will include project conception, design, implementation, and pilot testing of mobile phone software applications. Students will be formatively assessed during the course by means of set assignments. These do not count towards the end of year results but will provide students with developmental feedback. Set assignments will also amplify problem-solving skills useful for the set exercises and develop software components that form part of the students' projects.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 7, 10, 13	LO #1, 2, 3 and 4
	Assignments	4	10% (10)	2, 5, 9, 12	LO # 1, 2, 3 and 4
	Projects / Lab.	2	10% (10)	Continuous	
	Report	0	0% (0)		
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-2
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to mobile applications programming
Week 2	Environments of mobile applications programming
Week 3	The required features on mobile applications
Week 4	Backend and Frontend Design
Week 5	Rapid prototyping techniques
Week 6	Software engineering principles of mobile applications
Week 7	**Midterm Exam**
Week 8	Applications development process I
Week 9	Applications development process II
Week 10	Applications development process III
Week 11	Mobile sensing
Week 12	Application generation (.apk)
Week 13	Mobile applications publishing
Week 14	Security issues of mobile applications I
Week 15	Security issues of mobile applications II
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1, 2	Lab 1: Providing open-source sample mobile applications
Week 3, 4	Lab 2: Android studio and programming
Week 5, 6	Lab 3: Start from scratch, Designing basic features
Week 7, 8	Lab 4: Backend requirements and programming
Week 9, 10	Lab 5: Frontend requirements and programming
Week 11, 12	Lab 6: Finalizing mobile apps
Week 13, 14	Lab 7: Security testing

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Ed Burnette. 2015. Hello, Android: Introducing Google's Mobile Development Platform (4th. ed.). Pragmatic Bookshelf	No
Recommended Texts	Android Developer Guides, by Google. Last accessed August 2020	Online
Websites	https://www.coursera.org/articles/mobile-app-development	

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	**Arabic Language** اللغة العربية			**Module Delivery**	
Module Type	**Elective**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☒ **Seminar**	
Module Code	**UoM3CS312**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	UGIII-3		**Semester of Delivery**	6	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	م.م. مروة عدنان اسماعيل		**e-mail**	Loversmewa80@gmail.com	
Module Leader's Acad. Title	Assist. Lecture		**Module Leader's Qualification**	MSc.	
Module Tutor	NA		**e-mail**	NA	
Peer Reviewer Name	عائشة صديق		**e-mail**	Aeeshashaheen_1965@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	١-تقوية القدرة اللغوية لدى الطالب وإكسابه مهارة التعبير الصحيح ٢- تنمية قدرات الطالب ومهاراته الخطية والاملائية ليتمكن من كتابة البحوث العلمية والتقارير بصورة صحيحة ، وكذلك يتمكن من استعمال علامات الترقيم ووضعها في المكان المناسب في الجملة ٣- تدريب الطالب على استخدام القواعد النحوية أثناء القراءة والكتابة والتعبير ٤- تعويد الطالب على فهم المادة المقروءة والتعبير عنها بلغته الخاصة وذلك مما يشجع الطالب على التفكير والابتكار .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	يتوقع من الطالب بعد إنتهائه من دراسة مادة اللغة العربية تحقيق المخرجات الاتية : ١-معرفة القواعد النحوية ٢- معرفة كيفية توظيف ادوات اللغة العربية في كتابة اي بحث علمي ٣- تعزيز المحتوى العربي على الشبكة العنكبوتية ٤- التعلم الالكتروني واستخدام الحاسوب في التعليم
Indicative Contents المحتويات الإرشادية	مفردات المادة : أهمية اللغة العربية : وهذا الموضوع الاول يتحدث عن اهمية اللغة العربية بصورة عامة مع ربط اعلاقة اللغة العربية بعلم الحاسوب (٤ ساعات) اقسام الكلام : وهذا موضوع يقسم الى ثلاثة محاور وهي الاسم والفعل والحرف (٨ ساعات) علامات الاعراب : يتحدث عن علامات اعراب الاسم والفعل ويقسم الى محورين علامات الاعراب الاصلية وعلامات الاعراب الفرعية (٨ ساعات) المبتدأ والخبر :يتناول مفهوم المبتدأ والخبر واعرابه (٦ساعات) كان واخواتها : هذا الموضوع يتعبر تكملة لموضوع الافعال (٦ساعات) إن واخواتها : وهي من النواسخ ، وهي احرف مشبهة بالفعل (٨ ساعات) العدد : وهذا الموضوع مهم جدا لانه يعلم الطالب كيفية كتابة العدد من ناحية التذكير والتأنيث (٢ ساعات)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	الطريقة المستخدمة لتعليم الطلاب مادة اللغة العربية هي القاء المحاضرة والشرح بإستخدام السبورة وفي بعض الاحيان نستخدم الداتا شو باستخدام شرائح عرض برنامج البوربوينت (اذا كانت المادة تتطلب لذلك) وكذالك تضمين المحاضرة اسئلة توجه للطلاب لمعرفة مدى فهمهم للمادة ، واعطاءهم الواجب البيتي وفي منتصف الفصل يطلب من كل طالب تقرير حول مادة او مفردة معينة ، مع الاكثار من الاختبارات اليومية لتساعدهم في حفظ المادة ورفع مستواهم العلمي ايضا .

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	44	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	6	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.4
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**	2	10% (10)	5, 10	LO #1, 3,
	Assignments	3	١٠% (١٠)	2, 12	LO # 2, 3, and 4
	Projects / Lab.				
	Report	1	١٠% (١٠)	13	LO # 1, 2
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-3
	Final Exam	2 hr	٦٠% (٦٠)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	أهمية اللغة العربية
Week 2	علاقة اللغة العربية بعلم الحاسوب
Week 3	أقسام الكلام . الاسم
Week 4	الفعل
Week 5	الحرف
Week 6	علامات الاعراب الاصلية والفرعية
Week 7	**امتحان بالموضوعات (اهمية اللغة العربية وعلاقتها بعلم الحاسوب واقسام الكلام)**
Week 8	علامات الاعراب الفرعية
Week 9	الاسماء

Week 10	المبتدأ والخبر
Week 11	النواسخ
Week 12	كان واخواتها
Week 13	النواسخ
Week 14	ان واخواتها
Week 15	العدد
Week 16	الامتحان النهائي

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	There is no lap in this Module

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	كتاب النحو الوافي للمؤلف عباس حسن	NO
Recommended Texts	كتاب النحو الشافي للمؤلف محمود حسني وشرح ابن عقيل عن الفية ابن مالك	No
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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Object Oriented Programming** **البرمجة الكيانية**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**UoMCS201**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGII		**Semester of Delivery**	Three	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	م. زيد عبد الاله منذر		**e-mail**	zaidabdulelah@uomosul.edu.iq	
Module Leader's Acad. Title	Lecture		**Module Leader's Qualification**	Master	
Module Tutor	م.م. ياسر علي محمود		**e-mail**	yaser.ali@uomosul.edu.iq	
Peer Reviewer Name	Ruba Talal		**e-mail**	rubatalal@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. Abstraction: hiding the implementation details and showing only functionality to the user. 2. Encapsulation: data hiding. 3. Polymorphism: the ability to take more than one form. 4. Inheritance: objects of one class acquire the properties of objects of another class.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Codes basic programs in C# programming language 2. Uses objects and classes 3. Lists the object-oriented programming concepts 4. Declares objects and classes 5. Distinguishes classes and objects 6. Declares and uses variables 7. Declares and uses methods and properties 8. Explains and uses encapsulation 9. Explains and uses inheritance 10. Explains and uses polymorphism 11. Explains and handles exceptions 12. Describes exceptions 13. Throws exceptions 14. Catches exceptions
Indicative Contents المحتويات الإرشادية	Basics of C# [6 hrs] Characteristics of Object-Oriented Programming [6 hrs] Classes and Objects [10 hrs] Working with Constructors Data Members [12 hrs] Using Static Variables & Understanding Scope [12 hrs] Overloading [15 hrs] Inheritance [10 hrs] Exceptions and Errors [13]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Some of the popular teaching and learning strategies will be used in this class. Visualization, Teamwork and Inquiry-Based Teaching are examples of some of these strategies. Encourage students' participation in the exercises also will be considered.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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.				
	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	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Getting Started with C#
Week 2	Understanding C# Programs
Week 3	Characteristics of Object-Oriented Programming
Week 4	Classes and Objects
Week 5	Constructors
Week 6	Working with Data Members
Week 7	**Midterm Exam**
Week 8	Overloading Methods & Constructors

Week 9	Reusing Existing Code with Inheritance
Week 10	Reusing Existing Code with Inheritance
Week 11	Reusing Existing Code with Inheritance
Week 12	Polymorphism, Interfaces and Operator Overloading
Week 13	Polymorphism, Interfaces and Operator Overloading
Week 14	Exceptions and Errors
Week 15	Exceptions and Errors
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1: First experiment (Write first program in C#)
Week 3,4	Lab 2: Second experiment (Constructors)
Week 5,6	Lab 3: Third experiment (Overloading Methods & Constructors)
Week 7,8	Lab 4: Fourth experiment (Reusing Existing Code with Inheritance)
Week 9,10	Lab 5: Fifth experiment (Polymorphism, Interfaces and Operator Overloading)
Week 11,12	Lab 6: Sixth experiment (Exceptions and Errors)
Week 13,14,15	Lab 7: seventh Experiment (It incorporates all the skills learned during the laboratories)

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Microsoft Visual C# 2017 : An Introduction to Object-Oriented Programming, Seventh Edition	No
Recommended Texts	Sams Teach Yourself the C# Language in 21 Days	No
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.

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Database Fundamentals** اساسيات قواعد البيانات			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS202**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGII-2		**Semester of Delivery**	3	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Ammar Thaher Yaseen		**e-mail**	ammarthaher@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Maison Khadir Husain		**e-mail**	maisonkhadir@uomosul.edu.iq	
Peer Reviewer Name	RubaTalal		**e-mail**	rubatalal@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. To develop data analyzing skills. 2. To understand database principles and its application fields. 3. This course deals with the basic concept of database systems. 4. This is the basic subject for all database systems and their applications. 5. To understand database management system and database models. 6. To perform one of a database system project.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize general definitions of database and its characteristics. 2. List the roles of database management systems. 3. Summarize the data independence characteristic in database systems. 4. Discuss the views of the database system 5. Describe Conceptual, logical, physical levels of database system. 6. Define Network architecture and database system. 7. Identify general view of Entity Models. 8. Discuss candidate keys and focus on Primary Key. 9. Explain basics Entity-Relational model. 10. Discuss Normalization and Normal Form. 11. Identify the basic concepts of Relational Algebra. 12. Discuss ACID properties and Transactions. 13. Discuss 12 Codd's roles. 14. Revise the database principles.
Indicative Contents المحتويات الإرشادية	<u>Part A – Database Principles</u> Database and database management definitions, DBMS components, Database system elements, Database applications, Differences between file system and database system. [15 hrs] <u>Part B – Database Models</u> Hieratical Database Model, Network Database Model, Relational Database Model, Distributed Database, Data Warehouse. [10 hrs] <u>Part C – Entity-Relationship Diagram</u> Entity definition, Entity properties, Properties types, Relationship definition, Relationship constraints. [15 hrs] <u>Part D – Relational Model and Normalization</u> Entity-Relationship movement to Relational Model. Entity to Table, Properties to columns. [15 hrs]

	Part E –Relational Algebra Unary and Binary Operation, Selection, Projection, Union, Intersection, Difference, Join. [10 hrs] Part F – ACID Properties Transaction definition, Atomicity, Consistency, Isolation, Durability, 12 Codd rules. [10 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 project and by considering type of simple experiments involving some quizzes activities that are interesting to the students.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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)	2,6	LO #1 and 5
	Assignments	1	10% (10)	12	LO # 2,3,4,6-14
	Projects / Lab.	1	10% (10)	Continuous	
	Report				
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	General definitions of database and its characteristics.
Week 2	The roles of database management systems.
Week 3	Data independence characteristic in database systems.
Week 4	Views of the database system.
Week 5	Conceptual, logical, physical levels of database system.
Week 6	Network architecture and database system.
Week 7	Mid-term Exam.
Week 8	General view of Entity Models.
Week 9	Entity properties.
Week 10	Candidate keys and focus on Primary Key.
Week 11	Basics Entity-Relational model.
Week 12	Normalization and Normal Form.
Week 13	Basic concepts of Relational Algebra.
Week 14	ACID properties and Transactions.
Week 15	12 Codd's roles.
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1: Install SQL Server, Structure of SQL language, create, update, remove tables
Week 3,4	Lab 2: Add, read, update, remove from tables
Week 5,6	Lab 3: Create synonym, views, sequence of tables, use functions, triggers, cursors
Week 7,8	Lab 4: Install C#, create Forms, add buttons, textbox, label, add programs to buttons
Week 9,10	Lab 5: Connect SQL-Server to C#, display table records from DB via C# forms
Week 11,12	Lab 6: Add table records of DB via C# forms, update table records of DB via C# forms,
Week 13,14,15	Lab 7: Preparatory week before the final Exam.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Modern Database Management Systems, Fred R. McFadden, 10th ed, Addison –Wesly, 2015	Yes
Recommended Texts	Database system concepts, by Silberschatz, Korth and Sudarshan, 7th ed, McGraw-Hill, 2019.	No
Websites	https://hevodata.com/learn/database-systems/	

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	**Microprocessors** **معالجات**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS203**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGII	**Semester of Delivery**		Three
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Dr.Wael Wadullah Mahmood		**e-mail**	wael.hadeed@uomosul.edu.iq	
Module Leader's Acad. Title		Lec.	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Ruba Talal	**e-mail**	rubatalal@uomosul.edu.iq	
Scientific Committee Approval Date			**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UoMCS108	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Understand the architecture of the 8086 microprocessor 2. Learn assembly language, and write programs in assembly 3. Learn memory and Input/Output interfacing techniques 4. Understand the function and use of interrupts in a microprocessor system
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Have a clear understanding of the microprocessor terminology. 2. Be able to use the assembly language to develop and write programs that use different data types. 3. Have knowledge of x86 Microprocessor architecture and 8086 Hardware specifications. 4. Have knowledge of different microprocessor mechanisms and techniques such as Memory and I/O interfacing, Stack Operations, BIOS and MS-DOS Interrupts. 5. Be able to use different microprocessor mechanisms and techniques such as Memory and I/O interfacing, Stack Operations, BIOS and MS-DOS Interrupts. 6. Be able to understand the documentation for, and make use of the Assembly library 7. Prepare and deliver coherent and structured verbal and written technical reports.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Introduction to the microprocessor</u> 8086 µp architecture (Review to the computer organization course) [5 hrs] 8086 Internal architecture [10 hrs] 8086 Pin diagram; Multiplexed Pins [5 hrs] 8086 Pin diagram; Shared Pins in the two 8086 modes [10 hrs] 8086 Pin diagram; Minimum Mode 8086 Pins [5 hrs] 8086 Pin diagram; Maximum mode 8086 Pins [5 hrs] <u>Part B - 8086 Instruction set: Microprocessor Programming</u> Bit Manipulation Instructions [10 hrs]

	String Instructions, Branch Instructions, Program control Instructions. [5 hrs] Interrupts in 8086; Review, Interrupts in 8086; Special interrupts, Interrupts in 8086; special cases in interrupts . [10 hrs] How to write assembly program [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The ablity to working effectively alone or as a member of a small group working on some programming tasks. Use the scientific literature effectively.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	73	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.1
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.				
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to the microprocessor
Week 2	Basics of microprocessor
Week 3	x86 Microprocessor architecture
Week 4	8086 Hardware specifications
Week 5	Assembly Language Fundamentals: Defining Data, Symbolic Constants
Week 6	x86 Memory Management: Addressing Modes
Week 7	**Mid-term Exam**
Week 8	8086 Instruction set: Microprocessor Programming
Week 9	Data-Related Operators and Directives
Week 10	Data Transfers, Addressing, and Arithmetic
Week 11	Memory and I/O interfacing
Week 12	Stack Operations
Week 13	Conditional Processing: Boolean and Comparison Instructions
Week 14	Procedures: Defining and Using Procedures
Week 15	BIOS and MS-DOS Interrupts: Direct memory access
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
	No Labs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Godse, Atul P., and Deepali A. Godse. Microprocessors & Microcontrollers. Technical publications, 2021.	No
Recommended Texts	The Intel microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro processor, Pentium II, Pentium III, and Pentium 4 , and Core2 with 64-bit	Yes

	extensions: architecture, programming, and interfacing, Barry B. Brey, 8th ed., Pearson / Prentice Hall, 2009.	
Websites	http://www.dailyfreecode.com/Tutorial_Page10/Assembly_Language-49.aspx	

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	**Data Structures** هياكل البيانات			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**UoMCS204**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UGII-2	**Semester of Delivery**		3
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Ban Sharief Mustafa		**e-mail**	Banmustafa66@uomosul.edu.iq	
Module Leader's Acad. Title		Associate Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Ruba Talal	**e-mail**	rubatalal@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. Develop a comprehensive understanding of fundamental data structures and their practical applications in programming. 2. Gain proficiency in implementing and manipulating data structures, including arrays, linked lists, stacks, queues, trees, graphs, and hash tables. 3. Develop analytical skills to assess the efficiency and performance of different data structures and algorithms. 4. Enhance problem-solving abilities by selecting and applying appropriate data structures and algorithms to solve programming challenges. 5. Foster critical thinking and algorithmic reasoning skills to design efficient and optimized solutions using data structures.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the basic concepts and practical applications of data structures in programming. 2. Understand and implement link list, stack and queue data structures for organizing data. 3. Understand tree structures, implement binary trees, and perform tree traversals. Learn about balanced trees, implement AVL trees. 4. Understand heap and priority queue data structures for efficient data organization and prioritization. 5. Understand graph components and traversal techniques, such as DFS and BFS. 6. Implement hash tables for efficient data retrieval using hashing techniques. 7. Learn linear and binary search methods, implement them. 8. Implement selection sort, insertion sort, merge sort and quick sort algorithms and compare their efficiencies.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Overview of data structures and their importance in programming Basic terminology: elements, data types, operations Array operations: insertion, deletion, searching, and sorting [10 hours] Singly linked lists: structure, node representation, and traversal Operations on linked lists: insertion, deletion, and searching Stack operations: push, pop, and peek Queue operations: enqueue and dequeue [18 hours] Recursive functions and their implementation Recursive algorithms for factorial, Fibonacci sequence, and tower of Hanoi [6 hours] Binary trees: representation, traversal (in-order, pre-order, post-order) Binary search trees: insertion, deletion, and searching ,AVL trees: rotation operations

	and balancing, Red-Black trees: properties and balancing operations [12 hours] Heap operations: insertion, deletion, and heapify , Priority queues: definition and applications [6 hours] Introduction to graphs and their components (vertices and edges) Graph representations: adjacency matrix and adjacency list Graph traversal: depth-first search (DFS) and breadth-first search (BFS) Graph algorithms: connected components and topological sorting Minimum Spanning Trees (MST): Prim's and Kruskal's algorithms [12 hours] Introduction to hash tables and hashing techniques Hash functions: division method and multiplication method Collision resolution: chaining and open addressing [10 hours] Linear search and binary search algorithms Introduction to sorting algorithms: selection sort and insertion sort Merge sort and quicksort algorithms [19 hours]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Encouraging students to actively participate in class discussions, group activities, and problem-solving exercises. Providing opportunities for students to apply their knowledge through practical programming exercises and projects. Also, relating the course content to real-world scenarios and applications, helping students see the practical relevance of data structures and algorithms.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

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, 7 and 8
	Assignments	2	10% (10)	4, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	5	10% (10)	Continuous	
	Report				
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Data Structures: Overview and Importance in Programming.
Week 2	Arrays and Dynamic Memory Allocation: Memory Representation and Manipulation of Arrays.
Week 3	Linked Lists: Structure, Operations, and Comparison with Arrays.
Week 4	Stacks and Queues: LIFO and FIFO Concepts for Data Organization.
Week 5	Recursion: Understanding Recursive Functions and Algorithms.
Week 6	Trees: Hierarchical Structure and Traversal Methods in Binary Trees. Balanced Trees (AVL and Red-Black Trees): Maintaining Balance in Tree Structures.
Week 7	**Mid Term Exam**
Week 8	Heaps and Priority Queues: Efficient Data Organization and Prioritization.
Week 9	Graphs (Part 1): Understanding Graph Components and Traversal Techniques.
Week 10	Graphs (Part 2): Algorithms for Connected Components and Minimum Spanning Trees.
Week 11	Hash Tables: Techniques for Efficient Data Retrieval using Hashing.
Week 12	Searching Algorithms: Linear and Binary Search Methods and their Time Complexity Analysis.
Week 13	Sorting Algorithms (Part 1): Introduction to Selection and Insertion Sort and their Time Complexity Analysis.
Week 14	Sorting Algorithms (Part 2): Merge Sort and Quick Sort and their Time Complexity Analysis.
Week 15	Review and Recap: Consolidation of Key Concepts and Exam Preparation Discussion.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	Lab 1: Implementation and Operations on Linked Lists
Week 3,4	Lab 2: Implementing Stacks and Queues.
Week 5,6	Lab 3: Implementing Hash Tables with Various Hashing Techniques.
Week 7,8	Lab 4: Understanding and Implementing Tree Structures
Week 9,10	Lab 5: Depth-First Search and Breadth-First Search - Implementing Graph Traversal Algorithms.
Week 11,12	Lab 6: Searching Algorithms - Implementing and Analyzing Searching Algorithms.
Week 13,14,15	Lab 7: Sorting Algorithms - Implementing and Analyzing Sorting Algorithms.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	"Open Data Structures" by Pat Morin (Publisher: AU Press)	No
Recommended Texts	Problem Solving with Algorithms and Data Structures using Python" by Bradley N. Miller and David L. Ranum.	No
Websites	https://www.coursera.org/learn/data-structures-algorithms	

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	**Computational Statistics** **الإحصاء الحاسوبي**			**Module Delivery**	
Module Type	**Support**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS205**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGII		**Semester of Delivery**	3	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Dr. Zohair Al-Ameen		**e-mail**	qizohair@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Ruba Talal		**e-mail**	rubatalal@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. To understand models that represent complex data-generating processes. 2. To learn about different sampling methods and techniques to ensure that the collected samples are unbiased and representative. 3. To study the behavior of statistical models, evaluate the performance of algorithms, and conduct sensitivity analyses. 4. To assess the quality of the data by identifying missing values, outliers, inconsistencies, and other data issues. 5. To uncover relationships, dependencies, or associations between variables. 6. To create separate subsets of data for model training and model testing. By partitioning the data into a training set and a testing set, analysts can train predictive models on one subset and evaluate their performance on another. 7. To create visual representations, such as histograms or kernel density plots, that provide a clear picture of the data distribution.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand how data is generated. 2. Learn about sample collection. 3. Familiarize with the output of different statistical methods. 4. Recognize the quality of data. 5. Acknowledge the relationship between variables. 6. Familiarize with data partitioning techniques. 7. Comprehend how visual representation can describe the data.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: ▪ Probability Concepts [15 hrs]. ▪ Sampling Concepts [15 hrs]. ▪ Generating Variables [12 hrs]. ▪ Data Analysis [12 hrs]. ▪ Finding Structure [10 hrs]. ▪ Partitioning [10 hrs]. ▪ Probability Density Estimation [10 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	▪ Class delivery. ▪ Online tutorials. ▪ Lab experiments. ▪ Class activities. ▪ Self-study.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5	LO # 1-4
	Assignments	1	10% (10)	14	All
	Lab	1	10% (10)	Continuous	All
	Report	-	-	-	-
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-6
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction
Week 2	Probability Concepts 1
Week 3	Probability Concepts 2
Week 4	Sampling Concepts 1
Week 5	Sampling Concepts 2
Week 6	Generating Random Variables
Week 7	**Scheduled Exam**
Week 8	Exploratory Data Analysis 1
Week 9	Exploratory Data Analysis 2

Week 10	Finding Structure 1
Week 11	Finding Structure 2
Week 12	Data Partitioning 1
Week 13	Data Partitioning 2
Week 14	Probability Density Estimation 1
Week 15	Probability Density Estimation 2
Week 16	**Revisions for the Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2	**Lab 1:** Overview of MATLAB with Statistics Probability Concepts 1 with MATLAB
Week 3,4	**Lab 2:** Probability Concepts 2 with MATLAB Sampling Concepts 1 with MATLAB
Week 5,6	**Lab 3:** Sampling Concepts 2 with MATLAB Generating Random Variables with MATLAB
Week 7,8	**Lab 4:** Exploratory Data Analysis 1 with MATLAB Exploratory Data Analysis 2 with MATLAB
Week 9,10	**Lab 5:** Finding Structure 1 with MATLAB Finding Structure 2 with MATLAB
Week 11,12	**Lab6:** Data Partitioning 1 with MATLAB Data Partitioning 2 with MATLAB
Week 13,14	**Lab 7:** Probability Density Estimation 1 with MATLAB Probability Density Estimation 2 with MATLAB
Week 15	**Revisions for the Final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Martinez, W. L., & Martinez, A. R. (2015). Computational statistics handbook with MATLAB (Vol. 22). CRC press.	No
Recommended Texts	Gentle, J. E., Härdle, W. K., & Mori, Y. (2012). Springer Handbooks of Computational Statistics. Jain, V. (2009). Computational statistics handbook with MATLAB.	No
Websites	https://www.coursera.org/specializations/compstats	

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 is required but credit awarded
	F – Fail	راسب	(0-44)	A 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	**Human Rights حقوق الانسان**			**Module Delivery**	
Module Type	**Elective**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS206**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level		UGII	**Semester of Delivery**		Three
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	م.م. عمر دريد ذنون		**e-mail**	Omer.thnon@uomusul.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		M.A.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Ruba Talal	**e-mail**	rubatalal@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	١. **الدفاع عن كرامة الإنسان..** ٢. **المساهمة في تغيير حياة الإنسان إلى الأفضل بشأن: التغيير في القيم والمشاعر - والتغيير في السلوك** ٣. **تعزيز فكرة العدالة الاجتماعية..** ٤. **تعزيز الربط بين الفرد والجماعة والدولة ومؤسساتها..** ٥. **تعزيز مشاعر التضامن مع الآخرين..** ٦. **تنمية مهارات رصد الانتهاكات والتعامل مع المنتهكين..** ٧. **دعم مهارات فهم قضايا حقوق الإنسان..** ٨. **تعزيز سبل التعليم التفاعلي..** ٩. **تعزيز سبل المشاركة في الشأن العام – المواطنة**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	أ-الاهداف المعرفية تدريس المبادئ الرئيسية لأبرز حقوق الإنسان ومصادرها وأنواعها والآليات المستخدمة لحمايتها. اما الجانب السلوكي لابد أن تستهدف مقررات حقوق الإنسان ترجمة المعارف والخبرات والقيم وأنماط السلوك إلى عمل دائم ونشاط مستمر من أجل الدفاع عنها في الواقع المعاش وتعزيز الجهود الكفيلة بمعالجة قضايا حقوق الإنسان **ب- الأهداف المهاراتية الخاصة بالمقرر** ١.تبني ورعاية وتشجيع صفات التسامح والاحترام والتضامن المتأصلة في حقوق الانسان. ٢.التعريف بحقوق الانسان من بعديها الإقليمي والدولي والدولي وبالمؤسسات المنشأة لتطبيقها. ٣.تطوير معرفة الافراد بالوسائل والطرق التي بواسطتها يمكن لحقوق الانسان ان تترجم في شكل حقائق اجتماعية وسياسية على المستويين الإقليمي والدولي. ٤.تنوير الافراد بحقوقهم الشخصية وغرس احترام الاخرين في نفوسهم . ٥.إعطاء العناية الى التنوير بالصلة الوثيقة بين حقوق الإنسان من جانب والتنمية والسلام بما فيها نزع السلاح من الجانب الاخر ، والحاجة الى اقامة نظام عالمي جديد في الاقتصاد والاجتماع والثقافة لاعانة كل الناس على الاستمتاع بحقوقهم الإنسانية وتطوير ذواتهم. ٦.إعطاء تركيز مناسب للحقوق الاقتصادية والاجتماعية والثقافية والمدنية بالإضافة للحقوق السياسية ، وكذلك الحقوق الفردية والجماعية على اعتبار عدم قابلية هذه الحقوق للتقسيم او التجزئة ج- المهارات العامة والتأهيلية المنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي :في سبيل . تعزيز احترام حقوق الإنسان والحريات الأساس .الإنماء الكامل للشخصية الإنسانية وإحساسها بالكرامة

	تعزيز التفاهم والتسامح والمساواة بين الجنسين، والصداقة بين جميع الأمم والسكان الأصليين والمجموعات العرقية والقومية والإثنية والدينية واللغوية. تمكين كل الأفراد من المشاركة بفاعلية في مجتمع حر
Indicative Contents المحتويات الإرشادية	المدخل لحقوق الانسان ،مفهوم الحق في اللغة، مفهوم الحق في الاصطلاح، مفهوم الانسان ،الانسان كائن اجتماعي ،الشخصية القانونية للانسان ، مميزات الشخصية الطبيعية [5 hrs] مفهوم حقوق الانسان ،التطور التاريخي لحقوق الانسان، حقوق الانسان في العصور القديمة ،حقوق الانسان في المجتمعات الشرقية، حضارة بلاد الرافدين ،حقوق الانسان في بلاد وادي النيل[5 hrs] حقوق الانسان في الحضارة الغربية ، فكرة حقوق الانسان في الحضارة الاغريقية (اليونانية)،فكرة حقوق الانسان في الحضارة الرومانية ،فكرة حقوق الانسان في العصور الوسطى وعصر النهظة ومطلع العصر الحديث [5 hrs] فكرة حقوق الانسان في العصور الوسطى،فكرة حقوق الانسان في الشرائع السماوية [5 hrs] فكرة حقوق الانسان في الشريعة المسيحية[5 hrs] فكرة حقوق الانسان في الشريعة الاسلامية ،مصادر حقوق الانسان[5 hrs] الاعلان العالمي لحقوق الانسان،العهدان الدوليان الخاصان بحقوق الانسان[5 hrs] تقسيم حقوق الانسان [2 hrs] ضمانات حقوق الانسان[4 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	محاضرات- ورش عمل - ندوات

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	44	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	6	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.4
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	2	10% (10)	5, 10	LO #1, 2 and 4
	Assignments	2	10% (10)	2, 12	LO # 6
	Projects / Lab.				
	Report	1	10% (10)	13	LO # 3,5
Summative assessment	Midterm Exam	1 hr	10% (10)	7	LO # 1-6
	Final Exam	2 hr	60% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	المدخل لحقوق الانسان ،مفهوم الحق في اللغة، مفهوم الحق في الاصطلاح
Week 2	مفهوم الانسان ،الانسان كائن اجتماعي ،الشخصية القانونية للانسان ، مميزات الشخصية الطبيعية
Week 3	مفهوم حقوق الانسان ،التطور التاريخي لحقوق الانسان، حقوق الانسان في العصور القديمة
Week 4	حقوق الانسان في المجتمعات الشرقية، حضارة بلاد الرافدين ،حقوق الانسان في بلاد وادي النيل
Week 5	حقوق الانسان في الحضارة الغربية ، فكرة حقوق الانسان في الحضارة الاغريقية (اليونانية
Week 6	فكرة حقوق الانسان في الحضارة الرومانية ،فكرة حقوق الانسان في العصور الوسطى وعصر النهظة ومطلع العصر الحديث
Week 7	مراجعة سريعة ، امتحان
Week 8	فكرة حقوق الانسان في العصور الوسطى،فكرة حقوق الانسان في الشرائع السماوية ،
Week 9	فكرة حقوق الانسان في الشريعة المسيحية
Week 10	فكرة حقوق الانسان في الشريعة الاسلامية ،مصادر حقوق الانسان,
Week 11	الاعلان العالمي لحقوق الانسان
Week 12	العهدان الدوليان الخاصان بحقوق الانسان
Week 13	تقسيم حقوق الانسان
Week 14	ضمانات حقوق الانسان
Week 15	الامتحان الفصلي
Week 16	مراجعة قبل الامتحان النهائي

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	أ- الكتب الدراسية والمنهجية المقررة من اللجنة العلمية ولجان الاعتماد والأكاديمي .	Yes
Recommended Texts	ب- المحاضرات المؤرشفة من قبل تدريسي الاختصاص لكل مادة ورقية كانت أم فيدوية	No
Websites	ج- مواقع شبكة الانترنت الرسمية المعتمدة من قبل الجامعة .	

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

ملاحظة : سيتم تقريب العلامات العشرية أعلى أو أقل من ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال ، سيتم تقريب علامة ٥٤.٥ إلى ٥٥ ، في حين سيتم تقريب علامة ٥٤.٤ إلى ٥٤. لدى الجامعة سياسة عدم التغاضي "فشل التمرير القريب" لذا فإن التعديل الوحيد للعلامات الممنوحة بواسطة العلامة (العلامات) الأصلية سيكون التقريب التلقائي الموضح أعلاه

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Visual Programming البرمجة المرئية**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**UoMCS207**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGII	**Semester of Delivery**		Four
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	م. زيد عبد الاله منذر		**e-mail**	zaidabdulelah@uomosul.edu.iq	
Module Leader's Acad. Title		Lecture	**Module Leader's Qualification**		Master
Module Tutor	م.م. ياسر علي محمود		**e-mail**	yaser.ali@uomosul.edu.iq	
Peer Reviewer Name		Rana Muayad Hasan	**e-mail**	Ranamuayad@uomosul.edu.iq	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	UoMC201	**Semester**	Three
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Be familiar with the general characteristics of the GUI. 2. Understand the important conceptual level issues associated with good interface design. 3. Understand the purpose of toolkits and high-level class libraries, and be able to write significant programs using the WPF.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Codes basic programs in XAML. 2. Explains and uses Layout & Content controls 3. Explains and uses Button control 4. Explains and uses TextBox control 5. Explains and uses Lable control 6. Explains and uses RadioButton control 7. Explains and uses CheckBox control 8. Explains and uses ListBox control 9. Explains and uses ComboBox control 10. Explains and uses Menu control 11. Explains and uses Events and Commands 12. Explains and uses Resourses and Themes 13. Explains and uses Data Binding 14. Explains and uses Animation and Media
Indicative Contents المحتويات الإرشادية	XAML Overview: [10 hrs] Layout Controls: [10 hrs] Main Controls: [25 hrs] Menus Controls: [10 hrs] Events and Commands: [15 hrs] Multithreading: [7 hrs] Data Binding: [7 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Some of the popular teaching and learning strategies will be used in this class. Visualization, Teamwork and Inquiry-Based Teaching are examples of some of these strategies. Encourage students' participation in the exercises also will be considered.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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.				
	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	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	WPF Introduction
Week 2	XAML Overview
Week 3	Layout & Content Controls
Week 4	WPF Controls (Button + TextBox + Lable)
Week 5	WPF Controls (RadioButton + CheckBox)
Week 6	WPF Controls (ListBox + ComboBox)
Week 7	**Midterm Exam**
Week 8	Menu and StatusBar
Week 9	Events and Commands

Week 10	Events and Commands
Week 11	Resourses and Themes
Week 12	Multithreading
Week 13	Data Binding
Week 14	Data Binding
Week 15	Animation and Media
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2,3	Lab 1: First experiment (Write the first program in WPF)
Week 4,5	Lab 2: Second experiment (Layout & Content Controls)
Week 6,7	Lab 3: Third experiment (Events and Commands)
Week 8,9	Lab 4: Fourth experiment (Multithreading)
Week 10,11	Lab 5: Fifth experiment (Data Binding)
Week 12,13	Lab 6: Sixth experiment (Animation and Media)
Week 14,15	Lab 7: Final Experiment (It incorporates all the skills learned during the laboratories)

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Pro C# 7: With .NET and .NET Core	No
Recommended Texts	WPF 4 Unleashed by Adam Nathan	No
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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Architecture** معمارية الحاسوب			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoMCS208**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Dr.Wael Wadullah Mahmood		**e-mail**	wael.hadeed@uomosul.edu.iq	
Module Leader's Acad. Title	Lec.		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Rana Muayad Hasan		**e-mail**	ranamuayad@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. Introduction to the basic roles and responsibilities for each of the major hardware components of a computer. 2. Review the need to use a memory hierarchy, perform memory management, and to explain to them the various memory management techniques and their tradeoffs 3. Describe the structure, function, and purpose of the computer for presentation as clearly and completely as possible
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Have a clear understanding of the Computer terminology. 2. Have knowledge of Computer architecture and Hardware specifications. 3. Have knowledge of different types of comuters and techniques. 4. Review the need to use a memory hierarchy, perform memory management, and to explain to them the various memory management techniques and their tradeoffs. 5. Prepare and deliver coherent and structured verbal and written technical reports. 6. Review operation of hardware and software working synergistically together.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Introduction to Organization & Architecture</u> Introduction to Computer, Basic Concepts, Computer Function and Structure [5 hrs] Von neuman machine, Flynn computer architecture classification [5 hrs] Computer memory system [5 hrs] SRAM & DRAM [3 hrs] RAM design and ROMs [5 hrs] Cache memory principles and structure [5 hrs] <u>Part B - 8086 Instruction set: Microprocessor Programming</u> Interleaved memory [5 hrs] Address interleaving and performance model; Virtual Memory Concept [5 hrs] Paging and Segmentation mechanism [5 hrs] CPU (Register, Hardware, Micro programmed and I/O) Organization [3 hrs] Programmed and interrupt I/O [3 hrs] introduction to parallel processing (SISD,SIMD,MISD,MIMD) [4 hrs] pipeline structure [3 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Provides comprehensive converge of computer architecture including memory, CPU, I/O and parallel system.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	59	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**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.				
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Computer, Basic Concepts
Week 2	Computer Function and Structure
Week 3	Von neuman machine
Week 4	Flynn computer architecture classification

Week 5	Computer memory system
Week 6	Cache memory principles and structure
Week 7	Mid-term Exam
Week 8	Interleaved memory
Week 9	Address interleaving and performance model
Week 10	Virtual Memory Concept
Week 11	Paging and Segmentation mechanism
Week 12	CPU (Register, Hardware, Micro programmed and I/O) Organization
Week 13	Programmed and interrupt I/O
Week 14	introduction to parallel processing (SISD,SIMD,MISD,MIMD)
Week 15	pipeline structure
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
	No Labs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	William stalling, Computer organization & architecture,2003	Yes
Recommended Texts	Daniel. A practical introduction to computer architecture. Springer Science & Business Media, 2009.	No
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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Distributed Database** **قواعد البيانات الموزعة**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☐ **Seminar**	
Module Code	**UoMCS209**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGII	**Semester of Delivery**		Four (4)
Administering Department		Computer Science	**College**		Computer Science and Mathematics
Module Leader	Rayan Yousif Yacob Alkhayat		**e-mail**		rayan@uomosul.edu.iq
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Rana Muayad Hasan	**e-mail**		ranamuayad@uomosul.edu.iq
Scientific Committee Approval Date			**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Database Fundamental - UoMCS202	**Semester**	Three (3)
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To introduce distributed database systems DDBSs to the students. 2. To expose the benefits of using DDBS in real life. 3. Definitions of basic concepts of distributed database systems. 4. To enable students to understand the structural fundamentals of DDBSs. 5. To enable students creating and managing DDBSs.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the structure of distributed database . 2. List the various distributed database systems. 3. Summarize what is meant Distributed and Parallel Database Design. 4. Discuss the benefits of distributed query processing. 5. Describe the data replication. 6. Identify the Database Integration – Multidatabase Systems 7. Discuss the NoSQL, NewSQL and Polystores. 8. Discuss the various properties of distributed database systems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part I : Definitions, Creation, and Implementation: - Distributed Database Structure - Data Delivery Alternatives, Promises of DDBSs, Level of sharing, Behavior of access patterns, Level of knowledge on access pattern behavior , Top-Down Design Process. [10 hrs] Data and Access Control– Views in Centralized DBMSs, Views in Distributed DBMSs, Maintenance of Materialized Views. [10 hrs] Data Security - Discretionary Access Control , Multilevel Access Control Distributed Access Control. [10 hrs] Overview of Query Processing - Query Processing Problem Objectives of Query Processing, Complexity of Relational Algebra Operations Characterization of Query Processors. [10 hrs] Revision problem classes [9 hrs] Part II: Query and Transactions:- Query Decomposition and Data Localization : Query Decomposition, Normalization, Analysis, Elimination of Redundancy, Localization of Distributed Data. [10 hrs] Optimization of Distributed Queries- Query Optimization, Centralized Query Optimization, Join Ordering in Distributed Queries Distributed Query Optimization. [10 hrs.] Multidatabase Query Processing – Multidatabase Query Processing Architecture, Query Rewriting Using Views Query Optimization and Execution Query Translation

	and Execution, Properties of Transactions, Types of Transactions, Architecture Revisited. [10 hrs.]. Distributed Concurrency Control and Distributed DBMS Reliability: Taxonomy of Concurrency Control Mechanisms, Locking-Based Concurrency Control Algorithms, Timestamp-Based Concurrency Control Algorithms, Deadlock Management, Reliability Concepts and Measures , Local Reliability Protocols, Distributed Reliability Protocols, Network Partitioning. [5 hrs.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The course has dual objectives. The first is an in-depth study of the classical distributed database management issues such as distribution design, distributed query processing and optimization, and distributed transaction management. The second objective is to study more current distributed database management topics such as pervasive computing, Web data management, different distribution models (push versus pull), interoperability and componentization, and data mining on the web.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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.				
	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	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction
Week 2	Distributed and Parallel Database Design
Week 3	Distributed Data Control
Week 4	Distributed Query Processing
Week 5	Distributed Transaction Processing
Week 6	Data Replication
Week 7	**Mid-term Exam**
Week 8	Database Integration – Multidatabase Systems
Week 9	Parallel Database Systems
Week 10	Peer-to-Peer Data Management
Week 11	Big Data Processing
Week 12	NoSQL, NewSQL and Polystores
Week 13	Web Data Management
Week 14	Distributed and Parallel Database Design
Week 15	Database Integration – Multidatabase Systems
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to distributed database systems architecture.
Week 2	Lab 2: Introducing MS-SQL Server for DDBSs.
Week 3	Lab 3: Creating simple DDB , managing tables and records.
Week 4	Lab 4: How to access remote DDB, LAN experiment.
Week 5	Lab 5: Maintaining relations between connected DDB tables – Part1
Week 6	Lab 6: Maintaining relations between connected DDB tables – Part 2
Week 7	Lab 7: Lab Test
Week 8	Lab 8: Altering database, update, and modification – Part 1
Week 9	Lab 9: Altering database, update, and modification – Part 2

Week 10	Lab 10: Managing network based DDB.
Week 11	Lab 11: Lab subjects review
Week 12,13,14,15	Lab 12: Semester final test.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Principles of Distributed Database Systems, 4th Edition. Özsu, T., & Valduriez, P. Springer 2020.	Yes
Recommended Texts	Distributed Database Systems, Jindal, G., & Ray, C. (2010).	No
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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Compilers** مترجمات			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UoM**CS210				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Dr. Ielaf O. Abdul-Majjed		**e-mail**	ie_osamah@uomosul.edu.iq	
Module Leader's Acad. Title	Assist Prof		**Module Leader's Qualification**	Ph.D.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Rana Muayad Hasan		**e-mail**	ranamuayad@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. Be able to build a compiler for a (simplified) (programming) language 2. Know how to use compiler construction tools, such as generators of scanners and parsers 3. Be familiar with assembly code and virtual machines 4. Be able to define LL(1), LR(1), and SLR(1) grammars 5. Be familiar with compiler analysis and optimization techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After completing this module, a student should be able to: 1. Understand the principles guiding all aspects of the compilation process. 2. Recognize the function of each of the fundamental components of a conventional compiler. 3. Demonstrate familiarity with compiler front-end concepts, such as lexical analysis, syntactic analysis, semantic analysis, type checking, symbol tables, and so on. 4. Demonstrate understanding of compiler back-end theory, such as intermediate code generation, run-time organization, code generation, optimization, data flow analysis, and so on. 5. Demonstrate the ability to implement a portion of a high-level language compiler.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Front End</u> - Compiler phases and overall working, Scanners (Regular Expressions, NFA/DFA, Scanner Generators). [10 hrs] - Parsers (Grammars, Ambiguity Removal, LL, LR, and other deterministic parsing).[10 hrs] - Semantic Analysis (Symbol Tables, Syntax Driven Analysis, Type Systems, Attribute Grammars). [10 hrs] Revision problem classes [5 hrs] <u>Part C –Middle End</u> - Intermediate Forms, Syntax Directed Translation, Translation of: Expressions, Control Structures and Back-patching, Function and Procedure Calls, Runtime Organization. [10 hrs] Revision problem classes [5 hrs] <u>Part B - Back-end</u> - Code optimization: code is made shorter and simpler by combining steps or removing unnecessary steps which lead to the generation of optimized code.

	. [10 hrs] - Code generation: coverts the intermediate code or the optimized code into the target language. Usually, the target language is the machine code. [5 hrs] - Selected, allocated all available memory and registers, then run to process inputs and provide results. [5 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Software project: Emphasize design patterns, teamwork, and programming methodology by constructing a compiler to meet assigned specifications. 2. Application of theory: Emphasize the role of theory to enable automation of compiler tasks, and illustrate the limitations of that theory.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	50	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	3	10% (10)	5, 9,12	LO #1-4
	Assignments	5	10% (10)	4,5,8,9,12	LO # 2- 5
	Projects / Lab.	1	10% (10)	Continuous	
	Report	·			
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction: The phases of compiler design, Compiler construction tools
Week 2	Lexical tokens &regular expression, Finite automata, Converting RE to FSM
Week 3	lexical analysis: Designing lexical analysis, lexical analysis generator
Week 4	Syntax analysis 1: The role of the parser, Context free grammar, Top –down & bottom up parser
Week 5	Syntax analysis 2: Top –down LL(1) parser
Week 6	Error Management: Error recovery
Week 7	**Mid-term Exam**
Week 8	Syntax analysis 3: Bottom-up Parser Shift-reduce parsers, LR parser
Week 9	Syntax analysis 4: Bottom-up Parser SLR parser
Week 10	Syntax-Directed Translation: Inherited and Synthesized Attributes
Week 11	Semantic Analysis: Static and Dynamic Semantics, Semantic Errors, Type Checking
Week 12	Intermediate-code Generation: Postfix Notation, Three-Address Code, Syntax Tree Issues in the design of a code generator, flow graph, basic blokes
Week 13	Introduction of Object Code in Compiler: Instruction Selection, Register Allocation, Evaluation orders
Week 14	Code Optimization: Local and global code Optimization
Week 15	**Review**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1,2,3	Lab 1: lexer
Week 4,5	Lab 2: Symbol table implementation
Week 6,7	Lab 3: Top Down LL1 Parser
Week 8,9	Lab 4: Closure Operation
Week 10,11	Lab 5: Canonical Collection Generator
Week 12,13	Lab 6: LR0 Parser
Week 14,15	Lab 7: Type Checking

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Basics of Compiler Design, Torben E. Mogensen, 2009.	Yes
Recommended Texts	Compilers , principles , Techniques and tools by Aho,Lam, Sethi and Ullman, 2nd Ed. Addison – Wesely , 2007.	No
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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Software Engineering** هندسة البرمجيات			**Module Delivery**	
Module Type	**Support**			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☒ **Practical** ☒ **Seminar**	
Module Code	**UoMCS211**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UGII	**Semester of Delivery**		4
Administering Department		Computer Science	**College**	Computer Science and Mathematics	
Module Leader	Dr. Shayma Mustafa Mohi-Aldeen		**e-mail**	shaymamustafa@uomosul.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor			**e-mail**		
Peer Reviewer Name		Rana Muayad Hasan	**e-mail**	Ranamuayad@uomosul.edu.iq	
Scientific Committee Approval Date			**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 Aims أهداف المادة الدراسية	1. Introducing the concept of software engineering, and providing the activities necessary to produce various systems. 2. How to design software to solve big problems by understanding software engineering methodsand software development phases. 3. To enable the student to use the Enterprise Architect program, which is a UML (Unified Modeling Language) modeling tool that enables the student to manage and design large projects by using the diagrams provided by this tool in analyzing, designing and testing large systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The students will be able: 1. To know the meaning of software engineering and its goals. 2. To understand the various software process models. 3. To compare and select a process model for a business system. 4. To identify and specify the requirements for the development of an application and the SRS document. 5. To know the different software design techniques and architectural styles. 6. To develop and design efficient, reliable and cost effective software solutions. 7. To learn the software testing approaches and metrics used in software development. 8. To understand the different types of testing and the comparison between them. 9. To know about project management process and risk management. 10. To enable the students to manage theprocess of design and developthe big software by using the diagrams of UML.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: **<u>Part A -Software Engineering</u>** Definition, Applications and problems–Software Engineering Goals, Conflicting and Complementary goals of SWE, ,Software Process models: Water fall Model, Prototyping, Evolutionary development, Formal systems development. [10 hrs] Software Requirements - Objectives, Requirements Engineering Process, Types of Requirements, Software Requirement Specification, Software Requirement Validation and verification. [10 hrs] Analysis Model - Analysis Model Types and examples, Formal Specification, Formal methods, Formal Specification Languages. Software Design- Design and Quality, Software Design Levels, Fundamental Design Concepts. [10 hrs] Functional independence: Definition, Cohesion and its types, Coupling and its types, Effective Modular Design. Design elements: Data, Architectural and procedural

	design, Top-Down and Bottom-Up Design, Structured Design, Transform and Transaction Mapping. [10 hrs] **Part B - Software Testing** Definition and Objectives, Exhaustive Testing, Test case design, Software Testing Strategies. White Box Testing: Basis path testing, Basis path method with examples, Condition testing, Data flow testing ,Loop testing. Black Box Testing: Black box testing techniques - Boundary Value Analysis, Equivalence Class Partitioning. Types of Testing: Unit (Module) Testing, Integration testing, Validation testing, System testing, Acceptance testing. [30 hrs] **Part C- Software project management** Definition and goals, Project Management Tools, Risk management, Resource management, Project Execution & Monitoring, Project Scheduling. [14 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This module will be offered as a contact module, as students will require to attend learning opportunities and lectures using the traditional timetable. However, Google Classroom will be used to accommodate a blend of learning and teaching methods to facilitate learning. Learning material (Power Points and readings) will be made available to students at least one week before a contact session. Students will be engaged with case studies and work examples to apply the theoretical knowledge and theories to these case studies. This will be dealt with in group work skills.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	89	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4, 11	LO #1, 2, 3, 4, 6 and 7
	Assignments	3	10% (10)	2, 6, 12	LO # 1, 5, 7 and 8
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 3, 5 and 9
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction- Software definition, applications and problems,Software engineering definition.
Week 2	Software Engineering Goals, The conflicting and complementary goals of SWE,Software Process models (Software lifecycle): Water fall Model.
Week 3	Software Process models (continuous): Prototyping, Evolutionary development, Formal systems development.
Week 4	Software Requirements: Objectives, Requirements Engineering Process, Types of Requirements, Software Requirement Specification, Software Requirement Validation and verification.
Week 5	Analysis Model: Analysis Model Types and examples, Formal Specification, Formal methods, Formal Specification Languages.
Week 6	Software Design: Design and Quality, Software Design Levels, Fundamental Design Concepts.
Week 7	**Mid-term Exam**
Week 8	Functional independence: Definition, Cohesion and its types, Coupling and its types, Effective Modular Design.
Week 9	Design elements: Data, Architectural and procedural design, Top-Down and Bottom-Up Design, Structured Design, Transform and Transaction Mapping.
Week 10	Software Testing: Definition and Objectives, Exhaustive Testing, Test case design, Software Testing Strategies.
Week 11	White Box Testing: Basis path testing,Basis path method with examples, Condition testing, Data flow testing, Loop testing.
Week 12	Black Box Testing: Black box testing techniques - Boundary Value Analysis, Equivalence Class Partitioning
Week 13	Types of Testing: Unit (Module) Testing, Integration testing, Validation testing, System testing, Acceptance testing.
Week 14	Software project management: definition and goals, Project Management Tools.

Week 15	Risk management, Resource management, Project Execution & Monitoring, Project Scheduling.
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to UML
Week 2	Lab 2: Types of UML Diagrams
Week 3	Lab 3: Use Case Diagram, Examples of use case diagram
Week 4	Lab 4: Use Case Diagram Entities and Relations.
Week 5	Lab 5: Project
Week 6	Lab 6: Class Diagram, Examples of Class Diagram.
Week 7	Lab 7: Relations of Class Diagram
Week 8	Lab 8: Project
Week 9	Lab 9: Data Flow Diagram
Week 10	Lab 10: Examples of Data Flow Diagram.
Week 11	Lab 11: Project
Week 12	Lab 12: Sequence Diagram
Week 13	Lab 13: Examples of Sequence Diagram.
Week 14,15	Lab 14: Project

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Software engineering A practitioner's approach, Third Edition, Roger S. Pressman, 2005.	Yes
Recommended Texts	1. Software engineering, Eighth Edition, Ian Somerville, 2007. 2. Enterprise Architect User Guide, by Geoffrey Sparks, 2009.	No
Websites	https://www.slideshare.net/ShudipPal/software-engineering-requirements-engineering-software-maintenance?from_search=1	

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	**English Language 2** اللغة الإنكليزية ٢			**Module Delivery**	
Module Type	**Elective**			☐ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UoMCS212				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	UGII		**Semester of Delivery**	4	
Administering Department	Computer Science		**College**	Computer Science and Mathematics	
Module Leader	Zainab Qusay Ahmed Taqi		**e-mail**	Zainab.q@uomosul.edu.iq	
Module Leader's Acad. Title	Asst. lecturer		**Module Leader's Qualification**	MSc.	
Module Tutor			**e-mail**		
Peer Reviewer Name	Rana Muayad Hasan		**e-mail**	ranamuayad@uomosul.edu.iq	
Scientific Committee Approval Date			**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 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 مخرجات التعلم للمادة الدراسية	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, 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, and vocabulary development. 6. Develop the writing skill.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction, Study materials. [2 hrs] Grammar (quantity)(much/many, a few, a little, little, a lot of, lots), questions and answers. Articles, reeding (about shopping). Vocabulary: Shopping, prices, listening and reading. Verb patterns (want/hope to do), making questions. Future intentions: going to/will, practices, reading about Hollywood kids., Vocabulary: hot verbs: have, go, come, listening, everyday English: how do you feel?. [10 hrs] Grammar: What….. like?, Comparative and superlative adjectives big, bigger, biggest good, better, best, practices. Vocabulary: Synonyms and antonyms. Everyday English about directions, listening and reading. [10 hrs] Grammar: present tense, practices. for/ since, practices, questions. Adverbs, word pairs, practices. Everyday English about short answers (Question tags). [15 hrs] Review about Study materials. [5 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
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) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	44	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	6	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	0.5
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**	2	10% (10)	3,5 and 10	LO #1, #2
	Assignments	2	10% (10)	4, 6 and 12	LO #3, #4 and #6
	Report				
Summative assessment	**Midterm Exam**	1 hr	10% (10)	7	LO #1 - #5
	Final Exam	2 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction: Review about Study materials. [2 hrs]
Week 2	Quantities, wh- questions and answers.
Week 3	Articles, reeding (about shopping).
Week 4	Vocabulary: Shopping, prices.
Week 5	Grammar: Verb patterns, making questions.
Week 6	**Mid-term Exam**
Week 7	Future: Going to/will, practices, reading (Hollywood kids).
Week 8	Grammar: hot verbs, listening, everyday English: how do you feel?.
Week 9	Grammar: What ….. like? , Comparative and superlative adjectives big, bigger, practices.

Week 10	Vocabulary: Synonyms and antonyms.
Week 11	everyday English about directions, listening and reading, practices.
Week 12	Present tense, simple present, present continuous, practices.
Week 13	Grammar: for/ since, practices, questions.
Week 14	Adverbs, word pairs, practices.
Week 15	Everyday English about short answers (Question tags).
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
	No Labs

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Headway pre-intermediate plus student's book (john and Lize Soars)	Yes
Recommended Texts	Headway pre-intermediate plus work's book	Yes
Websites	https://7esl.com/	

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.