وزارة التعليم العالي والبحث العلمي

جامعة الانبار

كلية علوم الحاسوب وتكنلوجيا المعلومات

قسم علوم الحاسوب

نظام بولونيا

Module Description Form

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	***Computer Technology***			**Module Delivery**	
Module Type	***C***			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	***CSDC110***				
ECTS Credits	***6***				
SWL (hr/sem)	***150***				
Module Level		UGI	**Semester of Delivery**		One
Administering Department		CSIT	**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail: arwa.alqudsi@uoanbar.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		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**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 Objectives أهداف المادة الدراسية	- Provide a basic knowledge of computer hardware and software - Introduce the business areas to which computers may be applied. - Provide an introduction to business organization and information systems. - Develop the skills in network & communication , which play an important part in business computing and information processing
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- The student should understand the architecture of any IT systems. - The student should understand the parts of hardware. - The student should understand the system software. - The student should understand the architecture of networks ,protocols and communications devices.
Indicative Contents المحتويات الإرشادية	Data Conversion • D/A converters • A/D converters • Sample and Hold circuits Digital Component Operations • Multiplexing • Data storage • Integrated Circuits Digital Technology • Memory Technology • Circuit Board Technology • Nano-Technology

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- The student should use utilities in the lab to apply scientific experiment

	- The ability to execute the applications software .

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**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	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction of Computers and Programming
Week 2	Brief history of computer
Week 3	Generation of Computers & Computer hierarchy
Week 4	Basic Computer Components
Week 5	Computer function (fetch cycle, interrupt cycle, I/O function
Week 6	Semiconductor main memory (RAM, ROM, CACHE)
Week 7	Midterm Exam
Week 8	Computer Software(application software)
Week 9	External & Internal memory
Week 10	Telecommunications system & Network
Week 11	Topology of a network
Week 12	Layering model
Week 13	Protocols
Week 14	addressing communications
Week 15	All Topics
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Week 1	Basic Computer Components
Week 2	Computer function (fetch cycle, interrupt cycle, I/O function
Week 3	Semiconductor main memory (RAM, ROM, CACHE)
Week 4	Computer Software(application software)
Week 5	External & Internal memory
Week 6	Telecommunications system & Network
Week 7	Topology of a network
Week 8	Layering model
Week 9	Protocols
Week 10	addressing communications

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1.Computing Essentials Making IT work for you 2017 by Timothy J. O'Leary. 2.Computer Organization and Architecture Designing for Performance (8th Edition).	No
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 DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Programming in C++ I**			**Module Delivery**	
Module Type	***C***			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	***CSDC111***				
ECTS Credits	***8***				
SWL (hr/sem)	***200***				
Module Level		UGI	**Semester of Delivery**		one
Administering Department		CSIT	**College**	Type College Code	
Module Leader	Saad Adnan Abed		**e-mail**	E-mail: saad.adnan@uoanbar.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**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 Objectives أهداف المادة الدراسية	• Gain a solid understanding of the basic principles, syntax, and structure of the C++ programming language. • Develop the ability to write and compile C++ programs, including understanding the use of variables, data types, and operators. • Learn how to use control structures, including if-else statements, loops (while, for, do-while), and switch statements, to control the flow of a program.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of the module, students will be able to: • Explain the basic concepts and features of C++. • Describe the underlying memory model and explain the role of the execution stack and the heap. • Make effective use of the C++ Standard Template Library. • Make effective use of the control structures.
Indicative Contents المحتويات الإرشادية	Introduction to computer programming Introduction to C++ Programming C++ Standard Library Control flow in C++ Memory Management in C++ C++ Application Development

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Conceptual Understanding: Hands-on Practice Code Review and Feedback Problem-Solving Exercises

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	123	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
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	**200**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to computer programming**
Week 2	**Introduction to programming languages and C++**
Week 3	**Variables**
Week 4	**C++ Libraries**
Week 5	**C++ User Input and Output**
Week 6	**C++ Operators (Arithmetic operators, Bitwise operators, logical operators, and Relational operators)**
Week 7	Mid-term Exam
Week 8	**C++ Strings & C++ Math**
Week 9	**C++ Booleans**
Week 10	**C++ conditions**
Week 11	**Switch statement**
Week 12	**While loop**
Week 13	**For loop**
Week 14	**Break and Continue statements**
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**C++ Libraries**
Week 2	**C++ User Input**
Week 3	**C++ Operators**

Week 4	**If condition**
Week 5	**Switch condition**
Week 6	**Break and Continue**
Week 7	**For loop**
Week 8	**While loop C++**
Week 9	**Do-while loop**
Week 10	**Break and Continue statements**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	The C++ Programming Language (4th Edition) by Bjarne Stroustrup	No
Recommended Texts		
Websites	https://www.learncpp.com/ https://www.w3schools.com/CPP/default.asp	

Grading Scheme

مخطط الدرجات

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

Fail Group **(0 – 49)**	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	***Logic Design I***			**Module Delivery**	
Module Type	***C***			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	***CSDC112***				
ECTS Credits	***6***				
SWL (hr/sem)	***150***				
Module Level		UGI	**Semester of Delivery**		one
Administering Department		CSIT	**College**	Type College Code	
Module Leader	**Wesam Mohammed Jasim Abid Alrawi**		**e-mail**	co.wesam.jasim@uoanbar.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		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**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 Objectives أهداف المادة الدراسية	1- The student should understand number systems and codes and conversion between them. 2- The student should understand the Boolean expression and how to apply it. 3- The student should recognize among different logic gates and how to use them. 4- The student should understand how to design a logic circuit. 5- The student should understand using K-map for simplification.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Demonstrate a solid understanding of digital logic principles, including Boolean algebra, logic gates, truth tables, and the concept of binary representation.
Indicative Contents المحتويات الإرشادية	Introduction to Digital Logic Combinational Logic Design Arithmetic circuits Sequential Logic Design Circuit Testing and Verification

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Conceptual Understanding Problem-Solving Approach Hands-on Laboratory Experience Design Projects Simulation and Modeling

	Problem-Based Learning

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**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	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to number system
Week 2	Conversion between systems
Week 3	Codes and conversion among them
Week 4	Codes and conversion among them1
Week 5	Boolean expression
Week 6	Logic gates
Week 7	Mid-term Exam
Week 8	Logic gates design
Week 9	Circuit Design
Week 10	Second month exam
Week 11	NAND gates
Week 12	NOR gates
Week 13	Sum of product form
Week 14	Product Of sum form
Week 15	K-map
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered

Week 1	Codes and conversion among them
Week 2	Codes and conversion among them1
Week 3	Boolean expression
Week 4	Logic gates
Week 5	Circuit Design
Week 6	Second month exam
Week 7	NAND gates & NOR gates
Week 8	Sum of product form
Week 9	Product Of sum form
Week 10	K-map

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	An Introduction to Logic Technology by Luois Nashlsky	Yes
Recommended Texts	Fundamentals of logic design by J. Roth	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	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	***Mathematics I***			**Module Delivery**	
Module Type	***B***			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	***CCIT060***				
ECTS Credits	***6***				
SWL (hr/sem)	***150***				
Module Level		UGI	**Semester of Delivery**		one
Administering Department		CSIT	**College**	Type College Code	
Module Leader	Abdul-Adheem Zaily Hameed		**e-mail**	ab72d74@uoanbar.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**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 Objectives أهداف المادة الدراسية	Core Mathematical Knowledge: The course aims to provide students with a solid foundation of core mathematical concepts and theories. This includes topics such as algebra, calculus, geometry, discrete mathematics, probability, and statistics. The aim is to ensure that students have a comprehensive understanding of fundamental mathematical principles.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students should be able to: -Understand and use basic mathematical terminology. - Understand the role of formal definitions and proofs and be able to apply them in problem solving. - Understand the basics of propositional and predicate logic. - Understand the basics of elementary set theory. - Understand the basics of mathematical relations and functions. - Understand the basics of graph theory.
Indicative Contents المحتويات الإرشادية	Calculus Linear Algebra Discrete Mathematics Probability and Statistics Differential Equations

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Hands-on Practical Exercises Case Studies and Real-World Examples Collaborative Learning

	Continuous Assessment and Feedback

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**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**	2hr	20% (20)	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	Functions: Function Definition, Domain and range of functions, Graphing of function
Week 2	Limits: Definition of limits, Theorems of limits, Type of limits
Week 3	The Definition and Interpretation of the Derivative
Week 4	Properties of Derivative , Some laws of derivatives
Week 5	Derivatives of the six trig functions
Week 6	Exponential Functions, Logarithm Functions
Week 7	Mid-term Exam
Week 8	Inverse Sine, Inverse cosine
Week 9	Inverse tangent, Alternate Notation
Week 10	The six hyperbolic trigonometric functions I
Week 11	The six hyperbolic trigonometric functions II
Week 12	The two forms of the chain rule
Week 13	Using the chain rule
Week 14	first derivative, second derivative, third derivative.
Week 15	the properties of logarithms
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Calculas , Thomas ,1990,5th edition	Yes
Recommended Texts	Howard Anton, Irl Bivens, Stephen Davis, CALCULUS, 10th Edition, John Wiley & Sons, Inc., 2012.	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	***English I***			**Module Delivery**	
Module Type	***S***			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ***Practical** ☐ **Seminar**	
Module Code	***UOA003***				
ECTS Credits	**2**				
SWL (hr/sem)	***50***				
Module Level		UGI	**Semester of Delivery**		one
Administering Department		CSIT	**College**	Type College Code	
Module Leader	Kibrea Abdul-kadhim		**e-mail**	E-mail: kibrea.a.jasimi@uoanbar.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	**Module Leader's Qualification**		Ass.lec.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**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 Objectives أهداف المادة الدراسية	1. Teaching students to enhance their understanding of the English language and connect it to the concepts of computer science, while developing their listening and speaking abilities. 2. Reviewing the student's acquired English language skills and incorporating new vocabulary and skills that benefit the student in their academic studies and in enhancing their linguistic abilities.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Reviewing the fundamental rules of the English language. 2. Developing the student's skills in formal and informal writing in the English language. 3. Adding new vocabulary from the language. 4. Improving reading skills 5. Writing in English formally and informally. 6. Improving speaking skills in the English language. 7. Enhancing English grammar skills.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** **<u>English Language</u>** **Reading Comprehension:** we will explain (Literal comprehension, Inferential comprehension, Critical analysis of texts and Vocabulary development) to improving the student language.[11] **Writing Skills:** we will be showing all types of writing in English language to enhance the student level in writing. There are some methods of writing like (Sentence structure and grammar, Paragraph writing, Essay writing, Creative writing Formal and informal writing styles, Letter and email writing and speaking).[11 hrs] **Listening:** explain all methods of listening such as (Listening comprehension Conversational skills , Pronunciation and intonation, Presentation skills and Group discussions and debates). [11 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم	
Strategies	1. Lectures. 2. Discussions. 3. Solving grammar exercises. 4. Reading and discussion. 5. Writing exercises. 6. Memorizing Technical terms 7. Passage includes technical terms. 8. Homework assignment

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

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Tenses
Week 2	Auxiliary verbs 1
Week 3	Auxiliary verbs-negative form
Week 4	Memorizing Technical expressions
Week 5	Making a question
Week 6	Answering a question
Week 7	1st written exam
Week 8	English Articles
Week 9	Writing a letter or email 1
Week 10	Reading passage
Week 11	2nd written exam
Week 12	Speaking practice 1
Week 13	Speaking practice 2
Week 14	Review 1
Week 15	Review 2

Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	New Headway Plus Intermediate, Liz and John Soars, Oxford University Press, 2006	Yes
Recommended Texts	New Headway Plus Intermediate, Liz and John Soars,) -Oxford University Press, 2006.	Yes
Websites	https://www.merriam-webster.com/ https://dictionary.cambridge.org/	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	***Democracy and Human Rights***			**Module Delivery**	
Module Type	***S***			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	***UOA005***				
ECTS Credits	***2***				
SWL (hr/sem)	***50***				
Module Level		UGI	**Semester of Delivery**		one
Administering Department		CSIT	**College**	Type College Code	
Module Leader	Saad Ibrahim Ahmed Hussein		**e-mail**	Saad.ibrahim@uonbar.edu.iq	
Module Leader's Acad. Title		Asst. Prof.	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**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 Objectives أهداف المادة الدراسية	. أ . تعليم الطلبة على أساسيات حقوق الإنسان وقوانينها . ب. التعرف على الحقوق وأهم الإشكاليات والتحديات التي تواجهها
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- أن يعرف الطالب مفهوم الحقوق وقوانينها وتطبيقاتها . 2- أن يعرف الطالب كيفية المشاركة في نشر الحقوق وتطبيقها بالعمل الواقعي الحقيقي. 3- القدرة على استخدام الحقوق وسيلة من أجل التعايش السلمي بين مكونات المجتمع وجميع المخلوقات . 4- القدرة على مشاركة الآخرين في نشر هذه الحقوق .
Indicative Contents المحتويات الإرشادية	الحقوق لأساسية وغير الأساسية الحقوق المدنية الحقوق السياسية حقوق الانسان والقانون الدولي الانساني

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- المشاركة بالتحضير في قاعة الدرس 2- طريقة الأسئلة والأجوبة في قاعة الدرس 3- الواجبات 4- التقارير

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	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		Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	تعريف الحقوق
Week 2	أنواع حقوق الانسان
Week 3	الحقوق لأساسية وغير الأساسية
Week 4	الحقوق المدنية

Week 5	الحقوق السياسية
Week 6	الحقوق الاقتصادية والاجتماعية والثقافية
Week 7	امتحان
Week 8	الحقوق الفردية والحقوق الجماعية
Week 9	طائفة الحقوق الجديدة
Week 10	حقوق الانسان والقانون الدولي الانساني
Week 11	العلاقة بين حقوق الانسان والقانون الدولي الانساني
Week 12	أوجه الشبه والاختلاف بين حقوق الانسان والقانون الدولي الانساني
Week 13	المراحل التي مرت بها حقوق الانسان
Week 14	الاهتمام الدولي والاقليمي بحقوق الانسان
Week 15	مصادر حقوق الانسان
Week 16	الامتحان النهائي

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts		
Recommended Texts	.	
Websites	**http://ghrorg-learning.blogspot.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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	***Microprocessors***			**Module Delivery**	
Module Type	***C***			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	***CSDC120***				
ECTS Credits	***6***				
SWL (hr/sem)	***150***				
Module Level	UGI		**Semester of Delivery**	2	
Administering Department	CSIT		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**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 Objectives أهداف المادة الدراسية	1. The student will be able to understand and understand the mechanics of their algorithmic data repair problems in terms of their degree of complexity. 2. Trees, how to build them in C++, self-recall, and how to deal with them 3.. that the student be able to understand the working mechanics of algorithms for data structures 4.sorting algorithm
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	This article is based on knowledge Learn to program in C++ in a professional way
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Understand code and algorithms and implement them in different ways and new steps

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem)	**100**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to micro processor
Week 2	Evolution from 8080/8085 to 8086
Week 3	Pipelining, Registers
Week 4	ADD instruction:, mov instruction:
Week 5	INTRODUCTION TO PROGRAM SEGMENTS
Week 6	Data segment,
Week 7	Mid-term Exam

Week 8	Extra segment (ES) , Memory map of the IBM PC, What is a stack
Week 9	A few more words about segments in the 80x86 , Overlapping, Flag register
Week 10	Flag register con., Flag register and ADD instruction Use of the zero flag for looping
Week 11	Use of the zero flag for looping con., 80x86 Addressing Modes A,B,C,D
Week 12	80x86 Addressing Modes E,F,G, Segment overrides
Week 13	CONTROL TRANSFER INSTRUCTIONS, FAR and NEAR
Week 14	Unconditional jumps, statements
Week 15	CALL & Assembly language subroutines
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Eum8086-1
Week 2	Eum8086-2
Week 3	MOV + ADD instruction
Week 4	SUB instruction
Week 5	Push +POP instruction
Week 6	Flag register ,jump
Week 7	Flag register
Week 8	**Arduino uno board**
Week 9	**Arduino** uno PORT

Week 10	**Arduino** C Language & Instruction
Week 11	led Blinking
Week 12	Led Blinking& PUSH button
Week 13	Potentiometer
Week 14	Photo resistor as light sensor

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to 8086 Assembly Language Programming , Joe Carthy, UCD	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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	*Discrete Structures*			**Module Delivery**	
Module Type	***B***			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	*CCIT061*				
ECTS Credits	***6***				
SWL (hr/sem)	***150***				
Module Level		UGI	**Semester of Delivery**		2
Administering Department		CSIT	**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**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 Objectives أهداف المادة الدراسية	1- To Describe the aim of study discrete mathematics 2- To Understand what difference between ordinary math and discrete math. 3- To Understand what the relation between computer science and math 4- To Learn the operation between the difference objects of math. 5- To Apply the relation between this objects
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	. A- Knowledge and Understanding 1. Understand the concept of ordinary and partial 2. Understand the set theory 3. Understand the logic math 4. Understand the relation of two sets 5. Understand the graph theory
Indicative Contents المحتويات الإرشادية	• **Sets and Graphs** Sets and subsets: definitions, examples, Set operations, basic identities, power of a set, Cartesian product of sets, relations on sets, Basic graph terminology. • **Recurrence relations (Difference Equations)** Definition of a recurrence relation (difference equations), Homogeneous and inhomogeneous difference equations, Nonlinear difference equations: $x_{n+1} = g(x_n)$, Fixed points, linearisation, stability of fixed points. Applications: the Newton and Secant Methods to solve non-linear equations $f(x) = 0$, Programming: Short introduction to Matlab, Numerical algorithms for difference equations: Newton′s method, Fibonacci sequences, Recursion.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	. - By solving many exercises - Daily and weekly quizzes. - Guiding the student to some electronic websites.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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

assessment	**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**	2hr	20% (20)	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	Abstract of discrete mathematics
Week 2	Set theory
Week 3	Solve some example
Week 4	Logic
Week 5	Solve some example
Week 6	Functions
Week 7	Mid-term Exam
Week 8	Relation
Week 9	Some examples
Week 10	Graph theory
Week 11	Some example
Week 12	Tree

Week 13	Solve example
Week 14	Solve example
Week 15	Review
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Concrete Mathematics: A Foundation for Computer Science	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
	C – Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	***Programming in C++ II***			**Module Delivery**	
Module Type	***C***			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☒ **Seminar**	
Module Code	***CSDC121***				
ECTS Credits	***8***				
SWL (hr/sem)	***200***				
Module Level	UGI		**Semester of Delivery**	2	
Administering Department	CSIT		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSDC111	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Learn how to use the Advanced Tools helps programmers write fast, portable programs The main principles of programming and the development of programming languages Learn the principles of Structure programming
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon the completion of this module, students will be able to - Define and customize functions - Access and manipulate array elements - Read and write files
Indicative Contents المحتويات الإرشادية	Introductions to C++ Programming; Introductions to functions and modifiers. Also, introduction to arrays of one and two dimensions. Additionally, students will learn about creating and accessing files.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- Daily and weekly quizzes. - Class room activities. - Guiding the student to some websites.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	123	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
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	**200**

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
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	Function
Week 2	Passing Parameters. Passing by Value. Passing by Reference.
Week 3	Pointers
Week 4	Arrays. Array of One Dimension: Declaration of Arrays.
Week 5	Initializing Array Elements
Week 6	Accessing Array Elements

Week 7	Mid-term Exam
Week 8	Read / Write / Process Array Elements.
Week 9	Array of Two Dimension: Declaration of 2D-Arrays
Week 10	Read / Write / Process Array Elements.
Week 11	Member Function of String stdlib Library.
Week 12	Structures.
Week 13	Array of Structures.
Week 14	Files
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Function
Week 2	Passing Parameters. Passing by Value. Passing by Reference.
Week 3	Pointers
Week 4	Arrays. Array of One Dimension: Declaration of Arrays.
Week 5	Initializing Array Elements
Week 6	Accessing Array Elements
Week 7	Array of Two Dimension: Declaration of 2D-Arrays
Week 8	Read / Write / Process Array Elements.
Week 9	Array of Structures.
Week 10	The Files

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Mastering C++, shomme's series	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 Design II***			**Module Delivery**	
Module Type	***C***			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	***CSDC122***				
ECTS Credits	***6***				
SWL (hr/sem)	***150***				
Module Level	UGI		**Semester of Delivery**	2	
Administering Department	CSIT		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSDC112	**Semester**	1
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	- The student should understand encoder , decoder and multiplexers - The student should understand synchronous logic circuit - The student should understand flip-flops and how to use them - The student should understand registers and their types - The student should understand counters and their types - The student should understand ROM and PLA implementation
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- The student should understand encoder, decoder and multiplexers - The student should understand flip-flops and how to use them. - The student should understand registers and their types. - The student should understand counters and their types. - The student should understand ROM and PLA implementation.
Indicative Contents المحتويات الإرشادية	This course covers the logic design advanced concepts. It starts with combinational logic circuit design. From these designs are adder and subtractor. This course also covers the explanation of different circuit such as decoder, encoder and multiplexers. At the end of course, the flip-flop, latches and counter are covered

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- The student should use utilities in the lab to apply scientific experiment - The ability to design a logic circuit.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**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	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Synchronous logic gates
Week 2	Adder and subtractor circuits

Week 3	Comparator circuits
Week 4	Encoders
Week 5	Multiplexers
Week 6	Flip-flops
Week 7	Mid-term Exam
Week 8	SR flip flop and j k flip flop
Week 9	T flip flop and D flip flop
Week 10	Second month exam
Week 11	Registers design
Week 12	Counters design
Week 13	ROM
Week 14	PLA
Week 15	State plan
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Synchronous logic gates
Week 2	Adder and subtractor circuits
Week 3	Comparator circuits
Week 4	Encoders

Week 5	Multiplexers
Week 6	Flip-flops
Week 7	SR flip flop and j k flip flop
Week 8	T flip flop and D flip flop
Week 9	Second month exam
Week 10	Registers design
Week 11	Counters design
Week 12	ROM
Week 13	PLA
Week 14	State plan

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- "Digital Design" 4th Edition by M. Morris Mano and Michael D. Ciletti - Fundamentals of logic design by J. Roth	No
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors

(50 - 100)	**C -** Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**اللغة العربية**			**Module Delivery**	
Module Type	***S***			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	***UOA001***				
ECTS Credits	***2***				
SWL (hr/sem)	***50***				
Module Level	UGI		**Semester of Delivery**	2	
Administering Department	CSIT		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**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 Objectives أهداف المادة الدراسية	- تعليم الطلبة عل أساسيات اللغة العربية وقواعدها - تعليم الطلبة عل كيفية ألاعراب -
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- أن يتعرف الطالب على قواعد اللغة العربية - أن يعرف الطالب كيفية بناء الجمل واستخراجها للعنوان المطلوب - القدرة على استعمال العبارات الصحيحة - القدرة على مشاركة ألآخرين في الحوار الصحيح
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- مشاركة بالتحضير في قاعة الدرس - طريقة ألاسئلة وألاجوبة في قاعة الدرس - ادارة المحاضرة عل نحو تطبيقي مرتبط بواقع الحياة اليومية - تكليف الطالب ببعض ألانشطة والواجبات

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	20% (20)	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	العدد تذكيره وتأنيثه
Week 2	االعدادالمفردةوالمركبة
Week 3	ألفاظ العقود و االعداد (مئة ، ألف ، مليون)
Week 4	تعريف العدد وتنكيره
Week 5	ما يصاغ من العدد على وزن فاعل
Week 6	كتابة الهمزة المتوسطة والمتطرفة
Week 7	امتحان
Week 8	كتابة االلف اللينة
Week 9	كتابة التاء المربوطة والمبسوطة

Week 10	كتابة الضاد والظاء
Week 11	الالمات وأنواعها
Week 12	الهاءات وأنواعها
Week 13	النونات وأنواعها
Week 14	استعمالات (ما ، من) ، والفرق بين (أما ، إما)
Week 15	استعمالات (أن ، إن)
Week 16	الامتحان النهائي

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- قواعدًاللغةًالعربيةً، يوسفً الصيداويً	لا
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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	***Communication skills***			**Module Delivery**	
Module Type	***C***			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	***CSDC123***				
ECTS Credits	***2***				
SWL (hr/sem)	***50***				
Module Level	UGI		**Semester of Delivery**	Two	
Administering Department	CSIT		**College**	Type College Code	
Module Leader	Name		**e-mail**		
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**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 Objectives أهداف المادة الدراسية	- Develop Effective Communication Strategies: Learn how to adapt communication styles for different audiences, situations, and purposes. - Enhance Written Communication: Improve the ability to express thoughts and ideas clearly and concisely in written form, including emails, reports, and other written documents. - Improve Presentation Skills: Learn how to prepare and deliver effective presentations, including structuring content, using visual aids, and engaging an audience.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of the module, students will be able to: - Articulate their thoughts and ideas clearly and concisely, with improved vocabulary and grammar. - Produce well-structured, error-free written documents, such as emails, reports, and other written materials. - Adapt their communication style to suit different audiences, situations, and purposes. - Prepare and deliver engaging and informative presentations, utilizing appropriate structure, visual aids, and audience engagement techniques.
Indicative Contents المحتويات الإرشادية	Introduction to communication skills Study skills Library skills Listening skills Presentation skills

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- The student should use utilities in the lab to apply scientific experiment - The ability to execute the applications software.

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered

Week 1	INTRODUCTION TO COMMUNICATION SKILLS
Week 2	Verbal Communication
Week 3	Communication cycle
Week 4	Study skills
Week 5	Presentation of Work
Week 6	Planning work
Week 7	Mid-term exam
Week 8	Library skills
Week 9	Academic library
Week 10	Research libraries
Week 11	LISTENING SKILLS
Week 12	Why You Need Good Listening Skills
Week 13	Barriers to effective listening
Week 14	READING SKILLS
Week 15	Types and methods of reading

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Communication skills vol.I Wambui et al.	No
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 DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**DataBase**			**Module Delivery**	
Module Type	**C**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	CSDC210				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name:		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**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 Objectives أهداف المادة الدراسية	1. Understand relational data model in terms of data structure, data integrity, and data manipulation. 2. Understand and create conceptual database models utilizing entity-relationship. 3. Design data structures that will limit redundancy and enforce data integrity while conforming to organizational requirements utilizing normalization methodology. 4. Understand the theory behind the relational data model as it applies to interactions with current database management systems. 5. Interpret a given data model to query the database and transform the data into information using SQL (Structured Query Language). 6. Implement a data model in a current RDBMS. 7. Create reports based on transactional data, including elements such as data groupings and summary values.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Apply the basic concepts of Database Systems and Applications. 2. Use the basics of SQL and construct queries using SQL in database creation and interaction. 3. Design a commercial relational database system (Oracle, MySQL) by writing SQL using the system. 4. Analyze and Select storage and recovery techniques of database system.
Indicative Contents المحتويات الإرشادية	• Data definition and data Types • Specifying constraints (primary key, foreign key, referential integrity etc.) • Basic and complex retrieval queries • Aggregate functions • INSERT, DELETE, and UPDATE Statements • Using join and views

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The general teaching pedagogy includes class lectures, group discussions, case studies, guest lectures, research work; project work. assignments (theoretical and practical), and examinations (written and verbal), depending upon the nature of the topics. The teaching faculty will determine the choice of teaching pedagogy as per the need of topics.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Database Concepts
Week 2	Database Environment
Week 3	Relational Model
Week 4	Entity Relationship Model
Week 5	Introduction to SQL
Week 6	Basic SQL Tables
Week 7	Mid term Exam
Week 8	Data Modeling
Week 9	Constraints & Data Manipulation
Week 10	Database Design (Logical and Conceptual)
Week 11	Normalization Database Objects User Creation and Management
Week 12	Managing DB tables-Data Integrity
Week 13	Single and Multiple table queries
Week 14	Advanced Queries, Subqueries & Merge, and Introduction to Regular Expression Functions
Week 15	**Project**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: install and configuration SQL server
Week 2	Lab 2: Design a Database and create required tables. For e.g. Market, College Database
Week 3	Lab 3: Write the queries to implement the joins

Week 4	Lab 4: Converting ER Model to Relational Model using SQL
Week 5	Lab 5: Write the query for implementing the following functions: MAX (), MIN (), AVG (), COUNT ()
Week 6	Lab 6: Write the query to implement the concept of Integrity constrains
Week 7	Lab 7: Write the query to create the views

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Connolly, T. and C. Begg, "Database Systems: A Practical Approach to Design, Implementation, and Management," 6th edition, Pearson, 2014	Yes
Recommended Texts	Database System Concepts 7th edition by Silberschatz et al.	No
Websites	https://www.coursera.org	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Object Oriented Program**	**Module Delivery**
Module Type	**C**	**☒Theory**

Module Code	CSDC211			☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Dhafar Hamed Abd		**e-mail**	Dhafar.hamed@uoanbar.edu.iq	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	CSDC121	**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. Introduce the principles of object-oriented programming in a higher-level programming language in c++. 2. Analyze a problem statement to develop a mental model of objects necessary to create a software architecture 3. Utilize object-oriented programming to frame software architectures, with care towards separation of concerns and abstraction 4. Gain skills in designing, and programming software for reuse of code. 5. Establish development methods in object-oriented programming to qualify students for teaching the language in other settings

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Explain the motivation for and development of object-oriented programming languages. • Produce a set of use cases given a problem statement. • Produce class diagrams, object interaction diagrams and object state transition diagrams for a given problem. • Describe the essential features of an object-oriented programming language. • Produce and/or debug code fragments that illustrate principles of object-oriented software development. • Describe the principles for testing object-oriented software and derive sets of test data given a specification.
Indicative Contents المحتويات الإرشادية	✓ Structured programming ✓ Procedural programming ✓ Abstract data types (ADTs) ✓ Type of variable and range of applicable operations ✓ Use of classes in object-oriented programming ✓ How coupling and cohesion are implemented in OOP ✓ Abstraction and Encapsulation ✓ Data hiding/information hiding ✓ Classes and objects instances

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	There are different teaching and learning activities including lectures and laboratories. The concepts, process, and applications of data science will be discussed in lectures. Students will also learn computer programming knowledge and the skills of manipulating, processing, retrieving, storing, and plotting data. Students will develop small programs and learn different in laboratories.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	123	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem)	77	**Unstructured SWL (h/w)**	5

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Object Oriented Programming using C++
Week 2	Class and object in OOP
Week 3	Class constructor
Week 4	Local variable and class variable
Week 5	Static and none static method.

Week 6	Encapsulation
Week 7	Inheritance (Super class and sub class)
Week 8	Type of inheritance
Week 9	Mid exam
Week 10	Fried function
Week 11	Polymorphism Based on Overloaded Methods
Week 12	Exception Handling
Week 13	Using (try, catch, throw and final) with Exception
Week 14	Interface
Week 15	File
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: develop a program to implement 1 dimension array
Week 2	Lab 2: develop a program to perform matrix operation using multi-dimensions array
Week 3	Lab 3: develop program that implement a class and use it with objects
Week 4	Lab 4: develop program that implement a class and create array of objects
Week 5	Lab 5: write program for single inherence
Week 6	Lab 6: write program for hybrid inherence
Week 7	Lab 7: write code for overload function

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Object-oriented programming with C++ by E.Balagurusamy, 2nd Edition, TMH.	Yes
Recommended Texts	1. Object Oriented Design by Rumbaugh (Pearson publication) 2. Object-oriented programming in Turbo C++ By Robert Lafore, Galgotia Publication.	No
Websites	https://www.coursera.org	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Data Structures**			**Module Delivery**	
Module Type	**C**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	CSDC212				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSDC121	**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- Learning different data structures 2- Understand why this data structure is better than the other one. 3- Learning how to choose the best data structure for your algorithm. 4- learn how to deal with your problem, building its algorithm and fitting the best data structures to it.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Explain and utilize linked lists, stacks, queues and trees. • Apply design guidelines to evaluate alternative software designs. • Basic ability to analyze algorithms and to determine algorithm correctness and time efficiency class. • Master a variety of advanced abstract data type (ADT) and data structures and their implementations. • Ability to apply and implement learned algorithm design techniques and data structures to solve problems.
Indicative Contents المحتويات الإرشادية	• Analysis in Algorithms: Basic concepts of complexity measures Recursion • Basic Data Structures: Vector, linked list, stack, queue, dequeue, tree, trie, set, and hashing • Search Algorithms: Linear search for unordered/ordered lists, binary search, and interpolation search • Sorting Algorithms: Insertion sorts, exchange sort, selection sort, merge sort, quicksort, bucket sort, radix sort, and topological sort • Object-oriented Programming: Abstract classes and abstract methods, encapsulation, superclass and subclass, inheritance, and polymorphism

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	There are a number of teaching and learning activities including lectures, laboratories and group projects. The concepts and principles of complexity analysis in algorithms, data structures, search algorithms, sort algorithms, and object-oriented programming will be covered in lectures. The implantations of data structures and algorithms in an object-oriented language will be taught during the laboratories. Students are required to perform a group project to apply the concepts and principles covered in this course to critically analyses the given problem(s) and creatively formulate the solution(s). Students implement the solution(s) in an object-oriented language.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered

Week 1	Introduction to Data Structures
Week 2	Algorithms and Complexity
Week 3	Arrays and Pointers
Week 4	Linked List 1
Week 5	Linked List 2
Week 6	First exam
Week 7	Stack
Week 8	Queue
Week 9	Tree 1
Week 10	Tree 2
Week 11	Graph 1
Week 12	Graph 2
Week 13	Hashing 1
Week 14	Hashing 2
Week 15	Second try exam
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Accountant application using arrays
Week 2	Lab 2: Student information system using linked list
Week 3	Lab 3: Color cubes games using Stack
Week 4	Lab 4: A snake game using queu
Week 5	Lab 5: Social Media connections using Graph data structure

Week 6	Lab 6: Simple search engine application using hash table data structure

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to Algorithm, third Edition, Thomas H. Cormen Algorithms, fourth edition, Robert Sedgewick and Kevin Wayne	Yes
Recommended Texts	Introduction to Algorithm, third Edition, Thomas H. Cormen Algorithms, fourth edition, Robert Sedgewick and Kevin Wayne	Yes
Websites	https://www.coursera.org/learn/data-structures	

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	Advance Mathematics			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** **Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	CSDC213				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	Mak_alturky@uoanbar.edu.iq	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CCIT060	**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 describe the aim of study advance mathematics. 2. To understand what difference between ordinary equation and differential equation. 3. To understand the difference between the type of differential equation. 4. To learn the type of method to solve the differential equation. 5. To apply the application of differential equation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the concept of ordinary and partial. 2. Understand the method of solving the first order differential equation. 3. Understand the method of solving second order differential equation. 4. Understand the Laplace transform. 5. Understand the Fourier series. 6. Subject-specific skills: 7. Explain what mean of ordinary and partial. 8. Classify the method of solving. 9. Classify the differential equation. 10. Teaching and Learning Methods. 11. By solving many exercises.
Indicative Contents المحتويات الإرشادية	1. Direct methods for solving linear system of equation. 2. Simple Gaussian elimination method, gauss elimination method with partial pivoting, 3. Determinant evaluation, gauss Jordan method, 4. L U decompositions Doolittle's LU decomposition, Doolittle's method with row interchange. 5. Finding Matrix Inverse. 6. Iterative methods for solving linear systems of equations. 7. Jacobin iteration, gauss – seidel method, Successive over relaxation method (sort method). 8. Newton-Raphson Method, Runge-kutta Method. 9. Interpolation and the Lagrange Polynomial, Data Approximation and Neville's Method, Numerical Analysis Methods for Differential Equation. 10. Numerical Analysis Methods for Integral Equation.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	A- Knowledge and Understanding A1. Understand the concept of ordinary and partial

	A2. Understand the method of solving the first order differential equation A3. Understand the method of solving second order differential equation A4. Understand the Laplace transform A5. Understand the Fourier series.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Abstract of differential equation
Week 2	Separable equation
Week 3	Solve some example
Week 4	Homogenous equation
Week 5	Exact equation
Week 6	Linear equation
Week 7	Some example
Week 8	Bernoulli equation
Week 9	Second order differential equation
Week 10	Some example
Week 11	Laplace transform
Week 12	Power series , Fourier series
Week 13	Mid exam
Week 14	Review
Week 15	Final exam
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	

Week 2
Week 3
Week 4
Week 5
Week 6
Week 7

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		
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	**Computation Theory**			**Module Delivery**	
Module Type	**C**			☒**Theory** ☒**Lecture** ☐ **Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	CSDC220				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**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 Objectives أهداف المادة الدراسية	This course covers the Theory of computation. Computation models: automata and formal languages. Practical consequences. Finite automata are useful models for many important kinds of hardware and software. Here are the most important kinds: Software for designing and checking the behavior of digital circuits; The "lexical analyzer" of a typical complier, that is, the compiler component that breaks the input text into logical units, such as identifiers, keywords, and punctuation; Software for scanning large bodies of text, such as collections of Web pages, to find occurrences of words, phrases, or other patterns; Software for verifying systems of all types that have a finite number of distinct states, such as communication protocols or protocols for secure exchange of information.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Knowledge and understanding - Acquire a full understanding and mentality of Automata Theory as the basis of all computer science languages design - Have a clear understanding of the Automata theory concepts such as RE's, DFA's, NFA's, Stack's, Turing machines, and Grammars • Cognitive skills (thinking and analysis). - Be able to design FAs, NFAs, Grammars, languages modelling, small compilers basics - Be able to design sample automata • Communication skills (personal and academic).

	- Be able to minimize FA's and Grammars of Context Free Languages • Practical and subject specific skills (Transferable Skills).
Indicative Contents المحتويات الإرشادية	• Training in the applied use of key coding languages for creative computing • Training in key frameworks for creative computing • Introduction to online collaboration for creative computing

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Class discussions with examples.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**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)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Central concepts of Automata Theory.
Week 2	Regular Expressions; Operations on Regular expressions
Week 3	Finite Automata and Regular Expressions.
Week 4	Kleen's Theorem.
Week 5	Transition Graph.
Week 6	Deterministic Finite Automata (DFA) and Non-Deterministic Finite Automata(NDFA)
Week 7	Deterministic Finite Automata (DFA); Minimization of DFA.
Week 8	Conversion from FA and regular expressions.
Week 9	Mealy and Moore Machines.
Week 10	Converting from (Moore Machine) to (Mealy Machine) and vice versa.
Week 11	Context-Free Grammars
Week 12	Parse Trees; Ambiguity in Grammars and Languages
Week 13	Chomsky Normal Form(CNF)
Week 14	Pushdown Automata (PDA)
Week 15	The Turing Machine (TM).

Week 16	**Preparatory week before the final Exam.**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Introduction to Computer Theory, Daniel I. A. Cohen, Prentice-Hall, Second Edition, 1997.	Yes
Recommended Texts	JohnE.Hopcroft, RajeevMotwani, JeffreyD.Ullman: Introduc-tiontoAutomataTheory,Languages, and Computation; Addison Wesley,2000.	No
Websites	https://www.coursera.org/courses?query=theory%20of%20computation	

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	**Python Programming Language**	**Module Delivery**
Module Type	**C**	☒**Theory** ☐**Lecture** ☒**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**
Module Code	CSDC221	
ECTS Credits	**7**	
SWL (hr/sem)	**175**	

Module Level		2	**Semester of Delivery**		3
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Hussam Jasim Mohammed		**e-mail**	hussamjasim@uoanbar.edu.iq	
Module Leader's Acad. Title		Asst. Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSDC211	**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. Introduce the principles of a higher-level programming language in python. 2. Analyze a problem statement to develop a mental model of objects necessary to create a software architecture 3. Utilize object-oriented programming to frame software architectures, with care towards separation of concerns and abstraction 4. Gain skills in designing, and programming software for reuse of code.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Explain the motivation for and development of python programming language. • Produce a set of use cases given a problem statement. • Produce class diagrams, object interaction diagrams and object state transition diagrams for a given problem. • Describe the essential features of an object-oriented programming language. • Produce and/or debug code fragments that illustrate principles of object-oriented software development.

	• Describe the principles for testing object-oriented software and derive sets of test data given a specification.
Indicative Contents المحتويات الإرشادية	✔ Structured programming ✔ Procedural programming ✔ Abstract data types (ADTs) ✔ Type of variable and range of applicable operations ✔ Use of classes in object-oriented programming

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	There are different teaching and learning activities including lectures and laboratories. The concepts, process, and applications of data science will be discussed in lectures. Students will also learn computer programming knowledge and the skills of manipulating, processing, retrieving, storing, and plotting data. Students will develop small programs and learn different in laboratories.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Installation of Python and an Integrated Development Environment (IDE)
Week 2	Python Fundamental: Introduction, Variables, Comments, Python Data Types
Week 3	Python Fundamental: Operators, Python Conditions and If statements, Python Loops,
Week 4	Python Fundamental: Functions: defining functions, parameters, and return values
Week 5	Lists, tuples, sets, and dictionaries
Week 6	Introduction to Class Fundamentals
Week 7	Python - Object Oriented Programming (objects, inheritance, polymorphism)
Week 8	Mid-term Exam
Week 9	Reading and writing files in Python
Week 10	Exception handling and error management
Week 11	Introduction to standard input/output and libraries

Week 12	Exploring key Python libraries (e.g., NumPy, pandas, matplotlib)
Week 13	Installing and using external libraries
Week 14	Introduction to databases (SQLite, MySQL, or PostgreSQL) Connecting Python to databases
Week 15	python Project

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Installation of Python and an Integrated Development Environment (IDE)
Week 2	Python Fundamental: Introduction, Variables, Comments, Python Data Types
Week 3	Python Fundamental: Operators, Python Conditions and If statements, Python Loops,
Week 4	Python Fundamental: Functions: defining functions, parameters, and return values
Week 5	Lists, tuples, sets, and dictionaries
Week 6	Reading and writing files in Python
Week 7	Exception handling and error management

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	"Python Cookbook" by David Beazley and Brian K. Jones:	No
Recommended Texts		No
Websites	https://www.coursera.org	

Grading Scheme

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Algorithms**	**Module Delivery**
Module Type	**C**	☒**Theory** ☒**Lecture** ☒**Lab**
Module Code	CSDC222	

ECTS Credits	**6**			☐**Tutorial** ☐**Practical** ☐**Seminar**	
SWL (hr/sem)	**150**				
Module Level		1	**Semester of Delivery**		1
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**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 Objectives أهداف المادة الدراسية	1. To demonstrate performance of algorithms with respect to time and space complexity. 2. To explain graph and tree traversals. 3. To explain the concepts greedy method and dynamic programming. Applying for several applications like knapsack problem, job sequencing with deadlines, and optimal binary search tree, TSP and so on respectively. 4. To Illustrate the methods of backtracking and branch bound techniques to solve the problems like n-queens problem, graph coloring and TSP respectively.

	5. To familiarize the concepts of deterministic and non-deterministic algorithms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Determine the characteristics of complexity classes and evaluate algorithms in terms of time and space complexity. 2. Choose among the major algorithmic techniques the most appropriate to solve a given problem including discussion of space and time trade-offs. 3. Develop the appropriate algorithms and relevant data structures for graph processing.
Indicative Contents المحتويات الإرشادية	1. The role of algorithms in computing 2. Growth of functions & Asymptotic notations 2.1 Analysis of non-recursive and 2.2 Analysis of recursive algorithms 3. NP-completeness 3. Brute Force 3. Divide and Conquer 5. Hash Tables 6. Space and Time trade-offs 6. Graph Algorithms 7. Dynamic Programming 8. Greedy Algorithms 9. Linear Programming

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Lectures, class discussions, laboratory practical sessions and problem solving. • Office hours: Students are encouraged to make full use of the office hours of their instructor, where they can ask questions and go over lecture material. • Use of the Blackboard Learning platform, where instructors post lecture notes, assignment instructions, timely announcements, as well as additional resources.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Program cost and asymptotic analysis
Week 2	Sorting and searching
Week 3	Graph traversal (DFS, BFS) and applications
Week 4	Shortest path
Week 5	Hard problems
Week 6	Dynamic Programming
Week 7	Algorithm correctness
Week 8	Time and space complexity
Week 9	Asymptotic analysis: Big Oh, Little oh, Theta
Week 10	Mid exam
Week 11	NP-algorithms
Week 12	Greedy algorithms
Week 13	Limitations of Algorithmic Power
Week 14	Heuristic and Approximate Algorithms
Week 15	B-tree
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	

Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Levitin, A. (2012). Introduction to the design & analysis of algorithms. Boston: Pearson.	Yes
Recommended Texts	Edmonds, J. (2008). How to think about algorithms. Cambridge: Cambridge University Press.	No
Websites	https://www.coursera.org/course/algs4partI	

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	Numerical Analysis			**Module Delivery**	
Module Type	**B**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	CCIT062				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSDC213	**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	6. Appreciate the value of mathematical reasoning and analysis in applications 7. Realize the importance of mathematical principles and skills in solving some types of problems 8. Develop critical and analytical thinking, accuracy, neatness when using mathematics 9. Realize that a large number of problems cannot be solved by prepared "theoretical" formulas; instead, the solution is arrived at by a succession of approximations until the desired accuracy is obtained 10. Appreciate the usefulness of the computer and see how its use removed the drudgery involved in computations and how by use of programming techniques sequential processes are placed in the correct order 11. Exhibit values like: o cooperation through group study; o honesty by claiming credit only for the work he has done; o zeal and seriousness of intent to learn by participating actively in class discussion, doing his homework regularly and consulting his mentor; o patience, perseverance and diligence by solving assigned exercises completely including the difficult ones; o faith by doing what is right and giving his best in performing any assigned task; o show concern for the community through sharing of know-how and resources during group discussion; o self-reliance by being able to solve problems independently.
Module Learning Outcomes	12. Knowledge and Understanding: During the lecture the student understands the nature and operations of Numerical Analysis, demonstrates familiarity with theories and concepts used in Numerical Analysis, and identifies the steps required to carry out a piece of research on a topic in Numerical Analysis.

مخرجات التعلم للمادة الدراسية	13. Intellectual Skills: By the end of the course the student is expected to recognize and apply appropriate theories, principles and concepts relevant to Numerical Analysis, critically assess and evaluate the literature within the field of Numerical Analysis, analyze and interpret information from a variety of sources relevant to Numerical Analysis. 14. Practical Skills: By the end of the course student will have the ability to compare the computational methods for advantages and drawbacks, choose the suitable computational method among several existing methods, implement the computational methods using any of existing programming languages, testing such methods and compare between them, identify the suitable computational technique for a specific type of problems, and develop the computational method that is suitable for the underlying problem. 15. Transferable Skills: Within the lectures the student is able to transfer ideas and experience, work effectively as a part of a group and independently.
Indicative Contents المحتويات الإرشادية	**Introduction to Mathematical Modelling and Computational Methods –** Importance of computational modelling in engineering. Data representation and errors. Applications of commercial software packages such as MATLAB. Functions and plotting using MATLAB. **Computer Solution of Non-linear Equations -** Bracketing Methods. Bisection Method. Open Methods. Newton-Raphson Method. Secant Method. Convergence of methods. Determination of multiple roots. Engineering applications. Simultaneous Linear Equations - Solving simultaneous linear equations by Matrix Inversion. Cramer's Rule. Gauss Elimination. Gauss-Jordan Elimination. LU decomposition method. Engineering applications and choice of methods. Eigenvalues Problems. **Optimization -** Unconstrained optimization. Multi-dimensional optimization. Unconstrained optimization. Curve Fitting and Data Analysis - Interpolation using splines. Linear Least-Squares Regression. Nonlinear Regression. Introduction to Machine Learning Algorithms. **Numerical Differentiation and Integration -** Taylor's series expansion. Finite differences for the first derivative and the second derivative. High-accuracy differentiation formulas. Trapezoidal rule. Simpson's rule. High-order Newton-Cotes formulas. Applications of numerical differentiation and integration in heat transfer, solid mechanics and fluid flow problems.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Numerical analysis is the story of how functions, derivatives, integrals, and differential equations are handled as strings of numbers in the computer. At the heart of numerical analysis is an understanding of the speed of convergence of Taylor, Fourier, and other series expansions. Most scientists and engineers are sooner or later faced with computing tasks that require some knowledge of numerical analysis.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Direct methods for solving linear system of equation
Week 2	Simple Gaussian elimination method, gauss elimination method with partial pivoting,
Week 3	determinant evaluation, gauss Jordan method,
Week 4	L U decompositions Doolittle's LU decomposition, Doolittle's method with row interchange
Week 5	Finding Matrix Inverse
Week 6	Iterative methods for solving linear systems of equations
Week 7	Jacobin iteration, gauss – seidel method,
Week 8	Successive over relaxation method (sort method)
Week 9	Mid-term Exam
Week 10	Newton-Raphson Method
Week 11	Runge-kutta Method
Week 12	Interpolation and the Lagrange Polynomial, Data Approximation and Neville's Method
Week 13	Numerical Analysis Methods for Differential Equation
Week 14	Numerical Analysis Methods for Integral Equation
Week 15	Final Exam
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Agilent VEE and PSPICE
Week 2	Lab 2: Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 3	Lab 3: First-Order Transient Responses
Week 4	Lab 4: Second-Order Transient Responses
Week 5	Lab 5: Frequency Response of RC Circuits
Week 6	Lab 6: Frequency Response of RLC Circuits
Week 7	Lab 7: Filters

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Richard L. Burden and etc." Numerical Analysis ", 9th edition, 2014	Yes
Recommended Texts	Richard L. Burden and etc." Numerical Analysis ", 9th edition, 2014	Yes
Websites	https://www.coursera.org/courses?query=numerical%20analysis	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings

	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Networks**			**Module Delivery**	
Module Type	**S**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**CCIT063**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGII	**Semester of Delivery**		4
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Name: Foud Saleem Mubarak		**e-mail**	E-mail:	
Module Leader's Acad. Title		Asst. Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval		06/06/2023	**Version Number**		1.0

Date			

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1.Understanding Network Fundamentals: Introduce students to the basic concepts and components of computer networks, including network architectures, protocols, and network layers. 2.Exploring Network Protocols: Familiarize students with various network protocols, such as TCP/IP, UDP, HTTP, FTP, DNS, and their roles in facilitating communication and data transfer in computer networks. 3.Studying Network Topologies and Technologies: Explore different network topologies, such as bus, star, ring, mesh, and hybrid, and technologies such as Ethernet, Wi-Fi, and cellular networks. 4.Learning Network Design and Implementation: Develop skills in designing and implementing computer networks, including network planning.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1.Understand the fundamental concepts and principles of computer networks, including network architectures, protocols, layers, and networking technologies. 2.Explain the functions and interactions of various network layers, including the physical layer, data link layer, network layer, transport layer, and application layer. 3.Demonstrate knowledge of network addressing and routing, including IP addressing, subnetting, and routing algorithms. 4.Configure and troubleshoot network devices, such as routers, switches, and firewalls.

	5.Analyze and evaluate network performance and identify and resolve network-related issues and bottlenecks. 6.Design and implement a local area network (LAN) or a wide area network (WAN), considering factors such as network topology, security, and scalability. 7.Understand the principles and protocols of wireless networking, including Wi-Fi and cellular networks. 8.Evaluate network security risks and implement appropriate security measures, including authentication, encryption, and intrusion detection systems. 9.Demonstrate knowledge of network management and monitoring techniques, including network monitoring tools and protocols.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Introduction to Computer Networks:** • Basic concepts of computer networks • Network architecture and protocols • Networking standards and organizations **Network Models and Protocols:** • OSI model and TCP/IP protocol suite • Data encapsulation and protocol stacks • Network addressing and subnetting **Physical Layer and Data Link Layer:** • Transmission media and signaling techniques • Ethernet LANs and switching • MAC addressing and error detection and correction **Network Layer:** • IP addressing and subnetting • Routing algorithms and protocols (e.g., RIP, OSPF) • IPv6 and transition mechanisms **Transport Layer:** • Transport protocols (e.g., TCP, UDP) • Connection-oriented and connectionless communication • Flow control and congestion control **Application Layer:** • Application layer protocols (e.g., HTTP, FTP, DNS) • Client-server model and peer-to-peer applications • Web services and APIs **Network Security:** • Threats and vulnerabilities in computer networks • Cryptography and encryption techniques

	• Network security protocols (e.g., SSL/TLS, IPSec) **Wireless and Mobile Networks:** • Wireless LANs and cellular networks • Mobile IP and mobile network protocols • Wireless security and mobile application development **Network Management and Performance:** • Network monitoring and troubleshooting • Quality of Service (QoS) and traffic management • Network management protocols (e.g., SNMP) **Network Design and Planning:** • LAN and WAN design considerations • Network scalability and redundancy • Network documentation and project management **Case Studies and Practical Applications:** • Real-world network deployment and configurations • Analysis of network performance and optimization • Hands-on exercises and network simulations

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures**: Instructors deliver lectures to introduce and explain the fundamental concepts, principles, and protocols of computer networks. Lectures may include visual aids, diagrams, and examples to enhance understanding. **Case Studies and Real-world Examples**: Presenting case studies and real-world examples helps students understand how computer networks are utilized in various industries and scenarios. It demonstrates the practical applications of network technologies and protocols. **Group Projects:** Assigning group projects allows students to collaborate, apply their knowledge, and develop problem-solving skills. Projects may involve designing and implementing network solutions, analyzing network performance, or securing a network infrastructure. **Interactive Discussions:** Engaging students in discussions encourages active participation and deeper understanding. It provides opportunities to clarify doubts, analyze scenarios, and discuss network design considerations or security issues. **Networking Simulations:** Utilizing network simulation software allows students to experiment with network configurations, simulate network behavior, and observe the impact of various parameters. This helps reinforce theoretical concepts and gain

	practical experience. **Online Resources and Tutorials**: Recommending online resources, tutorials, and documentation helps students supplement their learning. These resources may include websites, forums, online courses, or educational videos that provide additional explanations, demonstrations, and practice exercises. **Networking Events and Workshops:** Encouraging students to attend networking events, workshops, or conferences helps them stay updated with the latest trends, technologies, and research in the field. It fosters networking and provides exposure to industry professionals. **Ethical and Professional Considerations**: Emphasizing ethical and professional conduct in networking, including discussions on privacy, security, and legal implications, helps students develop a sense of responsibility and ethical decision-making skills.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Introduction to Computer Networks:** • Basic concepts of computer networks • Network architecture and protocols • Networking standards and organizations
Week 2	**Network Models and Protocols:** • OSI model and TCP/IP protocol suite • Data encapsulation and protocol stacks • Network addressing and subnetting
Week 3	**Physical Layer and Data Link Layer:** • Transmission media and signaling techniques • Ethernet LANs and switching • MAC addressing and error detection and correction
Week 4	**Network Layer** • IP addressing and subnetting • Routing algorithms and protocols (e.g., RIP, OSPF) • Introduction to IPv6
Week 5	**Transport Layer** • Transport protocols (e.g., TCP, UDP) • Connection-oriented and connectionless communication • Flow control and congestion control
Week 6	**Application Layer** • Application layer protocols (e.g., HTTP, FTP, DNS) • Client-server model and peer-to-peer applications • Web services and APIs
Week 7	**Mid-term Exam**

Week 8	**Network Management and Performance** • Network monitoring and troubleshooting
Week 9	• Quality of Service (QoS) and traffic management
Week 10	• Network management protocols (e.g., SNMP)
Week 11	**Virtual Private Networks (VPNs) and Remote Access** • VPN concepts and protocols
Week 12	• VPN deployment and configuration
Week 13	Network Design and Planning • LAN and WAN design considerations
Week 14	• Network scalability and redundancy • Network documentation and project management
Week 15	**Project**
Week 16	**final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction and Network Basics • Introduction to lab equipment and software tools • Familiarization with network simulation software (e.g., Cisco Packet Tracer, GNS3) • Configuring and testing basic network connectivity
Week 2	Lab 2: Ethernet LANs and Switching • Configuring and testing Ethernet LANs using switches • Configuring VLANs and inter-VLAN routing • Implementing and troubleshooting Spanning Tree Protocol (STP)
Week 3	Lab 3: IP Addressing and Subnetting • Practicing IP addressing and subnetting calculations • Configuring IP addressing on network devices • Testing IP connectivity between devices within subnets
Week 4	Lab 4: Routing and Dynamic Routing Protocols • Configuring static routes and dynamic routing protocols (e.g., RIP, OSPF) • Testing routing functionality and verifying route tables • Troubleshooting routing issues

Week 5	Lab 5: Transport Layer Protocols • Configuring and testing TCP and UDP services • Analyzing packet captures to understand transport layer behavior • Implementing and troubleshooting port forwarding and NAT
Week 6	Lab 6: Application Layer Protocols • Configuring and testing common application layer protocols (e.g., HTTP, FTP, DNS) • Setting up web servers and clients • Analyzing application layer traffic using packet captures
Week 7	Lab 7: Network Security • Configuring and testing basic network security measures (e.g., access control lists, firewall rules)

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Distributed Systems And TCP/IP Programming In .NET 4.0,	Yes
Recommended Texts	Distributed Systems And TCP/IP Programming In .NET 4.0,	No
Websites	https://www.coursera.org/ComputerNetworks	

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	**Visual Programming in C#**			**Module Delivery**	
Module Type	**C**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**CSDC310**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGIII	**Semester of Delivery**		5
Administering Department		Computer Science	**College**	College of Computer Science and Information Technology	
Module Leader	Waleed Kareem Awad		**e-mail**	waleed.kareem@uoanbar.edu.iq	
Module Leader's Acad. Title		Techer	**Module Leader's Qualification**		Master
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		06/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSDC221	**Semester**	4
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. The course aims to introduce students to the fundamental concepts of C# programming language, including syntax, data types, variables, control structures (loops, conditional statements), and functions. 2. The course focus on teaching students how to use C# to develop practical software applications. This includes topics such as input/output operations, file handling, exception handling, and basic user interface development. 3. The course also focus on teaching students Working with data such as arrays, collections, and databases. 4. Understanding how to debug and troubleshoot code is an important skill for any programmer. The course may include techniques for finding and fixing errors in C# programs, as well as strategies for writing clean and maintainable code.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrate a solid understanding of the basic concepts of C# programming language, including syntax, data types, variables, control structures, and functions. 2. Apply object-oriented programming principles in C# to design and implement software solutions, including the use of classes, objects, inheritance, encapsulation, and polymorphism. 3. Develop and debug C# programs using appropriate programming techniques and tools, effectively identifying and fixing errors in code. 4. Utilize C# language features and libraries to perform input/output operations, handle exceptions, and manage files and data. 5. Create graphical user interfaces (GUIs) using C# and relevant frameworks, implementing event handling, user input validation, and visual design principles. 6. Employ C# programming techniques to interact with databases, including data retrieval, manipulation, and storage using ADO.NET or other relevant technologies. 7. Develop web applications using C# and frameworks such as ASP.NET, understanding concepts like HTTP requests and responses, session management, and database integration. 8. Apply best practices in coding style, documentation, and software development methodologies to write clean, efficient, and maintainable C# code. 9. Demonstrate an understanding of advanced topics in C# programming, such as multithreading, asynchronous programming, LINQ, and other advanced language features. 10. Analyze and solve programming problems using critical thinking and problem-solving skills, translating requirements into effective C# code solutions. 11. Collaborate effectively in a team environment, demonstrating the ability to communicate and work with others on C# programming projects.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1.Introduction to C#: • Overview of C# programming language • Setting up the development environment • Basic syntax and structure of a C# program • Data types, variables, and operators in C# • Control structures (loops, conditional statements) • Object-Oriented Programming in C#: 2. Classes and objects • Encapsulation, inheritance, and polymorphism • Constructors and destructors • Access modifiers and properties • Method overloading and overriding • Working with Data: 3. Arrays and collections • File handling and I/O operations • Exception handling • Introduction to databases and SQL • Connecting and interacting with databases • Graphical User Interface (GUI) Development. 4.Introduction to Windows Forms or WPF (Windows Presentation Foundation) • Event-driven programming • Creating and designing GUI elements (buttons, labels, textboxes, etc.) • Handling user input and validation • Implementing menus, dialog boxes, and other GUI components 5.Project Work and Case Studies: • Hands-on coding exercises and projects • Implementing real-world scenarios using C# • Analyzing and solving programming problems • Collaborating in team-based projects

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures**: Instructors can deliver lectures to introduce and explain the fundamental concepts of C# programming. Lectures can cover topics such as syntax, data types, control structures, object-oriented programming (OOP), and advanced C# features.

	Hands-on Programming: Students should have ample opportunities to practice their programming skills through hands-on coding exercises. Assignments and projects that involve implementing algorithms, solving programming problems, and building applications in C# can help students apply their knowledge and reinforce their understanding of the language. **Code Examples and Demonstrations**: Instructors can provide code examples and demonstrations to illustrate the usage of C# constructs, libraries, and frameworks. This can include step-by-step walkthroughs of code snippets, showing the execution flow, and explaining best practices. **Interactive Discussions**: Engage students in interactive discussions to encourage their participation and critical thinking. This can involve asking questions, discussing coding scenarios, sharing code reviews, and exploring different approaches to solving programming challenges. **Practical Examples and Real-world Applications**: Connect the theoretical concepts of C# to real-world applications. Showcase examples of how C# is used in various domains such as web development, desktop applications, game development, or mobile app development. This can help students understand the practical relevance of C# and inspire them to explore different career paths. **Online Resources and Tutorials:** Utilize online resources, tutorials, and documentation to supplement the learning experience. This can include recommended websites, forums, video tutorials, and interactive coding platforms that provide additional practice exercises and guidance. **Assessments and Projects**: Provide regular assessments such as quizzes, tests, coding assignments, and projects to gauge students' understanding and progress. Projects can be particularly effective in allowing students to apply their knowledge in real-world scenarios and showcase their programming skills. **Code Documentation and Debugging**: Emphasize the importance of code documentation and debugging techniques. Teach students how to write clean and readable code, document their code effectively, and use debugging tools and techniques to identify and fix programming errors. **Online Coding Challenges and Hackathons**: Encourage students to participate in online coding challenges and hackathons that focus on C# programming. This can help them improve their problem-solving skills, learn new techniques, and engage in friendly competition with their peers.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to C#: • Overview of C# programming language • Setting up the development environment • Basic syntax and structure of a C# program
Week 2	• Data types, variables, and operators in C#

Week 3	• Control structures (loops, conditional statements)
Week 4	Classes and objects • Object-Oriented Programming in C#
Week 5	Classes and objects • Constructors and destructors • Access modifiers and properties
Week 6	Arrays and collections, Classes and objects, Method overloading and overriding
Week 7	Mid-term Exam
Week 8	File handling and I/O operations Exception handling
Week 9	Introduction to Windows Forms or WPF (Windows Presentation Foundation)
Week 10	Event-driven programming Creating and designing GUI elements (buttons, labels, textboxes, etc.)
Week 11	Handling user input and validation
Week 12	Implementing menus, dialog boxes, and other GUI components
Week 13	Introduction to databases and SQL
Week 14	Connecting and interacting with databases
Week 15	Project Work and Case Studies: • Hands-on coding exercises and projects • Implementing real-world scenarios using C#
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to C# and Visual Studio • Setting up the development environment (Visual Studio) • Writing and running a basic C# program • Familiarization with the C# syntax and basic data types
Week 2	Lab 2: Control Flow and Decision Making

	• Implementing conditional statements (if, switch) • Working with loops (for, while, do-while) • Writing programs with decision-making logic
Week 3	Lab 3: Arrays and Collections • Creating and manipulating arrays • Exploring collection classes (List, Dictionary, etc.) • Implementing algorithms using arrays and collections
Week 4	Lab 4: Object-Oriented Programming Basics • Understanding classes and objects • Defining properties, methods, and constructors • Implementing basic inheritance and polymorphism
Week 5	Lab 5: Exception Handling • Handling runtime errors using try-catch blocks • Throwing and catching exceptions • Writing robust code with proper error handling techniques
Week 6	Lab 6: Working with Databases • Connecting to databases using ADO.NET • Executing SQL queries and retrieving data • Implementing CRUD operations (Create, Read, Update, Delete)
Week 7	Lab 7: Graphical User Interfaces (GUI) Development • Introduction to Windows Forms or WPF (Windows Presentation Foundation) • Designing and creating interactive user interfaces • Handling user events and input validation

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Agile Principles, Patterns, and Practices in C#,** W3Schools Online Web Tutorials	Yes
Recommended Texts	**Agile Principles, Patterns, and Practices in C#**	No
Websites	W3Schools Online Web Tutorials	

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 2D**	**Module Delivery**	
Module Type	**C**	☒**Theory** ☒**Lecture** ☒**Lab** ☒**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**CSDC311**		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		
Module Level	UGIII	**Semester of Delivery**	5

Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Ismail Taha Ahmad		**e-mail**	ismail.taha@uoanbar.edu.iq	
Module Leader's Acad. Title		Asst. Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		06/06/2023	**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 Objectives أهداف المادة الدراسية	1.The course aims to introduce students to the fundamental concepts of computer graphics, including the principles of digital image representation, rasterization, and vector graphics. 2. The main objective of this module is to introduce to the students the concepts of computer graphics. 3. It starts with an overview of interactive computer graphics, two dimensional system and mapping, then it presents the most important drawing algorithm, two-dimensional transformation. 4. Students will learn about the stages of the graphics pipeline, which involves transforming 3D models into 2D images. This includes understanding concepts such as modeling, transformation, projection, rasterization, and rendering.
Module Learning	1. Understanding of fundamental concepts: Demonstrate a solid understanding of the fundamental concepts and principles of computer graphics, including digital image

Outcomes مخرجات التعلم للمادة الدراسية	representation, rasterization, vector graphics, and the graphics pipeline. 2. Graphics programming skills: Develop practical programming skills in implementing computer graphics algorithms and rendering techniques using appropriate programming languages or graphics APIs. 3. 2D and 3D transformations: Apply various 2D and 3D transformations to manipulate and animate objects in a virtual scene, including translation, rotation, scaling, and shearing. 4. Rendering techniques: Apply different rendering techniques, such as flat shading, Gouraud shading, and Phong shading, to simulate the behavior of light and achieve realistic rendering of 3D objects. 5. Graphics algorithms: Implement and apply graphics algorithms, such as line-drawing algorithms, polygon filling algorithms, and hidden surface removal techniques, to generate and render computer-generated images efficiently.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1.Introduction to 2D Computer Graphics: • Overview of 2D computer graphics and its applications • Basic concepts of pixels, coordinates, and color representation • Graphics programming environment setup 2. 2D Drawing Algorithms: • Line drawing algorithms (e.g., DDA algorithm, Bresenham's line algorithm) • Circle drawing algorithms (e.g., midpoint circle algorithm) • Ellipse drawing algorithms (e.g., midpoint ellipse algorithm) 3. Geometric Transformations: • 2D translation, rotation, scaling, and shearing transformations • Matrix representation of transformations • Composite transformations and hierarchical transformations 4. Clipping and Windowing: • Line clipping algorithms (e.g., Cohen-Sutherland, Liang-Barsky) • Polygon clipping algorithms (e.g., Sutherland-Hodgman) • Windowing and viewport transformations 5. Color and Shading: • Color models and color spaces • Color interpolation and shading techniques (e.g., flat shading, Gouraud shading) • Anti-aliasing techniques for smoother edges 6. 2D Image Manipulation: • Image representation and file formats • Image filtering and convolution operations (e.g., blurring, sharpening) • Image transformations (e.g., rotation, scaling, flipping)

	7. Geometric Primitives and Curves: • Representation and rendering of geometric primitives (e.g., points, lines, polygons) • Bezier curves and B-spline curves • Interpolation and approximation techniques for curves 8. Bitmap and Vector Graphics: • Understanding the differences between bitmap and vector graphics • Bitmap image manipulation and editing techniques • Vector graphics representation and manipulation 9. Practical projects involving the implementation of 2D graphics techniques Case studies of real-world applications of 2D computer graphics

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures**: Instructors can deliver lectures to introduce and explain the fundamental concepts, principles, and techniques of 2D Computer Graphics. Lectures can include visual demonstrations, examples, and explanations of algorithms. Demonstrations and Visuals: Instructors can use demonstrations and visual aids to illustrate concepts and techniques in 2D Computer Graphics. This can include live coding demonstrations, interactive graphics applications, or visual presentations of graphics algorithms. **Interactive Discussions:** Engage students in interactive discussions to encourage their participation and critical thinking. This can involve asking questions, encouraging students to share their thoughts and ideas, and facilitating discussions around the applications and implications of 2D Computer Graphics in various fields. **Group Projects and Collaborative Learning**: Assigning group projects can foster collaboration and teamwork skills. Students can work together to create complex 2D graphics applications, design interactive interfaces, or solve graphics-related problems. Collaborative learning activities can also include peer reviews and feedback sessions. **Visual and Multimedia Resources**: Utilize visual and multimedia resources such as graphics software, simulation tools, online tutorials, and interactive learning materials to enhance the learning experience. These resources can provide additional visualizations, demonstrations, and interactive elements to reinforce the concepts being taught.
Student Workload (SWL)	

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**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	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to 2D Computer Graphics: • Overview of 2D computer graphics and its applications

	• Basic concepts of pixels, coordinates, and color representation
Week 2	Elements of pictures created in computer graphics
Week 3	Graphics display devices
Week 4	Raster Graphics And Vector Graphics
Week 5	Drawing Algorithms: Plotting Points
Week 6	2D Drawing Algorithms: Line drawing algorithms (e.g., DDA algorithm, Bresenham's line algorithm)
Week 7	Mid-term Exam
Week 8	Line drawing algorithms (e.g., Bresenham's line algorithm)
Week 9	Circle Drawing Algorithms (e.g., Direct Algorithm and DDA)
Week 10	Circle Drawing Algorithm (e.g., Bresenham Circle Drawing Algorithm)
Week 11	Ellipses Drawing Algorithms
Week 12	Two Dimensional Geometric Transformations (e.g.,Translation and Scaling with various examples)
Week 13	Two Dimensional Geometric Transformations (e.g.,Rotations with various examples)
Week 14	Two Dimensional Geometric Transformations (e.g.,Shearing and Reflection with various examples)
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Computer Graphics and OpenGL • Setting up the development environment (OpenGL libraries, IDE) • Basic OpenGL concepts (window creation, rendering loop) • Drawing basic shapes (points, lines, polygons)
Week 2	Lab 2: 2D Graphics and Transformations • 2D transformations (translation, rotation, scaling) • Clipping and window-to-viewport transformations • Implementing 2D graphics algorithms (e.g., line drawing, circle drawing)
Week 3	Lab 3: Rotations and Scaling

	• Rotation transformations in 2D • Scaling transformations in 2D • Implementing rotation and scaling transformations in graph
Week 4	Lab 4: Clipping and Windowing • Clipping techniques (e.g., Cohen-Sutherland, Liang-Barsky) • Windowing transformations (viewport and window coordinates) • Implementing clipping and windowing in 2D graphics software
Week 5	Lab 5: Coordinate Systems and Projections • Cartesian and homogeneous coordinate systems • Orthographic and perspective projections in 2D • Implementing coordinate systems and projections in graphics software
Week 6	Lab 6: Color Models and Color Mapping • RGB, CMYK, and HSL color models • Color mapping techniques (e.g., grayscale, dithering, interpolation) • Implementing color models and color mapping in 2D graphics software
Week 7	Lab 7: 2D Transformation Matrices • Homogeneous transformation matrices in 2D • Matrix operations for translation, rotation, scaling • Applying transformation matrices to 2D shapes

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	transformations.pdf	Yes
Recommended Texts	transformations.pdf	Yes
Websites	https://courses.cs.vt.edu/~cs4204/lectures/transformations.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	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Architecture**			**Module Delivery**	
Module Type	**C**			☒**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☒**Practical** ☐**Seminar**	
Module Code	**CSDC312**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name: Dr. Omar alokashi		**e-mail**	E-mail: omar.alokashi@uoanbar.edu.iq	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	

Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	06/06/2023	**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 Objectives أهداف المادة الدراسية	1.To understand the structure, function and characteristics of computer systems. 2. To understand the design of the various functional units and components of computers. 3. To identify the elements of modern instructions sets and their impact on processor design. 4. To explain the function of each element of a memory hierarchy, 5. To identify and compare different methods for computer I/O.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. This course introduces Machine Architecture with coverage of digital logic, machine level data and instruction representation, ALU design, and organization of the processor data path and control. Examines performance analysis, memory system hierarchy, pipelining, and communication.
Indicative Contents المحتويات الإرشادية	1. Introduction to Computer Architecture: • Definition and importance of computer architecture • Historical overview of computer architecture evolution • Basic components and functionalities of a computer system 2. Instruction Set Architecture (ISA): • Overview of instruction formats and addressing modes

	• Instruction execution cycle and pipeline concepts • RISC (Reduced Instruction Set Computer) and CISC (Complex Instruction Set Computer) architectures 3. Computer Arithmetic: • Representation of numbers (integer and floating-point) • Arithmetic operations and algorithms (addition, subtraction, multiplication, division) • Handling of overflow and underflow 4. Processor Design and Organization: • CPU components (registers, ALU, control unit) • Datapath and control unit design • Instruction fetch and decode, execution, and memory access stages 5. Memory Hierarchy: • Caches and cache organization (associativity, replacement policies) • Virtual memory and paging techniques • Secondary storage (hard disk drives, solid-state drives) 6. Input/Output (I/O) Systems: • I/O devices and interfaces • I/O architectures (programmed I/O, interrupt-driven I/O, DMA) • Bus architectures and protocols (PCI, USB, SATA) 7. Parallel Processing and Multiprocessors: • Flynn's taxonomy of parallel architectures • Shared memory and distributed memory multiprocessor systems • Parallel programming models and synchronization techniques 8. Performance Evaluation and Benchmarking: • Performance metrics (execution time, throughput, latency) • Performance measurement techniques and tools • Benchmarking and performance analysis methodologies 9. Computer System Interconnects: • Network topologies and protocols (Ethernet, TCP/IP) • Interconnection networks (bus, ring, mesh, hypercube) • High-speed interconnect technologies (InfiniBand, PCIe) 10. Emerging Trends and Technologies in Computer Architecture: • Multi-core and many-core architectures • Accelerators (e.g., GPUs, FPGAs) and heterogeneous computing • Energy-efficient and green computing 11. Computer Architecture Case Studies: • Analysis of real-world computer systems and architectures • Exploration of the design choices and trade-offs in different architectures • Evaluation of performance, power, and scalability in specific case studies

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: Instructor-led lectures are used to deliver the theoretical concepts and principles of computer architecture. The lectures provide an overview of the topics, explain complex concepts, and present real-world examples. 2. Hands-on Lab Exercises: Lab sessions provide students with practical experience in computer architecture. They involve working with hardware components, simulators, and software tools to implement and evaluate architectural concepts. Students may work individually or in groups to solve specific problems and gain hands-on experience. 3. Case Studies and Examples: Real-world case studies and examples are used to illustrate the application of computer architecture concepts. Students analyze and discuss the design choices, performance characteristics, and trade-offs in different architectures. 4. Interactive Discussions: Interactive discussions encourage student engagement and participation. Students can ask questions, clarify doubts, and engage in discussions on various topics related to computer architecture. This can be done through in-class discussions, online forums, or group activities. 5. Simulations and Virtual Labs: Computer architecture simulations and virtual labs provide a virtual environment for students to explore and experiment with different architectural concepts. They allow students to simulate hardware components and systems, run experiments, and observe the effects of various design decisions. 6. Assignments and Projects: Assignments and projects are given to students to apply their knowledge and skills in practical scenarios. These can include designing a simple processor, optimizing code for performance, analyzing and comparing different architectures, or implementing specific architectural features. 7. Guest Lectures and Industry Talks: Inviting guest lecturers from industry or academia who have expertise in computer architecture can provide students with real-world insights, current trends, and industry practices. Industry talks and visits to relevant companies or research centers can also provide exposure to the practical applications of computer architecture. 8. Assessment Methods: Various assessment methods are used to evaluate students' understanding and application of computer architecture concepts. This may include exams, quizzes, lab reports, project presentations, and class participation. 9. Online Resources and Materials: Supplementary online resources such as lecture notes, slides, video tutorials, and interactive simulations are made available to support students' learning. Online discussion platforms or learning management systems can be used to facilitate communication, share resources, and provide additional learning materials. 10. Continuous Feedback and Support: Regular feedback and support

	mechanisms are established to assist students in their learning journey. This may include individual consultations with the instructor, peer feedback, or formative assessments to identify areas of improvement and provide guidance.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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.				
	Report	1	10% (10)	13	LO #5, #8 and #10
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	Introduction to computer components and historical review
Week 2	Data representation in computer system
Week 3	Error detection and correction
Week 4	Boolean algebra and digital logic
Week 5	MARIE: an introduction to simple computer
Week 6	MARIE: The Architecture
Week 7	Instruction Set Architecture
Week 8	Instruction Types
Week 9	Memory (1)
Week 10	Memory (2)
Week 11	Input/output storage system
Week 12	System Software
Week 13	Alternative Architecture
Week 14	Embedded System
Week 15	Performance Measurement and Analysis
Week16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	The essential of computer architecture and organization, 5th	No

	edition, Linda Null	
Recommended Texts		
Websites	https://www.coursera.org/browse/ Computer Architecture	

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	**Wireless Networks**			**Module Delivery**	
Module Type	**C**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☒**Practical** ☐**Seminar**	
Module Code	**CSDC321**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name: Foad Salem Mubarek		**e-mail**	E-mail:	
Module Leader's Acad. Title	Asst. Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	06/06/2023		**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	CCIT063	**Semester**	4
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. Understand the basic concepts of wireless communication, including radio propagation, modulation techniques, and multiple access schemes. 2. Analyze the performance of wireless networks, considering factors such as throughput, delay, and capacity.

	3. Design and configure wireless network topologies and protocols. 4. Evaluate the security vulnerabilities and solutions in wireless networks. 5. Discuss the applications and future trends of wireless technologies.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students will have a solid understanding of the key concepts in wireless communication, including radio propagation, modulation, multiple access, network protocols, and security. 2. Students will be familiar with different wireless technologies like cellular networks, Wi-Fi, Bluetooth, and emerging trends like IoT and cognitive radio. 3. Students will be aware of the unique challenges and limitations of wireless communication, such as path loss, interference, and mobility. 4. Students will be able to design and implement simple wireless network protocols and applications. 5. Students will be able to critically evaluate different wireless technologies and standards, considering their strengths and weaknesses. 6. Students will be equipped with the tools and knowledge to continue learning about wireless networks throughout their careers.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **1.Introduction to Wireless Networks I:** • Overview: History, applications, architecture, challenges • Focus: Understanding the landscape of wireless communication **2. Transmission Fundamental of Wireless Network:** • Radio Frequency (RF) Spectrum: Wireless communication uses specific portions of the electromagnetic spectrum called the radio frequency (RF) spectrum. • Signal Modulation**:** Data is encoded onto the RF carrier wave through a process called modulation. 3. **End-to-End Transport Over Wireless I: Preliminaries, Split Connection** • Overview of end-to-end communication in networking. • Distinction between end-to-end communication in wired and wireless networks. • Introduction to mobility issues in wireless communication. 4. **Layering and End-to-End Argument:** • Exploration: Vulnerabilities, authentication, encryption, secure protocols project. • Design and implement a secure communication system for a specific scenario **5. Transmission Control Protocol(TCP) Primer:** • Characteristics of TCP: Connection-oriented protocol, Reliable and ensures data integrity. • Three-Way Handshake: Explanation of the process by which a TCP connection is established. Steps involved in the SYN, SYN-ACK, and ACK sequence. • Congestion Control: Overview of TCP congestion control algorithms. **6. TCP Over wireless**

	• **Congestion and Loss:** Impact of congestion and packet loss on TCP performance. • Mobile IP and Handover: Mobility Challenges: Exploring the impact of mobility on TCP connections. • Split Connection Concept: How splitting connections into separate control and data channels can be beneficial in wireless networks. **7.Mid-term Exam** **8. Wireless and Mobile Networks:** • **Wireless LANs and cellular networks** • **Mobile IP and mobile network protocols** • **Wireless security and mobile application development** 9. **Time-, Frequency-, and Code Division** • Time Division Multiple Access (TDMA) • Frequency Division Multiple Access (FDMA) • Code Division Multiple Access (CDMA) **10. Contention-Based Sharing (Ethernet)** • Carrier Sense Multiple Access with Collision Detection (CSMA/CD) • Advantages of Contention-Based Sharing in Ethernet 11. **MACA (Multiple Access with Collision Avoidance) :** • Objective: MACA aims to avoid collisions in wireless networks by using a reservation mechanism before data transmission. • Key Concept: Nodes use a two-step process involving a Request-to-Send (RTS) and Clear-to-Send (CTS) to reserve the channel for transmission. 12. **MACAW (Multiple Access with Collision Avoidance for Wireless):** • Evolution of MACA: MACAW builds upon MACA and introduces enhancements for better performance in wireless networks. • Exponential Backoff: Similar to MACA, MACAW utilizes an exponential backoff scheme to manage collisions. 13. **Wireless LAN Technology** • Wireless LAN Components: • Wireless Standards: • Wireless Security: • Wireless LAN Architectures: 14. **IEEE 802.11 Wireless LAN Standard Internet of Things (IoT) and network connectivity:** • Key IEEE 802.11 Standards: • Common Features: • Modulation Techniques: 15. **Review and Exam Preparation** • Recap of key concepts and topics • Practice exams and exam preparation 16. **Preparatory week before the final Exam**

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures**: Instructors deliver lectures to introduce and explain the fundamental concepts, principles, and protocols of computer networks. Lectures may include visual aids, diagrams, and examples to enhance understanding. **Case Studies and Real-world Examples**: Presenting case studies and real-world examples helps students understand how computer networks are utilized in various industries and scenarios. It demonstrates the practical applications of network technologies and protocols. **Group Projects:** Assigning group projects allows students to collaborate, apply their knowledge, and develop problem-solving skills. Projects may involve designing and implementing network solutions, analyzing network performance, or securing a network infrastructure. **Interactive Discussions:** Engaging students in discussions encourages active participation and deeper understanding. It provides opportunities to clarify doubts, analyze scenarios, and discuss network design considerations or security issues. **Networking Simulations:** Utilizing network simulation software allows students to experiment with network configurations, simulate network behavior, and observe the impact of various parameters. This helps reinforce theoretical concepts and gain practical experience. **Online Resources and Tutorials**: Recommending online resources, tutorials, and documentation helps students supplement their learning. These resources may include websites, forums, online courses, or educational videos that provide additional explanations, demonstrations, and practice exercises. **Networking Events and Workshops:** Encouraging students to attend networking events, workshops, or conferences helps them stay updated with the latest trends, technologies, and research in the field. It fosters networking and provides exposure to industry professionals. **Ethical and Professional Considerations**: Emphasizing ethical and professional conduct in networking, including discussions on privacy, security, and legal implications, helps students develop a sense of responsibility and ethical decision-making skills.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction to Wireless Networks I:** • Overview: History, applications, architecture, challenges

	• Focus: Understanding the landscape of wireless communication
Week 2	**Transmission Fundamental of Wireless Network:** • Radio Frequency (RF) Spectrum: Wireless communication uses specific portions of the electromagnetic spectrum called the radio frequency (RF) spectrum. • Signal Modulation**:** Data is encoded onto the RF carrier wave through a process called modulation. • Multiple Access Techniques: Multiple devices need to share the limited RF spectrum efficiently.
Week 3	**End-to-End Transport Over Wireless I: Preliminaries, Split Connection** • Overview of end-to-end communication in networking. • Distinction between end-to-end communication in wired and wireless networks. • Introduction to mobility issues in wireless communication. • Handover mechanisms and their impact on end-to-end transport.
Week 4	**Layering and End-to-End Argument:** • Exploration: Vulnerabilities, authentication, encryption, secure protocols • Project: Design and implement a secure communication system for a specific scenario
Week 5	**Transmission Control Protocol(TCP) Primer:** • Characteristics of TCP: Connection-oriented protocol, Reliable and ensures data integrity. • Three-Way Handshake: Explanation of the process by which a TCP connection is established. Steps involved in the SYN, SYN-ACK, and ACK sequence. • Congestion Control: Overview of TCP congestion control algorithms.
Week 6	**TCP Over wireless** • **Congestion and Loss:** Impact of congestion and packet loss on TCP performance. • Mobile IP and Handover: Mobility Challenges: Exploring the impact of mobility on TCP connections. • Split Connection Concept: How splitting connections into separate control and data channels can be beneficial in wireless networks.
Week 7	**Mid-term Exam**
Week 8	**Wireless and Mobile Networks** • Wireless LANs and cellular networks • Mobile IP and mobile network protocols • Wireless security and mobile application development
Week 9	**Time-, Frequency-, and Code Division** • Time Division Multiple Access (TDMA) • Frequency Division Multiple Access (FDMA) • Code Division Multiple Access (CDMA)
Week 10	**Contention-Based Sharing (Ethernet)** • Carrier Sense Multiple Access with Collision Detection (CSMA/CD) • Advantages of Contention-Based Sharing in Ethernet
Week 11	**MACA (Multiple Access with Collision Avoidance) :** • Objective: MACA aims to avoid collisions in wireless networks by using a reservation

	mechanism before data transmission. • Key Concept: Nodes use a two-step process involving a Request-to-Send (RTS) and Clear-to-Send (CTS) to reserve the channel for transmission.
Week 12	**MACAW (Multiple Access with Collision Avoidance for Wireless):** • Evolution of MACA: MACAW builds upon MACA and introduces enhancements for better performance in wireless networks. • Exponential Backoff: Similar to MACA, MACAW utilizes an exponential backoff scheme to manage collisions.
Week 13	**Wireless LAN Technology** • Wireless LAN Components: • Wireless Standards: • Wireless Security: • Wireless LAN Architectures:
Week 14	**IEEE 802.11 Wireless LAN Standard Internet of Things (IoT) and network connectivity:** • Key IEEE 802.11 Standards: • Common Features: • Modulation Techniques:
Week 15	**Review and Exam Preparation** • Recap of key concepts and topics • Practice exams and exam preparation
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction and Network Basics • Introduction to lab equipment and software tools • Familiarization with network simulation software (e.g., Cisco Packet Tracer, GNS3) • Configuring and testing basic network connectivity
Week 2	Lab 2: Ethernet LANs and Switching • Configuring and testing Ethernet LANs using switches • Configuring VLANs and inter-VLAN routing • Implementing and troubleshooting Spanning Tree Protocol (STP)
Week 3	Lab 3: IP Addressing and Subnetting • Practicing IP addressing and subnetting calculations • Configuring IP addressing on network devices • Testing IP connectivity between devices within subnets
Week 4	Lab 4: Routing and Dynamic Routing Protocols • Configuring static routes and dynamic routing protocols (e.g., RIP, OSPF) • Testing routing functionality and verifying route tables

	• Troubleshooting routing issues
Week 5	Lab 5: Transport Layer Protocols • Configuring and testing TCP and UDP services • Analyzing packet captures to understand transport layer behavior • Implementing and troubleshooting port forwarding and NAT
Week 6	Lab 6: Application Layer Protocols • Configuring and testing common application layer protocols (e.g., HTTP, FTP, DNS) • Setting up web servers and clients • Analyzing application layer traffic using packet captures
Week 7	Lab 7: Network Security • Configuring and testing basic network security measures (e.g., access control lists, firewall rules) • Implementing port security on switches • Analyzing network traffic for security threats using intrusion detection systems

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	“Wireless Communications and Networks" by William Stallings	Yes
Recommended Texts	"Wireless Networking: Understanding Internetworking Challenges" by Jack L. Burbank, Julia Andrusenko	No
Websites	https://www.coursera.org/ComputerNetworks	

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	**Mobile Applications Programming**			**Module Delivery**	
Module Type	**C**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☒**Practical** ☐**Seminar**	
Module Code	**CSDC323**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIII		**Semester of Delivery**	5	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	06/06/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSDC211	**Semester**	4
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Firstly, students aim to grasp the fundamental concepts and principles of mobile app development. This includes understanding the intricacies of platform architecture, the user interface design, and the application lifecycle, which form the basis of creating effective mobile applications. Additionally, a crucial goal is to become familiar with the diverse mobile device families and the operating systems they employ. Recognizing the differences and similarities between these platforms equips students to develop applications that cater to a broad user base. Understanding the motivations for choosing mobile app programming and the advantages it offers is essential. This includes recognizing the personal and professional benefits of a career in this field, and understanding the industry demand for mobile applications. As challenges inevitably arise in mobile app development, students need to identify these issues and develop effective strategies to overcome them. This includes addressing the disadvantages that can be encountered in this profession. Moreover, students should keep a finger on the pulse of the industry, staying updated on the latest trends and technologies. The ever-evolving landscape of mobile app development demands an awareness of future directions and potential disruptions. Students should also develop a strong grasp of wireless technologies and architectural components that underpin mobile app development, as well as mastery in multimedia integration and data management. Security, user authentication, and cross-platform development are further areas

	of focus. It is crucial to prioritize app security to protect user data and privacy, and to ensure that applications function seamlessly across different mobile platforms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Students will gain a comprehensive understanding of the core concepts and principles of mobile application development, which includes delving into the intricacies of platform architecture, the art of designing user-friendly interfaces, and comprehending the entire lifecycle of mobile applications. This foundation is essential for creating highly effective mobile applications. Moreover, students will become proficient in recognizing and distinguishing among various mobile device families and the operating systems they employ. This proficiency enables them to develop applications that cater to a broad spectrum of user needs, considering the differences and similarities among different platforms. Understanding the motivations and advantages of choosing a career in mobile app programming is emphasized, enabling students to appreciate the personal and professional benefits while recognizing the high demand for mobile applications in the industry. The course also equips students with problem-solving skills, encouraging them to identify challenges commonly encountered in mobile app development and develop effective strategies to overcome them. This includes addressing the disadvantages that are inherent to the profession, thus fostering critical thinking and adaptability. In addition to these core competencies, students will stay updated with the ever-evolving industry trends and technologies, ensuring their ability to adapt to future directions in mobile app development and navigate potential disruptions. The module emphasizes a comprehensive understanding of wireless technologies and architectural components that underpin mobile app development, which is critical for creating efficient and functional mobile applications. Furthermore, students will master multimedia integration and data management, ensuring they can effectively integrate multimedia content and manage data within mobile applications, providing a seamless user experience. Lastly, a strong focus on security, user authentication, and cross-platform development techniques ensures that students prioritize app security, protect user data and privacy, and develop versatile applications that work seamlessly across various mobile platforms.
Indicative Contents المحتويات الإرشادية	The course's Indicative Contents include a range of fundamental topics essential for understanding and succeeding in mobile app development. It commences with an Introduction to Mobile App Development, which introduces students to the foundational concepts, emphasizing platform

	architecture, user interface design, and the application lifecycle. Platform and Device Diversity is a critical component, enabling students to recognize various mobile device families and their operating systems, facilitating the creation of applications catering to diverse user bases. Students learn the Mobile App Fundamentals, acquiring knowledge about architecture, UI design, and app lifecycle. Programming Languages and Tools familiarize students with languages like Java/Kotlin, Swift/Objective-C, and the relevant development environments, enabling them to embark on mobile app development. User Interface Design explores principles of designing user-friendly interfaces, including layouts, navigation, controls, and responsiveness. Understanding Mobile Application Architecture is crucial for successful app development, encompassing architecture patterns and key concepts like data management and networking. Functional Implementation ensures students gain practical experience in developing app features, from user authentication to multimedia integration and utilizing device sensors. Cross-Platform Development Techniques provide insight into creating apps that function across various platforms. The course emphasizes Security and Privacy in app development, emphasizing data protection and authentication

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: Instructors may deliver lectures to introduce students to key concepts and theories related to mobile app development. These lectures provide foundational knowledge and frameworks for understanding mobile app development principles, programming languages, and best practices. 2. Practical Exercises: Practical exercises play a crucial role in helping students apply the theoretical knowledge gained in lectures. These exercises involve hands-on coding tasks, where students work on programming assignments to build mobile applications. Students can practice implementing various features, applying design principles, and solving real-world challenges. 3. Code Review and Feedback: Instructors may review students' code and provide feedback to help them improve their programming skills and coding practices. Code review sessions enable students to learn from their mistakes, understand best practices, and receive guidance on optimizing their code for performance and maintainability.

	4. Group Discussions and Peer Learning: Group discussions allow students to collaborate and exchange ideas. They can discuss challenging topics, share insights, and learn from each other's experiences. Group activities may involve problem-solving exercises, design critiques, or brainstorming sessions related to mobile app development. 5. Case Studies and Real-world Examples: Instructors can present case studies and real-world examples of successful mobile applications to illustrate concepts and best practices. Analyzing existing apps and their design choices can help students understand the practical implementation of various features and user interface elements. 6. Guest Speakers and Industry Experts: Inviting guest speakers from the industry who have expertise in mobile app development can provide valuable insights. These speakers can share their experiences, discuss industry trends, and provide practical advice to students. 7. Project-based Learning: Assigning projects allows students to apply their knowledge and skills to develop complete mobile applications. Students can work individually or in teams to plan, design, implement, and deploy their own mobile app projects. This approach provides hands-on experience and helps students develop problem-solving skills, project management abilities, and teamwork. 8. Workshops and Demos: Conducting workshops and live demonstrations can be effective in teaching specific mobile app development techniques or tools. These sessions provide step-by-step guidance, allowing students to see the practical application of concepts and gain proficiency in using development frameworks, APIs, or debugging tools. 9. Continuous Assessment and Feedback: Assessing students' progress throughout the course is essential. Instructors can use quizzes, assignments, coding exercises, and project evaluations to measure students' understanding and practical skills. Providing timely feedback on their work helps students identify areas for improvement and reinforces their learning. 10. Self-directed Learning: Encouraging self-directed learning is important in a rapidly evolving field like mobile app development. Instructors can guide students to explore additional resources, tutorials, online forums, and documentation to enhance their learning beyond the classroom.

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Mobile App Development • Mobile Phone Family • Reasons for using mobile application programming
Week 2	Advantages of Mobile Application Programming

	Disadvantages of Mobile Application Programming The future trends of mobile application programming Wireless Technologies and Architectures
Week 3	Flexible Mobile Phone I
Week 4	Flexible Mobile Phone II
Week 5	Mobile App Data Management (Local Storage, Databases)
Week 6	Short-Range Communication Systems
Week 7	Mid-term Exam + Navigation Patterns in Mobile Apps
Week 8	Wireless Technologies and Architectures
Week 9	Mobile App Multimedia Integration (Images, Audio, Video) Device Sensors and Integration
Week 10	Mobile App Security and Privacy User Authentication and Authorization
Week 11	Mobile Device Management (MDM) Mobile Device Management Works
Week 12	Cross-Platform Development Techniques
Week 13	Location-Based Services (LBS) Types of Location-Based Services
Week 14	Augmented Reality (AR) and Virtual Reality (VR) AR in Mobile Apps Challenges and Considerations Future Trends
Week 15	Operating Systems in Mobile Application Programming
Week 16	Project Work and Presentation

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: • Mobile Operating Systems • Setting up Development Environment (Android Studio) • Creating a "Hello World" Mobile App
Week 2	Lab 2: • User Interface Design in Mobile Apps (Layouts, Views) • Building a Simple User Interface
Week 3	Lab 3: • Implementing User Interaction and Event Handling • Adding Buttons, Text Input, and Image Views
Week 4	Lab 4: • Data Storage and Retrieval in Mobile Apps • Working with SQLite Databases
Week 5	Lab 5: • Networking and Web Services in Mobile Apps
Week 6	Lab 6: • Multimedia Integration in Mobile Apps • Displaying Images and Playing Audio/Video
Week 7	Lab 7: • Implementing User Authentication and Authorization • Login and Registration Functionality

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fitzek, Frank HP, and Frank Reichert, eds. *Mobile phone programming: and its Application to Wireless Networking*. Springer Science & Business Media, 2007.	Yes
Recommended Texts	Fitzek, Frank HP, and Frank Reichert, eds. *Mobile phone programming: and its Application to Wireless Networking*. Springer Science & Business Media, 2007.	No
Websites	https://www.coursera.org/browse/Mobile_Applications _Programming https://www.cs.cmu.edu/~bam/uicourse/830spring09/BFeiginMobileApplicationDevelopment.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	**Multimedia**	**Module Delivery**
Module Type	**C**	☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical**
Module Code	**CSDC320**	
ECTS Credits	**7**	

SWL (hr/sem)	**175**			☐ **Seminar**	
Module Level		UGIII	**Semester of Delivery**		Six
Administering Department		CSIT	**College**	Type College Code	
Module Leader	Name		**e-mail**		
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	CSDC311	**Semester**	Five
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	a. This course covers the theoretical basis for the Department of Computer Networks on the part of the media (text. draw. Image. audio and video) b. To know information about each type of media (input, processing, and output). c. To understand how to convert arguments from the entered form to the form that is processed by the computer, as well as the types of formulas in which it is stored in the computer. d. The student understands the foundations on which media is pressured and its benefits.
Module Learning	1. media Fundamentals: Define multimedia and its key components.

Outcomes مخرجات التعلم للمادة الدراسية	Explain the principles of multimedia design, including text, images, audio, and video integration. 2. Digital Media Production: Create and edit digital images using software tools (e.g., Adobe Photoshop). Record and edit audio using digital audio workstations (e.g., Audacity). Shoot, edit, and produce video content with attention to composition and storytelling. 3. Interactive Multimedia Development: Design and develop interactive multimedia projects, such as websites or interactive presentations. 4. Implement user interface elements and navigation in multimedia applications.
Indicative Contents المحتويات الإرشادية	Introduction to Multimedia, Digital Imaging, Digital Audio, and Interactive Multimedia.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	- The student should use utilities in the lab to apply scientific experiment - The ability to execute the applications programs .

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Multimedia computing
Week 2	Multimedia Systems
Week 3	Components of a Multimedia System
Week 4	Multimedia Data Basics
Week 5	Analog and Digital Signal Conversion
Week 6	Presentation of text and graph
Week 7	Presentation of still image and digital audio
Week 8	Presentation of video
Week 9	Digital Audio Synthesis

Week 10	Graphic/Image Data Structures
Week 11	Basics of Video
Week 12	Spatial and Frequency Domain
Week 13	Image Compression
Week 14	Video compression Audio compression
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**-Introduction to Multimedia Computing:** Lab Assignment: Explore multimedia computing tools and their applications. Have students use basic multimedia software to create a simple multimedia presentation.
Week 2	**- Multimedia Systems:** Lab Assignment: Set up a basic multimedia system using hardware and software components. Students should assemble a multimedia workstation and install relevant software.
Week 3	**- Components of a Multimedia System:** Lab Assignment: Analyze different multimedia components. Have students dissect and identify the hardware components of a multimedia system and explain their functions.
Week 4	**- Multimedia Data Basics:** Lab Assignment: Work with multimedia data. Students should compress and decompress multimedia files using various compression techniques.
Week 5	**- Analog and Digital Signal Conversion:** Lab Assignment: Experiment with analog-to-digital and digital-to-analog conversion. Students can capture and digitize an analog signal (e.g., audio or video) and then play it back.
Week 6	**- Presentation of Text and Graphics:** Lab Assignment: Create multimedia text and graphics presentations. Have students design a

	multimedia presentation that combines text and graphics using presentation software.
Week 7	**-Presentation of Still Images and Digital Audio:** Lab Assignment: Develop multimedia content with still images and audio. Students can create a multimedia slideshow with images and audio narration.
Week 8	**- Presentation of Video:** Lab Assignment: Work with video presentations. Students should edit and enhance video content using video editing software.
Week 9	**- Digital Audio Synthesis:** Lab Assignment: Generate digital audio. Have students create a short piece of digital music or sound using audio synthesis software.
Week 10	**- Graphic/Image Data Structures:** Lab Assignment: Explore image data structures. Students can experiment with manipulating images using various data structures.
Week 11	**- Basics of Video:** Lab Assignment: Investigate video properties. Students can analyze different video formats and codecs and assess their impact on video quality and file size.
Week 12	**- Spatial and Frequency Domain:** Lab Assignment: Study spatial and frequency domain transformation. Students can perform basic image and sound transformations in both domains and observe the effects.
Week 13	**Image Compression:** Lab Assignment: Learn about image compression. Students should compress and decompress images using standard compression algorithms.
Week 14	**- Video Compression and Audio Compression:** Lab Assignment: Work with video and audio compression. Have students compare different compression techniques and their effects on multimedia quality.
Week 15	**Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		No
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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**Internet of Things**		**Module Delivery**	
Module Type	**E**		☒**Theory** ☒**Lecture** ☒**Lab** ☒ **Tutorial** ☒ **Practical** ☐**Seminar**	
Module Code	**CSDE321**			
ECTS Credits	**6**			
SWL (hr/sem)	**150**			
Module Level	UGIII	**Semester of Delivery**	6	
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Name: Ahmed Subhi Abdalkafor	**e-mail**	ahmed.abdalkafor@uoanbar.edu.iq	
Module Leader's Acad. Title	Asst. Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	06/06/2023	**Version Number**	1.0	

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	CSDC120	**Semester**	2
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Define IoT Concepts: Students will be able to articulate the fundamental concepts of the Internet of Things, including sensors, actuators, connectivity, and data analytics. Analyze IoT Architectures: Students will analyze and compare different IoT architectures, understanding the roles of edge computing, cloud platforms, and communication protocols. Evaluate Security in IoT Systems: Students will assess security challenges in IoT systems and propose strategies to mitigate risks, covering data integrity, confidentiality, and device authentication. Design IoT Solutions: Students will be able to design end-to-end IoT solutions, considering hardware selection, communication protocols, and data processing techniques. Implement IoT Protocols: Students will implement and troubleshoot common IoT protocols such as MQTT and CoAP, ensuring effective communication between devices.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Introduction to IoT Concepts Define and explain fundamental concepts related to the Internet of Things (IoT), including sensors, actuators, connectivity, and data analytics. Describe the historical evolution and current trends of IoT technologies and applications. Analyze and compare different IoT architectures, identifying the roles of edge computing, cloud platforms, and various communication protocols. Security and Privacy Assess and articulate security challenges in IoT systems, proposing effective strategies to mitigate risks related to data integrity, confidentiality, and device authentication. Evaluate the ethical implications of IoT applications, considering privacy concerns, data ownership, and potential societal impacts.
Indicative Contents المحتويات الإرشادية	Module 1: Introduction to IoT Concepts 1.1 Overview of IoT Definition and key concepts Evolution of IoT technologies 1.2 IoT Components

	Sensors and actuators Communication protocols Edge computing vs. cloud computing 1.3 IoT Applications Smart homes and cities Industrial IoT (IIoT) Healthcare applications 1.4 Current Trends in IoT Machine learning and AI in IoT Edge computing advancements IoT in 5G networks Module 2: IoT Security and Privacy 2.1 Security Challenges in IoT Data integrity and confidentiality Device authentication and access control Network security considerations 2.2 Ethical Implications of IoT Privacy concerns in IoT applications Data ownership and governance Societal impacts and ethical considerations

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: Deliver comprehensive lectures to introduce and explain fundamental IoT concepts, principles, and technologies. Include visual demonstrations, real-world examples, and explanations of IoT protocols and architectures. 2. Demonstrations and Visuals: Use live demonstrations and visual aids to illustrate IoT concepts. Showcase real-world IoT devices, simulate data communication processes, and visually present the

	implementation of IoT protocols and algorithms. 3. Interactive Discussions: Engage students in interactive discussions to foster critical thinking about the applications and implications of IoT. Encourage them to share insights, ask questions, and discuss the societal impact, ethical considerations, and future trends of IoT. 4. Group Projects and Collaborative Learning: Assign group projects to encourage collaboration and teamwork. Have students work together to design and implement IoT solutions, addressing challenges such as connectivity, data processing, and security. Include peer reviews and feedback sessions to enhance the learning experience

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**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	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7

assessment	**Final Exam**	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to IoT Concepts Overview of IoT Evolution and history of IoT Key components and technologies in IoT
Week 2	IoT architectures: Edge computing vs. cloud computing Communication protocols in IoT Applications of IoT in different industries
Week 3	IoT Security and Privacy Security challenges in IoT Encryption and secure communication in IoT
Week 4	Ethical implications and privacy concerns in IoT
Week 5	Strategies for securing IoT systems
Week 6	IoT device architecture: Microcontrollers and microprocessors
Week 7	Mid-term Exam
Week 8	Sensor integration and interfacing
Week 9	Sensor networks: Design principles and scalability
Week 10	AI-driven IoT solutions
Week 11	Blockchain in IoT
Week 12	Emerging trends in IoT

Week 13	IoT in smart cities and homes
Week 14	IoT and 5G networks
Week 15	Final project presentations by student groups
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Packet Tracer – Connecting Devices to Build IoT Topology
Week 2	Registration Server, Motion Capture, Webcam
Week 3	Packet Tracer – Simulating IoT Devices
Week 4	Packet Tracer - Sensors and the PT Microcontroller
Week 5	Packet Tracer – SBC Actuate
Week 6	Explore the Smart Home
Week 7	Packet Tracer – Build a Connected Factory Solution

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Buyya, R., & Dastjerdi, A. V. (Eds.). (2016). *Internet of Things: Principles and paradigms*. Elsevier.	Yes
Recommended Texts	Kumar, S. (2021). *Fundamentals of Internet of Things*. CRC Press.	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية		
Module Title	**Compilers**	**Module Delivery**
Module Type	**C**	☒**Theory** ☒**Lecture** ☒**Lab**
Module Code	**CSDC322**	

ECTS Credits	**6**		☒ **Tutorial** ☐**Practical** ☐**Seminar**		
SWL (hr/sem)	**175**				
Module Level		UGIII	**Semester of Delivery**		6
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Name: Esam Taha Yassen		**e-mail**	co.esamtaha@uoanbar.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		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		06/06/2023	**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 Objectives أهداف المادة الدراسية	The objective the compiler course is to understand the basic principles of compiler design, its various constituent parts, algorithms and data structures required to be used in the compiler.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the fundamental concepts of compiler design: Students should be able to comprehend the basic principles, techniques, and components involved in designing and implementing compilers. 2. Analyze and describe the various phases of a compiler: Students should be able to explain the different phases of a compiler, including lexical analysis, syntax analysis, semantic analysis, intermediate code generation,

	optimization, and code generation. 3. Implement a compiler: Students should gain practical experience by implementing a simple compiler for a programming language. This may involve designing and developing the lexical analyzer, parser, semantic analyzer, and code generator. 4. Apply formal language theory: Students should understand formal languages, regular expressions, context-free grammars, and automata theory, and be able to apply this knowledge to analyze and manipulate programming languages. 5. Perform lexical and syntactic analysis: Students should be able to develop lexical analyzers and parsers to break down the source code into meaningful tokens and construct the corresponding parse tree or abstract syntax tree. 6. Conduct semantic analysis: Students should learn how to perform semantic analysis, including type checking, symbol table management, and static analysis techniques to ensure program correctness and identify potential errors. 7. Understand intermediate representations: Students should become familiar with various intermediate representations used in compilers, such as three-address code, abstract syntax trees, and control flow graphs. They should understand how to manipulate and optimize these representations. 8. Apply optimization techniques: Students should learn about common compiler optimization techniques, such as constant folding, common subexpression elimination, loop optimization, and register allocation. They should be able to apply these techniques to improve the efficiency of generated code. 9. Generate Low Level Language: Students should understand the process of generating machine code or assembly language from the intermediate representation. They should be able to apply code generation algorithms and handle low-level details such as instruction selection and addressing modes. 10. Test and debug compilers: Students should develop skills in testing and debugging compilers. They should be able to identify and fix errors in the compiler implementation and evaluate the correctness and performance of generated code. 11. Stay updated with current compiler trends: Students should be aware of recent developments and trends in the field of compiler design, including just-in-time (JIT) compilation, language-specific optimizations, and parallelizing compilers.
Indicative Contents المحتويات الإرشادية	1. Introduction to compilers • Overview of the compiler structure and its role in software development • Compilation process and phases • Types of compilers (e.g., native compilers, just-in-time compilers) 2. Lexical analysis • Tokenization and regular expressions

- Lexical analyzer design and implementation
- Scanning techniques (e.g., finite automata, regular expressions, lexer generators)

3. Syntax analysis
    - Context-free grammars and parsing techniques
    - Top-down parsing (e.g., recursive descent parsing)
    - Bottom-up parsing (e.g., LR(0), SLR(1), LALR(1), and LR(1) parsing)
    - Parser generators (e.g., Yacc, Bison)
4. Semantic analysis
    - Symbol tables and identifier management
    - Type systems and type checking
    - Attribute grammars and semantic actions
    - Static analysis and error detection
5. Intermediate code generation
    - Intermediate representations (e.g., abstract syntax trees, three-address code)
    - Syntax-directed translation and code generation
6. Code optimization
    - Common optimization techniques (e.g., constant folding, common subexpression elimination)
    - Loop optimization (e.g., loop unrolling, loop fusion)
    - Data-flow analysis and optimization
    - Control flow analysis and basic blocks
    - Code optimization at the intermediate representation level
    - Register allocation and instruction scheduling
7. Code generation
    - Target machine models and instruction sets
    - Instruction selection and mapping
    - Addressing modes and memory management
    - Runtime support for generated code (e.g., runtime libraries, exception handling)
8. Compiler testing and debugging
    - Testing strategies for compilers
    - Compiler validation techniques
    - Debugging and error handling in compilers
    - Performance evaluation of generated code
9. Advanced topics
    - Just-in-time (JIT) compilation
    - Language-specific optimizations
    - Parallelizing compilers
    - Recent trends and research directions in compiler design

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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

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

assessment	**Final Exam**	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Compilers • Overview of compilers and their role in software development • Compilation process and phases • Types of compilers
Week 2	Lexical Analysis • Tokenization and regular expressions • Lexical analyzer design and implementation • Scanning techniques
Week 3	Syntax Analysis (Part 1) • Context-free grammars and parsing techniques • Top-down parsing
Week 4	Syntax Analysis (Part 2) • Bottom-up parsing • Parser generators
Week 5	Semantic Analysis (Part 1) • Symbol tables and identifier management • Type systems and type checking
Week 6	Semantic Analysis (Part 2) • Attribute grammars and semantic actions • Static analysis and error detection
Week 7	Mid-term Exam + Static analysis and error detection
Week 8	Intermediate Code Generation • Intermediate representations • Syntax-directed translation and code generation
Week 9	Control Flow Analysis and Optimization • Control flow analysis • Basic blocks • Data-flow analysis and optimization
Week 10	Code Optimization (Part 1)

	• Principles of Optimization • Common optimization techniques • Local code optimization at the intermediate representation level • Global Optimization Methods
Week 11	Code Optimization (Part 2) • Loop optimization • Register allocation and instruction scheduling
Week 12	Code Generation • Target machine models and instruction sets • Instruction selection and mapping
Week 13	Memory Management and Runtime Support • Addressing modes • Memory management • Runtime support for generated code
Week 14	Compiler Testing and Debugging • Testing strategies for compilers • Compiler validation techniques • Debugging and error handling in compilers •
Week 15	Advanced Topics • Just-in-time (JIT) compilation • Language-specific optimizations
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Compiler Tools and Setup • Introduction to compiler development tools. • Setting up the development environment for compiler labs
Week 2	Lab 2: Preprocessor Lab • Implement Macros • Eliminate Comments • Eliminate White Spaces
Week 3	Lab 3: Lexical Analysis Lab • Implementing a lexical analyzer using Lex or a similar tool • Testing and validating the lexical analyzer with sample inputs
Week 4	Lab 4: Syntax Analysis Lab • Implementing a recursive descent parser or a bottom-up parser

	• Constructing and analyzing parse trees for sample inputs
Week 5	Lab 5: Semantic Analysis Lab • Building a symbol table and performing type checking • Handling semantic errors and reporting them in the compiler
Week 6	Lab 6: Intermediate Code Generation Lab • Generating intermediate code (e.g., three-address code) • Implementing basic optimizations at the intermediate representation level
Week 7	Lab 7: Code Generation Lab • Mapping intermediate code to target machine instructions • Handling memory management and addressing modes in code generation

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	A.Aho,R.Sethi,J.D.Ullman," Compilers- Principles, Techniques and Tools"Addison-Weseley,2007	Yes
Recommended Texts	A.W.Appel,"Modern Compiler Implementation in ML" ,CambridgeUniversity Press,1998	Yes
Websites	https://github.com/yihui-he/Modern-Compiler-Implementation-in-C	

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**			**Module Delivery**	
Module Type	**C**			☒**Theory** ☒**Lecture** ☐**Lab** ☒**Tutorial** ☒**Practical** ☐**Seminar**	
Module Code	**CSDC313**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGIII	**Semester of Delivery**		6
Administering Department		Type Dept. Code	**College**	Type College Code	
Module Leader	Name: Hussein Khalid		**e-mail**	E-mail: hussein.k.almulla@uoanbar.edu.iq	
Module Leader's Acad. Title		Techer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		06/06/2023	**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 Objectives أهداف المادة الدراسية	1. Understanding Software Engineering: Introduce students to the discipline of Software Engineering, its importance, and its role in the development of high-quality software systems. 2. Software Development Life Cycle (SDLC): Familiarize students with the various phases of the SDLC, including requirements gathering, system analysis, design, implementation, testing, deployment, and maintenance. 3. Requirements Engineering: Teach students how to elicit, analyze, document, and manage software requirements. Emphasize the importance of requirements validation and traceability.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1.Understand the fundamental principles, concepts, and practices of Software Engineering, including the importance of following a systematic and disciplined approach to software development. 2. Apply software development methodologies and processes, such as the Software Development Life Cycle (SDLC), to analyze, design, implement, test, and maintain software systems. 3. Elicit, analyze, document, and manage software requirements effectively, considering stakeholders' needs and system constraints. 4. Design software systems and architectures that are modular, scalable, and maintainable, applying software design principles, architectural styles, and design patterns. 5. Implement and execute software testing techniques to verify and validate software functionality, ensuring the delivery of high-quality software systems. 6. Apply project management principles and practices to plan, estimate, schedule, and monitor software development projects, considering resource allocation and risk

	management. 7. Understand and apply software configuration management practices, including version control, build management, and change management. 8. Demonstrate the ability to work effectively in a team, collaborating with others in software development projects and communicating ideas and solutions effectively. 9. Understand the challenges and techniques of software maintenance and evolution, including bug fixing, software updates, and system enhancements. 10. Develop a professional and ethical attitude towards software engineering, recognizing the importance of professional responsibility, accountability, and lifelong learning in the field.
Indicative Contents المحتويات الإرشادية	1.Introduction to Software Engineering: • Definition and importance of Software Engineering • Software development life cycle models (e.g., waterfall, iterative, agile) • Roles and responsibilities of software engineers 2. Requirements Engineering: • Elicitation, analysis, and documentation of software requirements • Requirements validation and verification techniques • Requirements management and traceability 3. Software Design Principles: • Object-oriented design principles (e.g., encapsulation, inheritance, polymorphism) • Design patterns and architectural styles • Modularity and software component design 4.Software Testing and Quality Assurance: • Testing techniques (e.g., unit testing, integration testing, system testing) • Test planning, test case design, and test execution • Software quality attributes and metrics 5. Software Project Management: • Project planning, estimation, and scheduling • Risk management and mitigation strategies • Project monitoring and control 6.Software Configuration Management: • Version control systems and practices • Build management and release processes • Change management and configuration control 7.Software Maintenance and Evolution: • Types of software maintenance (e.g., corrective, adaptive, perfective) • Bug tracking and debugging techniques • Software reengineering and system evolution

	8. Software Development Tools and Environments: • Integrated Development Environments (IDEs) and software development tools • Collaboration and communication tools for software teams • Software documentation and knowledge management tools 9. Software Ethics and Professional Practices: • Ethical considerations in software engineering • Professional responsibility and accountability • Intellectual property and legal issues in software development 10. Emerging Trends and Technologies in Software Engineering: • Software development for mobile platforms • Cloud computing and Software-as-a-Service (SaaS) • DevOps and continuous integration/continuous delivery (CI/CD)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Lectures:** Instructors deliver lectures to introduce key concepts, theories, and principles of Software Engineering. Lectures provide a structured presentation of the material, allowing students to gain a foundational understanding of the subject matter. **Practical Exercises:** Practical exercises provide hands-on experience with software development tools, programming languages, and methodologies. Students may work on coding assignments, case studies, or small projects to apply the concepts learned in lectures. **Group Projects**: Group projects promote collaboration and teamwork, which are essential skills in software development. Students work in teams to design, develop, and implement software systems, allowing them to practice project management, communication, and problem-solving skills. **Case Studies and Real-World Examples:** Case studies and real-world examples help students understand how Software Engineering principles are applied in practical situations. These examples can illustrate common challenges and solutions encountered in real software projects. **Guest Speakers:** Inviting guest speakers from industry or academia can provide students with insights into real-world software engineering practices, current trends, and challenges. Guest speakers can share their experiences and provide valuable perspectives on software development. **Code Reviews and Feedback:** Providing opportunities for code reviews and feedback helps students improve their coding skills and understand best practices. Instructors

	or peers can review code, offer suggestions for improvement, and provide constructive feedback on design and implementation choices. **Discussions and Debates:** Engaging students in discussions and debates on software engineering topics encourages critical thinking and helps students develop a deeper understanding of the subject. These discussions can cover ethical considerations, emerging technologies, or software development methodologies. **Workshops and Demonstrations:** Workshops and demonstrations allow students to explore specific tools, techniques, or frameworks relevant to software engineering. Instructors can conduct hands-on sessions to demonstrate the practical application of certain concepts or demonstrate the use of software development tools. **Online Resources and Platforms:** Utilizing online resources and platforms, such as learning management systems, online tutorials, and discussion forums, can support student learning outside the classroom. These resources provide additional materials, practice exercises, and opportunities for asynchronous discussions. **Assessment and Feedback:** Regular assessments, such as quizzes, exams, and project evaluations, help measure student understanding and progress. Providing timely and constructive feedback on assignments and assessments allows students to identify areas for improvement and deepen their understanding of Software Engineering concepts.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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.				
	Report	1	10% (10)	13	LO #5, #8 and #10
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	Introduction to Software Engineering • Definition and importance of Software Engineering • Software development life cycle models • Roles and responsibilities of software engineers
Week 2	Requirements Engineering • Software requirements elicitation techniques • Requirements analysis and documentation • Requirements validation and verification
Week 3	Software Design Principles • Object-oriented design principles • Design patterns and architectural styles • Modularity and software component design
Week 4	Software Testing and Quality Assurance • Testing techniques and levels (unit testing, integration testing, system testing) • Test planning and test case design • Software quality attributes and metrics
Week 5	Software Project Management • Project planning and estimation • Risk management and mitigation • Project monitoring and control

Week 6	Software Configuration Management • Version control systems and practices • Build management and release processes • Change management and configuration control
Week 7	Mid-term Exam + Change management and configuration control
Week 8	Software Maintenance and Evolution • Types of software maintenance • Bug tracking and debugging techniques • Software reengineering and system evolution
Week 9	Software Development Tools and Environments • Integrated Development Environments (IDEs) and software development tools • Collaboration and communication tools for software teams • Software documentation and knowledge management tools
Week 10	Software Ethics and Professional Practices • Ethical considerations in software engineering • Professional responsibility and accountability • Intellectual property and legal issues in software development
Week 11	Emerging Trends and Technologies in Software Engineering • Software development for mobile platforms
Week 12	Emerging Trends and Technologies in Software Engineering • Cloud computing and Software-as-a-Service (SaaS)
Week 13	Emerging Trends and Technologies in Software Engineering • DevOps and continuous integration/continuous delivery (CI/CD)
Week 14	Group Project Work • Work on group projects applying software engineering principles • Project management, communication, and collaboration
Week 15	Project Presentations and Review • Group project presentations and demonstrations • Review and discussion of lessons learned
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	

Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	https://www.tutorialspoint.com/software_engineering/software_engineering_tutorial.pdf	Yes
Recommended Texts	https://www.tutorialspoint.com/software_engineering/software_engineering_tutorial.pdf	Yes
Websites	https://www.coursera.org/browse/ software-engineering/software-engineering	

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	**Research methodology**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☐**Lab** ☐**Tutorial** ☒ **Practical** ☐**Seminar**	
Module Code	**UOA019**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	UGIII		**Semester of Delivery**	6	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name: Atheer Bassel Abdulkareem		**e-mail**	atheerbassel@uoanbar.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	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**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 Objectives أهداف المادة الدراسية	1. Understanding the research process: The course aims to familiarize students with the research process, including the various stages involved, from formulating a research question to presenting findings. 2. Developing research skills: The course aims to develop students' skills in conducting research, including identifying research problems, designing appropriate research methods, collecting and analyzing data, and drawing valid conclusions. 3. Familiarity with research design: The course focuses on introducing different research designs, such as experimental, correlational, qualitative, and quantitative, and helps students understand their strengths, limitations, and appropriate applications. 4. Literature review: Students learn how to conduct a comprehensive review of existing literature on a specific topic, identify gaps in knowledge, and situate their research within the broader scholarly context. 5. Ethical considerations: The course emphasizes the importance of ethical conduct in research, such as obtaining informed consent, protecting participants' rights, and maintaining integrity in data collection, analysis, and reporting. 6. Data collection and analysis: Students learn various data collection methods, including surveys, interviews, observations, and experiments. They also gain knowledge about data analysis techniques, including descriptive statistics, inferential statistics, and qualitative analysis. 7. Research proposal development: The course may include practical exercises or assignments that involve developing a research proposal. Students learn how to formulate research questions, create a research design, select

	appropriate methods, and outline a research plan. 8. Critical thinking and problem-solving: The course encourages students to think critically about research problems, evaluate research designs and methodologies, and develop problem-solving skills to overcome challenges encountered during the research process. 9. Effective communication of research: Students learn how to communicate their research effectively through various means, such as research reports, academic papers, oral presentations, and posters.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowledge of research methods: Gain a comprehensive understanding of various research methods, including qualitative and quantitative approaches, and their applications in different disciplines. 2. Research design skills: Develop the ability to design research studies by formulating appropriate research questions, selecting suitable methodologies, and designing data collection procedures. 3. Ethical considerations: Understand the ethical principles and guidelines that govern research involving human participants, ensuring the protection of their rights and confidentiality. 4. Literature review proficiency: Acquire skills in conducting a thorough literature review, identifying relevant sources, evaluating research articles, and synthesizing existing knowledge. 5. Data collection and analysis techniques: Gain proficiency in collecting and analyzing data using appropriate methods and tools, such as surveys, interviews, statistical software, or qualitative analysis software. 6. Critical thinking and problem-solving: Enhance critical thinking skills to evaluate research problems, identify limitations, and develop effective solutions to address them. 7. Research proposal development: Learn to formulate research proposals, including research objectives, research questions, and appropriate methodologies, considering the feasibility and ethical implications. 8. Data interpretation and presentation: Develop the ability to interpret research findings accurately and present them effectively through written reports, oral presentations, and visual aids. 9. Collaboration and teamwork: Foster effective teamwork and collaboration skills by engaging in group projects, discussions, and peer reviews, which simulate real-world research collaborations. 10. Research communication skills: Improve the ability to communicate research concepts and findings to both academic and non-academic audiences, fostering clear and concise communication. 11. Research ethics and integrity: Understand the importance of ethical conduct in research, including responsible research practices, plagiarism prevention, and the responsible use of data. 12. Reflective practice: Develop a reflective approach to research, critically evaluating the strengths and weaknesses of research methodologies and approaches used in personal research projects.

Indicative Contents المحتويات الإرشادية	1. Introduction to Research Methodology: • Definition and purpose of research • Characteristics of good research • The research process and its components • Types of research (e.g., exploratory, descriptive, experimental) • Ethical considerations in research 2. Research Design: • Understanding research design and its significance • Experimental, quasi-experimental, and non-experimental designs • Cross-sectional and longitudinal designs • Qualitative research design and approaches (e.g., phenomenology, grounded theory) • Quantitative research design and approaches (e.g., surveys, correlational studies) 3. Sampling Techniques: • Probability and non-probability sampling methods • Sample size determination • Random sampling, stratified sampling, cluster sampling, and convenience sampling • Sampling errors and techniques to minimize them 4. Data Collection Methods: • Questionnaire design and development • Interview techniques (structured, semi-structured, and unstructured) • Observation methods (participant observation, non-participant observation) • Document analysis and secondary data sources • Use of technology in data collection (online surveys, computer-assisted interviewing) 5. Data Analysis: • Introduction to statistical analysis techniques • Descriptive statistics (measures of central tendency, measures of dispersion) • Inferential statistics (hypothesis testing, t-tests, ANOVA, regression analysis) • Qualitative data analysis techniques (thematic analysis, content analysis, coding) • Introduction to data analysis software (SPSS, NVivo, Excel) 6. Writing and Presenting Research: • Academic writing conventions and formatting (APA style) • Structure and components of a research paper • Literature review techniques and strategies • Effective presentation skills (oral and visual presentations) • Interpreting and communicating research findings 7. Research Ethics and Integrity: • Ethical considerations in research involving human participants • Informed consent and confidentiality

	• Institutional review boards and research ethics committees • Research misconduct and plagiarism prevention • Responsible data management and sharing 8. Research Proposal Development: • Components of a research proposal (introduction, literature review, methodology, timeline) • Research question formulation and hypothesis development • Justification for research and research objectives • Data collection and analysis plan • Budgeting and resources required for research

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Lectures: In-class lectures are often used to introduce key concepts, theories, and frameworks related to research methodology. Lectures provide a foundation of knowledge and help students understand the theoretical underpinnings of research methods. 2. Interactive Discussions: Facilitating interactive discussions encourages student engagement and critical thinking. These discussions can involve analyzing research articles, evaluating research designs, and debating ethical considerations. Students can also share their experiences, ask questions, and engage in problem-solving exercises. 3. Case Studies: Case studies present real-life research scenarios or studies, allowing students to analyze and critique research methodologies used. This approach helps students understand how research methods are applied in different contexts and develop a deeper understanding of the strengths and limitations of various approaches. 4. Group Projects: Collaborative group projects foster teamwork and provide practical experience in applying research methodologies. Working in teams, students can design and execute research studies, analyze data, and present their findings. Group projects simulate real-world research collaborations and promote effective communication and cooperation. 5. Practical Exercises: Hands-on practical exercises allow students to apply research methods, such as designing surveys, conducting interviews, or analyzing data. These exercises may involve using statistical software, qualitative analysis tools, or data collection techniques. Faculty or teaching assistants can provide guidance and feedback during these activities. 6. Workshops and Seminars: Guest speakers, workshops, and seminars provide opportunities for students to learn from experts in the field and gain insights into current research practices. These sessions may cover topics such as advanced statistical analysis techniques, emerging research methodologies,

	or specialized research areas. 7. Research Proposal Development: Guiding students through the process of developing a research proposal allows them to apply the concepts and skills learned in the course. Faculty members can provide feedback and support as students formulate research questions, select appropriate methodologies, and develop research plans. 8. Practical Examples and Case Illustrations: Using practical examples and case illustrations helps students connect theoretical concepts with real-world applications. Faculty members can present examples from their own research or share published studies to demonstrate how different research methods are employed. 9. Independent Study and Research: Encouraging independent study and research allows students to explore specific topics of interest in-depth. This can involve conducting a literature review, designing and executing a small-scale research project, or analyzing existing datasets. Faculty members can provide guidance and support throughout the independent study process. 10. Assessment and Feedback: Assessments, such as quizzes, exams, research reports, and presentations, provide opportunities for students to demonstrate their understanding of research methodology. Constructive feedback from faculty members helps students identify areas for improvement and refine their research skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**100**		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.				
	Report	1	10% (10)	13	LO #5, #8 and #10
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	Introduction to Research Methodology • Overview of the research process • Characteristics of good research • Ethical considerations in research
Week 2	Research Design • Experimental, quasi-experimental, and non-experimental designs • Cross-sectional and longitudinal designs
Week 3	Sampling Techniques • Probability and non-probability sampling methods • Sample size determination
Week 4	Data Collection Methods • Questionnaire design and development • Interview techniques
Week 5	Data Analysis - Descriptive Statistics • Measures of central tendency • Measures of dispersion

Week 6	Data Analysis - Inferential Statistics • Hypothesis testing • t-tests
Week 7	• Mid-term Exam + Hypothesis testing
Week 8	Data Analysis - Inferential Statistics (continued) • ANOVA • Regression analysis
Week 9	Qualitative Research Methods • Introduction to qualitative research • Approaches and techniques in qualitative research
Week 10	Data Analysis - Qualitative Analysis • Thematic analysis • Content analysis
Week 11	Research Proposal Development • Components of a research proposal • Research question formulation and objectives
Week 12	Literature Review • Strategies for conducting a literature review • Evaluating and synthesizing research articles
Week 13	Data Interpretation and Presentation • Effective presentation skills • Interpreting and communicating research findings
Week 14	Research Ethics and Integrity • Ethical considerations in research involving human participants • Responsible data management and sharing
Week 15	Review and Recap • Recap of key concepts and methodologies covered throughout the course • Q&A session and preparation for final assessments
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	
Week 2	
Week 3	

Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Operating Systems I**			**Module Delivery**	
Module Type	**Core learning activity (C)**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**CSDC410**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGIV	**Semester of Delivery**		7
Administering Department		CSIT	**College**	Type College Code	
Module Leader	Dr. Arwa Hatem Qassim		**e-mail**	E-mail: arwa.alqudsi@uoanbar.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSDC211	**Semester**	3
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 critically understand the specialist theories, principles, and concepts of modern operating systems. 2. To explain the fundamental structure of a modern operating system and its core functions and services. 3. To critically examine and evaluate different strategies and techniques used by operating systems to manage computer resources. 4. To examine the algorithmic ideas integrated into the design and implementation of different operating systems. 5. To understand how operating systems manage resources such as processors, memory, and I/O.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enabling students to obtain an understanding and knowledge of the components of an operating system. 2. Running and executing programs within the computer. 3. Providing the students with the fundamentals and topics related to thinking. 4. Problem Solving: Use a range of approaches to critically analyze and evaluate practices of operating systems in identifying, defining, and solving problems by using alternative effective and efficient algorithms. 5. Modeling and Design: Use a range of specialist models to model the problems of computer and communication systems, such as deadlock, and design efficient and effective handling procedures. 6. Analytic: Critically analyze and evaluate the performance and effectiveness of different algorithms used by different operating systems. 7. Creative: Extend knowledge in operating systems to construct specific and effective solution to manage and control computer resources. 8. Communication: Show ability to communicate information in appropriate oral and written forms. 9. Organizational and Developmental Skills: Demonstrate ability to organize

	ideas and effectively allocate time in given assignment.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** **Part A: Operation System** **Concepts and Theories:** Demonstrate critical knowledge and understanding of the concepts of operating system, its architecture, and functions.[15] **Contemporary Trends, Problems and Research:** Demonstrate critical knowledge and understanding of major current issues of computer recourses management and methods of handling these problems in modern operating systems. [15 hrs] **Problem Solving:** Use a range of approaches to critically analyze and evaluate practices of operating systems in identifying, defining and solving problems by using alternative effective and efficient algorithms.[15 hrs] **Modeling and Design:** Use a range of specialist models to model the problems of computer and communication systems, such as deadlock, and design efficient and effective handling procedures.[15 hrs] **Analytic:** Critically analyze and evaluate the performance and effectiveness of different algorithms used by different operating systems.[11 hrs] **Creative:** Extend knowledge in operating system to construct specific and effective solution to manage and control computer resources.[11 hrs] **Presentation:** All students should participate in different presentations about different subjects. [11 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

	1. Providing students with the fundamentals and topics related to thinking. 2. Giving students daily assignments. 3. Encouraging the formation of group discussions during the lecture. 4. Present stimulating questions during the lecture, such as 'how' and 'why.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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	5% (5)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	5% (5)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	20% (20)	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.
Week 2	Computer Hardware Structure Overview.
Week 3	Operating System Concepts and Structure.
Week 4	Process: Concepts, States, Operations, Process Communication.
Week 5	Process: Concepts, States, Operations, Process Communication.
Week 6	Protection and Security
Week 7	Process State
Week 8	Process Management: Process Synchronization.
Week 9	Process Management: Process Scheduling.
Week 10	Process Management: Process Scheduling.
Week 11	Process Management: Process Scheduling.
Week 12	Process Management: Process Scheduling
Week 13	Introduction to Memory management
Week 14	Process Management: Deadlocks.
Week 15	Reviewing All Topics
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to MS-DOS Instructions

Week 2	Lab 2: WAP to implement First Come First Serve (FCFS) Scheduling.
Week 3	Lab 3: WAP to implement shortest job first (SJF) scheduling.
Week 4	Lab 4: Exam 1.
Week 5	Lab4: WAP to implement Priority based scheduling.
Week 6	Lab 6: WAP to implement Round Robin (RR) scheduling.
Week 7	Lab 7: Exam 2.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Silberschatz A., Galvin P. B. and Gagne G. (2013) Operating System Concepts, Ninth Edition, Wiley.	Yes
Recommended Texts	1. Tanenbaum A. S. (2009) Modern Operating Systems, Third Edition, Pearson Education. 2. Mchose A. and Flynn I. M. (2011) Understanding Operating Systems, Sixth Edition, Cengage Learning. 3. Tanenbaum A. S. and Woodhull A. S. (2006) Operating Systems Design and Implementation, Third Edition, Pearson Hall.	Yes
Websites	https://www.os-book.com/OS9/	

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 Security I**			**Module Delivery**	
Module Type	**Core learning activity (C)**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**CSDC411**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGIV	**Semester of Delivery**		7
Administering Department		CSIT	**College**		
Module Leader	Ali Makki Sagheer Saleh		**e-mail**	E-mail: ali_makki@uoanbar.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		Name	**e-mail**	E-mail:	

Scientific Committee Approval Date	01/06/2023	**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 Objectives أهداف المادة الدراسية	6. To explore the concepts of information security attacks, services, and mechanism. 7. To make students familiar with the basic concepts of applied cryptography, including classical cryptography and modern secret key cryptography. 8. To explain the mathematical foundation of modern cryptography, especially number theory and finite fields. 9. To highlight the practical applications and modes of operation of block ciphers.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**After completing the module, the student should be able to:** 1. Describe the basic mathematical and technical issues relating to information security. 2. Learning how to leverage these concepts to protect computers from external threats.

	3. Interpret how technology affects the design of symmetrical systems, especially block ciphers. 4. Use rigorous mathematical formulations of symmetric cryptography to spot weaknesses in designs. 5. Demonstrate skills in using classical ciphers for encryption and decryption. 6. Demonstrate skills in using some basic cryptanalysis techniques related to classical cryptography.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** **Computer Security:** focus on basic terms of cryptography. Also the basic cipher system such as symmetric key cryptography, including classical , stream and block ciphers (DES and AES) and their modes of operation.[15 hrs] The course will emphasize rigorous mathematical formulations of security goals and aim to train students in spotting weaknesses in designs. This is generally regarded by undergraduates as a challenging course. It is mainly theoretical and mathematical in nature and calls for the ability to understand abstract concepts. [15 hrs] **Assignments and homework:** Assignments and homework will be distributed during the course. Unless otherwise is stated, all homework should be performed individually by students. The default time for submitting any homework is one week (they should be submitted before the beginning of the next lecture). All assignments and homework assignments have to be submitted in a printed well-organized form. [15 hrs] All students should participate in different presentations about different subjects. [10 hrs] Different topics will be discussed with students where they will be asked to search over the web for and try to prepare a reports for every topic they asked to provide. [8

	hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Directing students with inferential questions during lectures and assigning them to research the answers through internet searches. 2. Prohibiting the exchange of solutions among students in groups by changing the assignments from one group to another. 3. Encouraging students to attend theoretical lectures by conducting daily exams.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #10, #11

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction and Historical Notes.
Week 2	Classical Encryption Techniques.
Week 3	Substitution Ciphers
Week 4	Transposition Ciphers and.
Week 5	Encryption Machines.
Week 6	Block Ciphers.
Week 7	The Data Encryption Standard.
Week 8	DES Cryptanalysis.
Week 9	Groups, Rings, and Fields.
Week 10	Modular Arithmetic.
Week 11	Polynomial Arithmetic.
Week 12	Finite Fields of the Form GF(2n).
Week 13	AES: The Advanced Encryption Standard and AES Strength
Week 14	Block, Stream Ciphers and Modes of Operation.

Week 15	Review All Topics.
Week 16	Preparatory week before the final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	William Stallings, Cryptography and Network Security: Principles and Practice, 5/E.	Yes
Recommended Texts	William Stallings, Cryptography and Network Security: Principles and Practice, 5/E ISBN-10: 0136097049 ISBN-13: 9780136097044 Publisher: Prentice Hall Copyright: 2011	Yes

	(3rd or 4th editions of this text are also sufficient)	
Websites	https://www.amazon.com/Cryptography-Network-Security-Principles-Practice/dp/0136097049.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information

معلومات المادة الدراسية					
Module Title	**Artificial Intelligence**			**Module Delivery**	
Module Type	**Core learning activity (C)**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**CSDC412**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	UGIV		**Semester of Delivery**	7	
Administering Department	CSIT		**College**		
Module Leader	Dr. Belal Al-Khateeb		**e-mail**	E-mail : belal-alkhateeb@uoanbar.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	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**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 Objectives أهداف المادة الدراسية	1. Understanding of AI definitions, characteristics, and types. 2. Distinguishing between AI search techniques. 3. Designing smart systems for solving daily life problems

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the 1. Introducing students to a new scientific subject that enhances their knowledge in the field of computer science, Artificial Intelligence. 2. It aims to introduce students to the meaning of the scientific term "Artificial Intelligence" and its applications in computer science, engineering, and other related fields. 3. Developing students' computational and mathematical skills. 4. Introducing students to the use of logical thinking in problem representation and solving 5. The course aims to provide an understanding of the fundamentals and principles of Artificial Intelligence methods, including algorithms and computer programs that simulate human, animal, or other behavioral patterns. These methods enable computers (machines) to acquire the ability to learn, infer, and react to specific situations. One of these intelligent applications is the humanoid robot. 6. AI is a rapidly evolving field, and studying AI allows students to understand the underlying principles, algorithms, and techniques that drive AI systems. This knowledge can lead to advancements in AI technology, such as developing more efficient algorithms, improving machine learning models, or creating new AI applications. 7. AI has the potential to tackle complex problems that are difficult for traditional computing methods.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** **<u>Part A – Artificial Intelligence Concepts</u>** **Presenting all concepts of Artificial Intelligence:** Including an interactive topic that covers important points about Artificial Intelligence. In addition to that doing some reports related to these topics. [15 hrs] **Systematic Search:** Showing different sides of Basic Graph Concepts; State Space

	Representation of Problems, Search Algorithms. [15 hrs] **AI:** discussing different types of Clause Normal Form, Modus-Ponens and Resolution Inference Rules in Predicate Logic. [15 hrs] Revision problem classes. [10 hrs] **<u>Part B – Lab work</u>** **Assignments:** There are going to be many assignments during the class. These assignments will be given along with the concept of AI. The assignment should help the student to be familiar with the AI concepts by practicing them. [15 hrs] All students should participate in different presentations about different subjects. [8 hrs] Different topics will be discussed with student where they will be asked to search over web for and try to prepare reports for every topic they asked to provide. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Teaching and learning methods are divided into theoretical and practical components.** 1. **In the theoretical part**, students learn about the scientific subject through explanations supported by examples. This is followed by interactive question-and-answer sessions between students and the instructor, where the instructor encourages students to solve examples themselves to enhance their understanding of the subject and increase their self-confidence. 2. **In the practical part,** the learning process takes place in the laboratory. Students learn the fundamentals of logical programming by presenting programming examples to them and encouraging constructive discussions

	among students to expedite the understanding process.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	108	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
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 12	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	3 and 13	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	14	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	10	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	General Introduction
Week 2	The History of AI
Week 3	Systematic Search: Basic Graph Concepts; State Space Representation of Problems.
Week 4	Depth-First Search, Breadth-First search, and Hybrid Search.
Week 5	Propositional Logic and Resolution in Propositional Logic.
Week 6	Predicate Logic: Basic Concepts and Definitions.
Week 7	Horn Clauses; Unification; Skolemization and Clause Normal Form.
Week 8	Modus-Ponens and Resolution Inference Rules in Predicate Logic.
Week 9	Control Strategies for Resolution Inference (Problem Solving).
Week 10	Mid Term Exam.
Week 11	Heuristic Search: Heuristic Functions;
Week 12	Hill Climbing Algorithm and Best-First Search Algorithm.
Week 13	Cost Functions
Week 14	A* Algorithm and Properties of Heuristic Functions.
Week 15	Search in Games: Introduction.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to basics of the python language and take the fundamental tools in python (if, else if, nested if, for loop, while , list and functions) and implementing various

	program in python.
Week 2	An introduction to the topic of how to represent a tree in the Python language (Represent a tree in python using list) and explanation the first algorithm (Depth first search) then write and execute the program on the computer by the students.
Week 3	Explanation (Breadth first search and hybrid algorithms)and explain how to convert the algorithms to a program in python by using (list, functions, and loops) then write and execute the program on the computer by the students.
Week 4	Explanation (Hill climbing and Best - search algorithm) and explain how to convert the algorithm to a program in python by using (list, functions and loops)then write and execute the program on the computer by the students.
Week 5	Explanation(A* search algorithm) and explain how to convert the algorithm to a program in python by using (list, functions and loops), write and execute the program on the computer by the students.
Week 6	Explanation (Min Max search algorithm) and explain how to convert the algorithm to a program in python by using (list, functions and loops), write and execute the program on the computer by the students.
Week 7	Making a comprehensive review of all algorithms and then making a final exam for all the previous topics.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Artificial Intelligence: A Modern Approach, Stuart Russell and Peter Norvig, Pearson Education, 2020.	Yes
Recommended Texts	Artificial Intelligence: Structures and Strategies for Complex Problem Solving, George F. Luger, Addison-Wesley, 2008	Yes
Websites	https://www.amazon.com/Artificial-Intelligence-Structures-Strategies-Complex/dp/0321545893.	

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**	**Module Delivery**
Module Type	**Core learning activity (C)**	☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**
Module Code	**CSDC413**	
ECTS Credits	**6**	
SWL (hr/sem)	**150**	

Module Level		UGIV	**Semester of Delivery**		7
Administering Department		CSIT	**College**		
Module Leader	Azmi Tawfiq Hussein Ali al-Rawi		**e-mail**	E-mail: azmi.alrawi@uoanbar.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		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSDC213	**Semester**	3
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. Explaining the concept of image processing to students and its various applications. 2. Empowering students to understand the types of image processing. 3. Empowering students with the necessary skills to perform image processing, write relevant algorithms, and employ methods for visualization and digital image manipulation. 4. Providing students with skills in using the MATLAB package and applying it in image processing.
Module Learning	1. Understanding the concept of image processing and its various

Outcomes مخرجات التعلم للمادة الدراسية	applications. 2. Understanding how images are represented and displayed on the screen.. 3. Understanding and acquiring knowledge of using the MATLAB package in image processing applications. 4. Understanding and acquiring knowledge of different methods of image processing. 5. Understanding and gaining knowledge of various algorithms used in image processing. 6. Providing the student with the skill of representing two-dimensional arrays.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** **<u>Part A: Data Image Processing</u>** **Data Image Processing :** data digital processing typically refers to the key topics and subject areas covered in a curriculum or course focused on data processing and digital technologies. Here is a sample list of indicative contents for data digital processing (Basics of data and information, Data types and formats, Data collection and validation and Data storage and retrieval). [15 hrs] **Elements:** Focus for elements of digital image processing system and human visual system.[15 hrs] **sampling and quantizing:** Explain the concept of sampling and quantizing for digital image processing. [15 hrs] **linear and nonlinear mapping:** showing the concept of Convolution and correlation processes and present all types of 2D filtering compared with 1D filtering.[15 hrs] **<u>Part B : Lab</u>** **Assignments and homework:** Assignments and homework will be distributed during the course. Unless otherwise is stated, all homework should be performed individually by students. The default time for submitting any homework is one week (they should be submitted before the beginning of the next lecture). All assignments and homework assignments have to

	be submitted in a printed well-organized form. [15 hrs] All students should participate in different presentations about different subjects. [10 hrs] Different topics will be discussed with students where they will be asked to search over the web for and try to prepare a reports for every topic they asked to provide. [8 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Utilizing data visualization. 2. Utilizing the internet. 3. Utilizing whiteboard. 4. Utilizing open discussions.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Pictures & Images, What is the digital images.
Week 2	Elements of digital image processing system and human visual system.
Week 3	Electromagnetic spectrum and visible radiation.
Week 4	Image representation and digital image files formats.
Week 5	Sampling & Quantization.
Week 6	Gray scale image modification.
Week 7	Algebraic operations on images.
Week 8	Mid Examine.
Week 9	Image analysis and histogram representation.
Week 10	Image preprocessing and image enhancement.
Week 11	linear and nonlinear mapping.

Week 12	Convolution and correlation processes.
Week 13	Types of 2D filtering compared with 1D filtering.
Week 14	color Space and image Sampling.
Week 15	Preparatory week before the final Exam.
Week 16	**Final Exam.**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to MATLAB Programming.
Week 2	Information Mat lab Desktop.
Week 3	Fundamentals of Image Processing.
Week 4	Methods of Displaying Image.
Week 5	Image Analysis.
Week 6	Image Enhancement.
Week 7	Color Images

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Gonzalez, Digital Image Processing Using Mtlab, 2nd Edition, Pearson,2009	Yes
Recommended Texts	Alsadair Mc Andrew, An introduction to digital image processing with MATLAB , 2004	Yes
Websites	https://www.academia.edu/4147698/An_Introduction_to_Digital_Image_Processing_with_Matlab_Alasdair_McAndrew_2004.	

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	**Game Programming**	**Module Delivery**

Module Type	**Elective learning activity (E)**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**CSDE414**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level		UGIV	**Semester of Delivery**		7
Administering Department		CSIT	**College**	Type College Code	
Module Leader	Mohamed Salah Ibrahim Jassem		**e-mail**	E-mail: moh.salah@uoanbar.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		07/06/2023	**Version Number**		1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module		**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	10. Understand the fundamentals of game development. 11. Understand the principles of physics in games. 12. Implement collision detection and response. 13. Simulate realistic movements and interactions. 14. Learn programming languages commonly used in game development (e.g., C++, C#, or Java)

	15. Develop gameplay mechanics for a simple game. 16. Gain proficiency in using game development tools and engines (e.g., Unity, Unreal Engine) 17. Create, import, and manipulate game assets (graphics, audio, etc.)
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 10. Demonstrate a solid understanding of the fundamentals of game programming and design principles. 11. Apply programming concepts and techniques to develop game mechanics and functionality. 12. Utilize game development tools and engines (e.g., Unity, Unreal Engine, or Godot) to create and prototype games. 13. Implement physics simulations and realistic behaviors in games, including collision detection and response. 14. Design and develop intelligent game characters. 15. Create intuitive and visually appealing user interfaces (UI) that enhance the overall player experience.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.** **<u>Part A – Game Programming Concepts</u>** Presenting all concepts of game programming. Including an interactive topic that covers important points about game programming. In addition to that doing some reports related to these topics . [15 hrs] Game Programming challenges: Showing different sides of game programming abilities such as game graphics, game physics, game sprites and more. [15 hrs] Game Programming tools – discussing different types of game engies. How to render images, and how to design games. Learning tools that can accelerate building games. [10 hrs] Game Engines and how to use them with example of games built using these game engines [15 hrs] Revision problem classes [6 hrs] **<u>Part B – Lab work</u>**

	Assignments There are going to be many assignments during the class. These assignments will be given along with the concept of game programming. The assignment should help the student to be familiar with the game programming concepts by practicing them. [15 hrs] All students should participate in different presentations about different games. This is going to be a list of games hand out to student where they will choose the game they interested in and presenting it to the student in the class. [7 hrs] Different topics will be discussed with student where they will be asked to search over web for and try to prepare a reports for every topic they asked to provide. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Project-Based Learning:** Encourage learners to work on practical projects that involve developing a game from start to finish. This hands-on approach helps them apply their programming skills and gain a deeper understanding of game development concepts.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Game Programming
Week 2	How to design a Game
Week 3	Game Physics - The main parts of game physics
Week 4	Fortnite and Battlefield – what are these games, who developed them
Week 5	Minecraft and animal crossing, what are these games, who developed them
Week 6	Game Graphics – the concept of pixel, color, resolutions, and others.

Week 7	Mid-term Exam
Week 8	Game Design – texture mapping, lighting, rasterization, and others.
Week 9	Unity Game Engine - Colliders and Tilemaps
Week 10	Unity Engine - Layer-Based Collision Detection and Player Collisions
Week 11	Unity Engine - Health and Inventory
Week 12	Unity Engine - Characters, Coroutines, and Spawn Points
Week 13	Game programming with Artificial Intelligence
Week 14	Artificial Intelligence – Algorithms and Procedures
Week 15	Artificial Intelligence – Smart Games
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Installing and creating your first project with unity
Week 2	Lab 2: C# and Unity
Week 3	Lab 3: Unity Foundations
Week 4	Lab 4: Colliders
Week 5	Lab 5: State and Animations
Week 6	Lab 6: World Building
Week 7	Lab 7: Camera Setting and Player movement

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Developing 2D Games with Unity_ Independent Game Programming with C#	Yes
Recommended Texts	Learning C# by Developing Games with Unity 3D	Yes
Websites	https://www.uoanbar.edu.iq/staff-page.php?ID=1634	

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 II**			**Module Delivery**	
Module Type	**Core learning activity (C)**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**CSDC420**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		UGIV	**Semester of Delivery**		8
Administering Department		CSIT	**College**	Type College Code	
Module Leader	Dr. Arwa Hatem Qassim		**e-mail**	E-mail: arwa.alqudsi@uoanbar.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSDC410	**Semester**	7
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	18. To critically understand the specialist theories, principles, and concepts of modern operating systems. 19. To explain the fundamental structure of a modern operating system and its core functions and services. 20. To critically examine and evaluate different strategies and techniques used by operating systems to manage computer resources. 21. To examine the algorithmic ideas integrated into the design and implementation of different operating systems. 22. To understand how operating systems manage resources such as processors, memory, and I/O.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	16. Enabling students to obtain an understanding and knowledge of the components of an operating system. 17. Running and executing programs within the computer. 18. Providing the students with the fundamentals and topics related to thinking. 19. Problem Solving: Use a range of approaches to critically analyze and evaluate practices of operating systems in identifying, defining, and solving problems by using alternative effective and efficient algorithms. 20. Modeling and Design: Use a range of specialist models to model the problems of computer and communication systems, such as deadlock, and design efficient and effective handling procedures. 21. Analytic: Critically analyze and evaluate the performance and effectiveness of different algorithms used by different operating systems. 22. Creative: Extend knowledge in operating systems to construct specific and effective solution to manage and control computer resources. 23. Communication: Show ability to communicate information in appropriate oral and written forms. 24. Organizational and Developmental Skills: Demonstrate ability to organize ideas and effectively allocate time in given assignment.
Indicative Contents	**Indicative content includes the following:**

المحتويات الإرشادية	**Part A: Operation System** Concepts and Theories: Demonstrate critical knowledge and understanding of the concepts of operating system, its architecture, and functions.[15] Topics covered include computer system and OS structure; process management: process, threads, CPU scheduling, process synchronization, deadlocks; memory management; mass storage management, and file systems.[15 hrs] Contemporary Trends, Problems and Research: Demonstrate critical knowledge and understanding of major current issues of computer recourses management and methods of handling these problems in modern operating systems. [15 hrs] Problem Solving: Use a range of approaches to critically analyze and evaluate practices of operating systems in identifying, defining, and solving problems by using alternative effective and efficient algorithms.[15 hrs] Modeling and Design: Use a range of specialist models to model the problems of computer and communication systems, such as deadlock, and design efficient and effective handling procedures.[15 hrs] **Port B: Lab Work** Analytic: Critically analyze and evaluate the performance and effectiveness of different algorithms used by different operating systems.[5 hrs] Creative: Extend knowledge in operating system to construct specific and effective solution to manage and control computer resources.[5 hrs] Presentation: All students should participate in different presentations about different subjects. [8 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	5. Providing students with the fundamentals and topics related to thinking. 6. Giving students daily assignments. 7. Encouraging the formation of group discussions during the lecture. 8. Present stimulating questions during the lecture, such as 'how' and 'why.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.133
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	5% (5)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	5% (5)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	20% (20)	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	**Process Management: Deadlocks.**
Week 2	**Process Management: Deadlocks.**
Week 3	**Resource-Allocation Graph**
Week 4	**Deadlock Handling**
Week 5	**Deadlock Avoidance (Banker's Algorithm)**
Week 6	**Resource-Request of Banker's Algorithm**
Week 7	**Memory Management.**
Week 8	**Dynamic storage allocation problem**
Week 9	**The problem of Contiguous Memory Allocation**
Week 10	**The problem of Contiguous Memory Allocation**
Week 11	**Virtual Memory**
Week 12	**Virtual Memory**
Week 13	**Replacement Algorithms**
Week 14	**Replacement Algorithms**
Week 15	Students team research projects (reports and presentations).
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: WAP to implement DeadLock Detection. (Banker's Algorithm)
Week 2	Lab 2: WAP to implement DeadLock Detection. (Banker's Algorithm with new resource).
Week 3	Lab 3: Exam 1.
Week 4	Lab 4:WAP to implement Algorithms for Allocation First-Fit
Week 5	Lab 5: WAP to implement Algorithms for Allocation of Best-Fit and Worst Fit
Week 6	Lab 6: WAP to implement for Page Replacement Algorithms
Week 7	Lab 7: Exam 2.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Silberschatz A., Galvin P. B. and Gagne G. (2013) Operating System Concepts, Ninth Edition, Wiley.	Yes
Recommended Texts	4. Tanenbaum A. S. (2009) Modern Operating Systems, Third Edition, Pearson Education. 5. Mchose A. and Flynn I. M. (2011) Understanding Operating Systems, Sixth Edition, Cengage Learning. 6. Tanenbaum A. S. and Woodhull A. S. (2006) Operating Systems Design and Implementation, Third Edition, Pearson Hall.	Yes
Websites	https://www.os-book.com/OS9/	

Grading Scheme

مخطط الدرجات

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

	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
(0 – 49)	**F –** Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	**Computer Security II**		**Module Delivery**	
Module Type	**Core learning activity (C)**		☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**CSDC421**			
ECTS Credits	**5**			
SWL (hr/sem)	**125**			
Module Level	UGIV	**Semester of Delivery**	8	
Administering Department	CSIT	**College**	Type College Code	
Module Leader	Ali Makki Sagheer Saleh	**e-mail**	E-mail: ali_makki@uoanbar.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	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSDC411	**Semester**	7
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	23. To explore the concepts of cryptographic key distribution and the limitation of symmetrical systems in this area. 24. To make students familiar with the basic concepts of public key cryptography and hash functions. 25. To explain the basic applications of public key systems in key distribution and digital signatures. 26. To highlight the technical and social issues related to viruses, worms, and trusted systems.
Module Learning Outcomes	**After completing the module, the student should be able to:** 1. Understand and discuss the mathematical background behind the

مخرجات التعلم للمادة الدراسية	evolution of public key cryptography. 2. Interpret how technology and theoretical advances can threat existing public key systems. 3. Demonstrate skills in using some public key algorithms for various applications. 4. Demonstrate skills in applying cryptographic hash functions for message authentication. 5. Describe the social and ethical issues relating to viruses and other malicious codes.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following:** **Computer Security:** focus will mainly be directed to public key cryptography. We will cover topics like hash functions, digital signatures, asymmetric encryption, RSA, public-key infrastructure, key distribution, and various applications.[15 hrs] The course aims to train students in spotting weaknesses in designs. Indeed, we will cover topics of security. This is generally regarded by undergraduates as a challenging course. It is mainly theoretical and mathematical in nature and calls for the ability to understand abstract concepts. [15 hrs **Assignments and homework:** Assignments and homework will be distributed during the course. Unless otherwise is stated, all homework should be performed individually by students. The default time for submitting any homework is one week (they should be submitted before the beginning of the next lecture). All assignments and homework assignments have to be submitted in a printed well-organized form .[15 hrs] All students should participate in different presentations about different subjects. [10 hrs] Different topics will be discussed with students where they will be asked to search over the web for and try to prepare a reports for every topic they are asked to provide. [8 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	4. Directing students with inferential questions during lectures and assigning them to research the answers through internet searches. 5. Prohibiting the exchange of solutions among students in groups by changing the assignments from one group to another. 6. Encouraging students to attend theoretical lectures by conducting daily exams.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.133
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 #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7

assessment	**Final Exam**	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Issues for Symmetric Key Cryptography: Key Distribution
Week 2	Random Number Generation
Week 3	Prime Numbers and Primality Tests
Week 4	Public-Key Cryptography I: General Concepts
Week 5	RSA System
Week 6	RSA Security
Week 7	Public-Key Cryptography II: Exchanging Secret Session Keys and Diffie-Hellman System
Week 8	Public-Key Cryptography III: Constructing Digital Signatures El-Gamal System
Week 9	Hashing for Message Authentication
Week 10	Cryptographic Hash Functions
Week 11	Digital Signature Scheme
Week 12	MACs Schemes.
Week 13	Trusted Systems.
Week 14	Mounting Targeted Attacks with Trojans and Social Engineering. Malware: Viruses and Worms.
Week 15	Review All Topics.
Week 16	Preparatory week before the final Exam.

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	William Stallings, Cryptography and Network Security: Principles and Practice, 5/E.	Yes
Recommended Texts	William Stallings, Cryptography and Network Security: Principles and Practice, 5/E ISBN-10: 0136097049 ISBN-13: 9780136097044 Publisher: Prentice Hall Copyright: 2011 (3rd or 4th editions of this text are also sufficient)	Yes
Websites	https://www.amazon.com/Cryptography-Network-Security-Principles-Practice/dp/0136097049.	

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	**Machine Learning**	**Module Delivery**
Module Type	**C**	☒ **Theory** ☐ **Lecture**
Module Code	**AICD422**	

ECTS Credits	**6**			☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
SWL (hr/sem)	**150**				
Module Level		UGIV	**Semester of Delivery**		8
Administering Department		CSIT	**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title		Associate Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Ahmed J. Aljaaf		**e-mail**	a.j.aljaaf@uoanbar.edu.iq	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSDC412	**Semester**	7
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Machine Learning Course aims to equipe students with a solid foundation of learning algorithms concepts and theories, including supervised and unsupervised learning. Students are expected to have a comprehensive understanding of the fundamental concepts and techniques of machine learning, regression modules, naive bayes, and more advance concepts including support vector machine and neural networks.
Module Learning Outcomes	By the end of the module, students should be able to:

مخرجات التعلم للمادة الدراسية	1- Understanding core concepts of machine learning, including supervised and unsupervised learning, neural networks, and various algorithms. 2- Developing a strong foundation in mathematics and statistics, which are essential for understanding machine learning algorithms. 3- Gaining hands-on experience in implementing machine learning algorithms and models using programming languages like Python. 4- Learning how to preprocess and clean data effectively, as high-quality data is crucial for accurate machine learning model training. 5- Understanding how to evaluate the performance of machine learning models, including metrics like accuracy, precision, recall, and F1-score, and techniques like cross-validation. 6- Exploring practical applications of machine learning across various domains, such as healthcare, finance, natural language processing, and computer vision.
Indicative Contents المحتويات الإرشادية	Linear Algebra Probability and Statistics Hypothesis Testing

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Hands-on Practical Exercises Case Studies and Real-World Examples Collaborative Learning Continuous Assessment and Feedback

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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**	2hr	20% (20)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Machine Learning (supervised, unsupervised, reinforcement learning)
Week 2	Linear Regression Module

Week 3	Logistic Regression
Week 4	Naive Bayes
Week 5	Support Vector Machine (SVM)
Week 6	Tree Models
Week 7	Random Forests
Week 8	Boosting
Week 9	Time Series Analysis and Forecasting using ARIMA models
Week 10	Introduction to Artificial Neural Networks
Week 11	Multi-layer Perceptrons (MLPs)
Week 12	Ensemble Learning Approach
Week 13	K-Means Clustering
Week 14	Feature Extraction Techniques
Week 15	Principle Component Analysis (PCA)
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Install Python and essential libraries (e.g., NumPy, scikit-learn). Verify your environment with a "Hello, World!" ML program.
Week 2	Implement a simple linear regression model. Perform data preprocessing and visualize results.
Week 3	Implement a logistic regression model for binary classification.

	Evaluate the model using accuracy, precision, recall, and F1-score.
Week 4	Implement decision tree models for classification and regression. Explore tree visualization and interpretability.
Week 5	Understand the concept of ensemble learning. Build and evaluate Random Forest models.
Week 6	Learn about boosting algorithms, like AdaBoost and Gradient Boosting. Implement a boosting model for classification.
Week 7	Implement SVM Via scikit-learn library.
Week 8	Explore cross-validation methods (e.g., k-fold cross-validation). Learn about various performance metrics (e.g., accuracy, precision, recall).
Week 9	Multi-layer Perceptrons (MLPs) Via scikit-learn library
Week 10	Implement K-Means Clustering algortihm

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Machine Learning Algorithms	No
Recommended Texts	Machine Learning Concepts	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	**Web Development**	**Module Delivery**
Module Type	**Core learning activity (C)**	☒**Theory** ☒**Lecture** ☒**Lab**
Module Code	**CSDC423**	

ECTS Credits	**6**			☐**Tutorial** ☐**Practical** ☐**Seminar**	
SWL (hr/sem)	**150**				
Module Level		UGIV	**Semester of Delivery**		8
Administering Department		CSIT	**College**	Type College Code	
Module Leader	Alaa Abdalqahar Jihad		**e-mail**	E-mail: it.alaa.heety@uoanbar.edu.iq	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		PhD
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date			**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CSDC210	**Semester**	3
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	27. Create a basic PHP script. 28. Execute a PHP script. 29. Send data to the Web browser. 30. Write comments in PHP. 31. Demonstrate how to use variables. 32. Work with string variables, including concatenation and a few string functions. 33. Work with numeric variables, including arithmetic and formatting. 34. Work with constants.

	35. Know how PHP treats the two quotation mark types differently. 36. Recognize common escape sequences. 37. Implement some basic debugging techniques
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enhanced User Experience: Web applications are designed to provide an intuitive and user-friendly experience for visitors or users. 2. Increased Accessibility: Web applications can be accessed from anywhere with an internet connection, making them highly accessible to users across different devices and platforms. 3. Improved Efficiency and Productivity: Web applications can automate and streamline various business processes, leading to improved efficiency and productivity. 4. Scalability and Flexibility: Web applications can be designed and developed to accommodate growth and changing business needs. 5. Cost-effectiveness: Compared to traditional software applications, web applications can be more cost-effective in terms of development, deployment, and maintenance.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.** **<u>Part A: Web Application Development</u>** **Web application:** present the concept of web application and explain the introduction of the PHP and functions. [15 hrs] **Requirements Gathering and Analysis**: showing the identifying the goals and objectives of the web application , understanding the target audience and user requirements.[15 hrs] **MySQL:** Introduction to MySQL and how to connect to the database. Also describe MySQL Queries and how it works. After that explain the advanced PHP .[15 hrs] Different topics will be discussed with student where they will be asked to search over web for and try to prepare a report for every topic they asked to provide. [15 hrs] Showing applying methods of inserting CSS to the HTML and Designing and applying

	styling tables and explain how inserting JavaScript code and dealing HTML by JavaScript.[15 hrs] **<u>Part B: Lab</u>** **HTML:** showing Creating the HTML files and writing basic script and executing HTML tags then , how we can Creating HTML forms to collect data.[10 hrs] There are going to be many assignments during the lab.[8 hrs] .

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Online Courses and Tutorials: Utilize online courses, tutorials, and video lectures to provide structured learning materials. 2. Interactive Coding Exercises: Incorporate interactive coding exercises and challenges to reinforce concepts and provide hands-on practice.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
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	5% (5)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	5% (5)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	15% (15)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	15% (15)	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 on Web Hosts.
Week 2	Introduction to PHP.
Week 3	Programming with PHP.
Week 4	Functions in PHP.
Week 5	Data Validation (Server Side).
Week 6	First exam.
Week 7	Introduction to MySQL.
Week 8	Connecting to the Database.
Week 9	MySQL Queries.

Week 10	MySQL Queries.
Week 11	Operation on MySQL.
Week 12	Advanced PHP.
Week 13	Second Exam.
Week 14	Students team research projects (reports and presentations).
Week 15	Students team research projects (reports and presentations)
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Creating the HTML files and writing basic scripts.
Week 2	Executing HTML tags.
Week 3	Creating HTML forms to collect data.
Week 4	Inserting CSS to HTML and Dealing with inline style.
Week 5	Quiz and in lab script writing.
Week 6	Applying methods of Inserting CSS to the HTML and Designing and applying styling tables.
Week 7	Inserting JavaScript code and Dealing html by JavaScript

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	PHP and MySQL for Dynamic Web Sites 4th Edition.	Yes
Recommended Texts	PHP and MySQL for Dynamic Web Sites 4th Edition.	Yes

Websites	https://www.academia.edu/40707720/PHP_and_MySQL_for_Dynamic_Web_Sites_Fourth_Edition

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	**Project**			**Module Delivery**	
Module Type	**Basic learning activities (B)**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Tutorial** ☐**Practical** ☐**Seminar**	
Module Code	**UOA020**				
ECTS Credits	**8**				
SWL (hr/sem)	**200**				
Module Level		UGIV	**Semester of Delivery**		8
Administering Department		CSIT	**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/06/2023	**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 Objectives أهداف المادة الدراسية	38. Research and Investigate: Conduct thorough research on a specific topic or problem related to the field of study. 39. Problem Identification: Identify a real-world problem or challenge that requires attention or a solution. 40. Goal Setting: Clearly define the goals and objectives of the graduation project, outlining what the project aims to accomplish or contribute to the field. 41. Literature Review: Conduct a comprehensive review of existing literature, studies, and research relevant to the chosen topic, to understand the current state of knowledge in the field. 42. Methodology Development: Develop an appropriate methodology or approach to investigate the problem and achieve the project goals. 43. Data Collection: Gather relevant data through surveys, experiments, observations, interviews, or other appropriate methods. 44. Data Analysis: Analyze the collected data using appropriate statistical or qualitative analysis techniques to derive meaningful insights and draw conclusions. 45. Solution Development: Propose innovative solutions, designs, systems, models, algorithms, or strategies to address the identified problem. 46. Implementation and Testing: Implement the proposed solution or design, and conduct testing or experimentation to evaluate its effectiveness, performance, or feasibility. 47. Results and Evaluation: Analyze the results of the project, evaluate the performance of the developed solution or design, and compare it to existing approaches or benchmarks.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Research Skills: Demonstrate the ability to conduct independent research, including literature review, data collection, and analysis, to explore a specific topic or problem. 2. Problem-Solving Skills: Identify and define a real-world problem or challenge, develop innovative solutions, and evaluate their feasibility and effectiveness. 3. Critical Thinking: Apply critical thinking skills to evaluate existing knowledge, analyze data, and draw logical conclusions based on evidence. 4. Communication Skills: Effectively communicate project objectives, methodologies, findings, and recommendations in both written and oral formats to diverse audiences. 5. Project Management: Plan, organize, and execute a complex project, including setting goals, managing resources, and meeting deadlines. 6. Analytical Skills: Apply appropriate analytical tools and techniques to interpret and analyze data collected during the project. 7. Technical Competence: Apply knowledge and skills gained from the academic program to design, implement, and evaluate a practical solution or prototype. 8. Professional Ethics: Adhere to ethical guidelines and demonstrate professional integrity throughout the project, including the responsible handling of data and respect for intellectual property. 9. Teamwork and Collaboration: Collaborate effectively with project team members, demonstrate interpersonal skills, and contribute to a positive team dynamic. 10. Self-Management: Take responsibility for self-directed learning, time management, and reflection on personal and professional development throughout the project.
Indicative Contents	

المحتويات الإرشادية	**Project Graduate:** it typically entails the key components and elements that should be included in the project work. The specific contents can vary depending on the field of study, academic institution, and the nature of the project. [10 hrs] **Introduction:** Background and context of the project, Problem statement or research question, Objectives and goals of the project, and Significance and relevance of the project. [15 hrs] **Literature Review:** Review of existing research and literature relevant to the project topic, critical analysis of previous studies and theories, Identification of research gaps and areas for further investigation and theoretical framework or conceptual model for the project. [15 hrs] **Methodology:** Description of the research design or methodology employed data collection methods and techniques, Sampling strategy and sample size (if applicable),tools, instruments, or software used for data collection and analysis.[14 hrs] **Data Analysis and Findings:** Presentation and analysis of the collected data, application of appropriate statistical or qualitative analysis methods, Interpretation of the results and findings, and comparison of results with existing literature or theories. [14 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 types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	123	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.133
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation

تقييم المادة الدراسية

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

Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	
Week 16	

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

Week 6	
Week 7	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Problem , Objective, methodology and results.	Yes
Recommended Texts	HANDBOOK OF RESEARCH METHODOLOGY. Edition 1.	Yes
Websites	https://www.researchgate.net/publication/319207471_HANDBOOK_OF_RESEARCH_METHODOLOGY	

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.