Ministry of Higher Education and Scientific Research Scientific Supervision and Scientific Evaluation Apparatus Directorate of Quality Assurance and Academic Accreditation Accreditation Department

Academic Program and Course Description Guide

2024-2025

Academic program description form

University name: University of Wasit.
College/Institute: College of Computer Science and Information Technology.
Computer Science Department
Name of the academic or professional program: Bachelor's degree. Computer Science
Name of final degree: Bachelor of Science in. Computer Science.
Semester Academic system.
Description preparation date: 10/3/2025
Date of filling the file: 10/3/2025

Signature:
Head of Department Name:

Date: 10/3/2025

Signature:
Scientific Associate Name:
Assist. Prof. Dr.
Abdul Hadi M. Alaidi
Dean Assistant for
Scientific Affairs

Date: 10/31/2025

Check the file before Division of Quality Assurance and University Performance
Name of the Director of the Quality Assurance and University Performance Division

Date: 10/3/2025
Signature:

Asst. Prof. Dr
Saif Ali Alsaidi
Dean college of computer
scenic & Information Technology

Authentication of the Dean
10/31/2025

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Organization**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☒**Lecture** ☐**Lab** ☒**Practical** ☐**Tutorial** ☒**Seminar**	
Module Code	cs-101				
ECTS Credits	**6**				
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Computer organization refers to the way in which the hardware components of a computer system are arranged and interconnected. It implements the provided computer architecture and covers the "How to do?" aspect of computer design. The aim of computer organization is to provide a clear understanding of the operation of a computer system.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Discussing the organization of computer-based systems and how a range of design choices are influenced by applications. • Understanding different processor architectures and system-level design processes. • Understanding the structure, function and characteristics of computer systems. • Understanding the design of the various functional units and components of computers. • Identifying the elements of modern instructions sets and their impact on processor design. • Explaining the function of each element of a memory hierarchy. • Identifying and comparing different methods for computer I/O. • Grasping the basic elements of logic circuits and other higher level modules. • Demonstrating computer organization & its programming consideration.
Indicative Contents المحتويات الإرشادية	A- Aims: The main goal of this course is to teach students the foundation of computer organization, the structure and behavior of the various functional units of the computer and how they interact to provide the processing needs of the user. The course aims to provide students with sufficient background necessary to understand the hardware operation of digital computers. Objectives include enabling students to: 1. Learn about computer functional modules. 2. . Understand the algorithms used in computerarithmetic. 3. Understand the techniques used in designing a digital computer. 4. Understand the concepts related to computer architecture. 5. Understand the basics of parallel processing B- Intended Learning Outcomes (ILOs): A- Knowledge and Understanding:

	Students should … A1) Learn the concepts of computer organization. A2) Know the important principles and definitions of computer architecture. B- Intellectual skills: with the ability to … B1) Compare and analyse the techniques used in the different computer functional modules. B2) Apply the appropriate tools to a digital computer design. C- Subject specific skills – with ability to … C1) Work on the implementation of the algorithms of the computer arithmetic. C2) Translate the learned concepts and ideas into practice. C3) Understand the main attributes of a computer system architecture. D- Transferable skills – with ability to D1) Possess good knowledge of the concepts of computer architecture. D2) Develop advanced techniques, tools and algorithms into complete projects. D3) Choose the appropriate computer functional module for a certain project

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	141	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	9	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem)	**150**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week	Material Covered
Week 1	basic Structure of Computers (Qualitative Discussion)
Week 2	Register Transfer and Micro-operation
Week 3	basic Computer Organization and Design
Week 4	CPU Organization
Week 5	**Control Unit**

	Hardwired Control Unit, Micro-programmed Control Unit: Control memory, Address Sequencing, conditional branching, mapping of instructions, subroutine, Design of Control Unit.
Week 6	**CPU Registers** Program Counter, Stack Pointer Register, Memory Address Register, Instruction Register,
Week 7	Mid-term Exam
Week 8	**Instructions**. Operational Code, Operands, Zero, One, Two and Three Address Instruction, Instruction Types, Addressing modes, Data Transfer and Manipulation instructions, Program control instructions.
Week 9	**CISC and RISC processors** Introduction, relative merits and De-merits.
Week 10	**Computer Peripherals** VDU, Keyboard, Mouse, Printer, Scanner (Qualitative approach).
Week 11	**Memory** Primary memory: ROM, PROM, EPROM, EEPROM, Flash memory
Week 12	**Memory** RAM: SRAM, DRAM, Asynchronous DRAMs, Synchronous DRAMs, Structure of Larger Memories, RAMBUS Memory, Cache Memory:
Week 13	**memory** Mapping Functions, Replacement Algorithms, interleaving, Hit and Rate penalty, Virtual memories, Address Translation, Memory
Week 14	**memory** Management requirements, Secondary Storage: Magnetic Hard Disks, Optical Disks, Magnetic Tape Systems.
Week 15	**computer Peripherals**

	VDU, Keyboard, Mouse, Printer, Scanner (Qualitative approach).
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Principle of Windows I
Week 2	Principle of WindowsII
Week 3	Principle of Windows IV
Week 4	Format pc I
Week 5	Format pc II
Week 6	Microsoft Office
Week 7	Office WORD I
Week 8	Office WORD II
Week 9	Office excel sheet I
Week 10	Office excel sheet II
Week 11	Office excel sheet IV
Week 12	Power point I
Week 13	Power point II.
Week 14	Power point IV.
Week 15	Final

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- Computer System Architecture, Mano, Latest edition,	Yes
Recommended Texts	• Computer Organization, Hamacher, McGraw-Hill. • Structured computer organization, Tanenbaum, Prentice Hall	yes
Websites	google	

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	**Program languages 1**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Practical** ☒**Tutorial** ☒**Seminar**	
Module Code	cs-102				
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- Learn the classification of programming techniques and the operations of computer. 2- Study the basic knowledge about fundamentals of programming languages
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Study the Classification of programming, the structure and operations of a computer, basic of arithmetic operations and control structure.
Indicative Contents المحتويات الإرشادية	he indicative contents of a study program language can vary depending on the institution and the specific program. However, most programming languages courses cover the basics of programming concepts such as data types, variables, control structures, functions, and algorithms. They also cover more advanced topics such as object-oriented programming, software engineering principles, and web development.

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	138	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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 programming language describing how to display text, add integers
Week 2	Defining memory concepts, Arithmetic, Equality and relational Operators
Week 3	Introduction to classes and objects.

Week 4	Defining and declaring a class with a method,
Week 5	Declaring a method with a parameter
Week 6	Introducing instance variables
Week 7	Mid-term Exam
Week 8	Introducing instance variables, set methods, get methods
Week 9	Initializing Objects with constructors
Week 10	Defining floating-point numbers and type double
Week 11	Control Statements Part I - Conditional statements, repetition using while statement
Week 12	Control Statements Part I - Conditional statements, repetition using while statement
Week 13	types of repetitions, nested repetition
Week 14	compound assignment statement
Week 15	increment and decrement operators.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to programming language describing how to display text, add integers
Week 2	Defining memory concepts, Arithmetic, Equality and relational Operators
Week 3	Introduction to classes and objects.
Week 4	Defining and declaring a class with a method,
Week 5	Declaring a method with a parameter in c++

Week 6	Introducing instance variables in c++
Week 7	Mid-term Exam
Week 8	Introducing instance variables, set methods, get methods
Week 9	Initializing Objects with constructors
Week 10	Defining floating-point numbers and type double
Week 11	Control Statements Part I - Conditional statements, repetition using while statement
Week 12	Control Statements Part I - Conditional statements, repetition using while statement
Week 13	types of repetitions, nested repetition
Week 14	compound assignment statement
Week 15	increment and decrement operators.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Schildt, Herbert, C++ (Computer program language), McGraw-Hill, New York: 2008.	Yes
Recommended Texts	Savitch, Walter Problem solving with C++: The object of programming/ C++, Pearson Addison Wesley, 2005.	yes
Websites	Malik, D S, C++ programming: From Problem Analysis to Program Design / C plus plus programming, Course Technology, 2009	

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	**Mathematiecs**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☒**Lecture** ☒**Lab** ☒**Practical** ☒**Tutorial** ☒**Seminar**	
Module Code	cs-104				
ECTS Credits	**6**				
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This course studies the mathematical elements of computer science. Topics include propositional logic; predicate logic; mathematical reasoning; techniques of proof; mathematical induction; set theory; number theory; matrices; sequences and summations; functions, relations and their properties, elementary graph theory, and tree.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Learning outcomes are concise descriptions of what students will learn and how that learning will be assessed.
Indicative Contents المحتويات الإرشادية	In general, mathematics is the study of numbers, quantities, and shapes2. It is a subject that is used in everyday life and is essential in many careers such as engineering, science, and finance3.

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ 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	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to plane geometry

Week 2	function and graph
Week 3	slope of curves
Week 4	derivative of function
Week 5	computations of derivatives-sum,
Week 6	product, and quotient formulas
Week 7	Mid-term Exam
Week 8	chain rule
Week 9	implicit differentiation, applications of derivatives to optimization problems and related rate problems
Week 10	implicit differentiation, applications of derivatives to optimization problems and related rate problems
Week 11	mean-value theorem;
Week 12	definite integrals and fundamental theorem of calculus application of definite integrals to computations of areas (length, surface) and volumes.
Week 13	application of definite integrals to computations of areas (length)
Week 14	application of definite integrals to computations of areas surface
Week 15	application of definite integrals to computations of areas volumes.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**

Required Texts	Thomas Calculus", 12thED,George B. Thomas Jr., Maurice D. Weir, Joel R. Hass, 2009Differential Equations (Schaum's Outlin Series).	Yes
Recommended Texts	2. Calculus (Haward Anton).	yes
Websites	3. Advanced Engineering Mathematics (Erwin Kreyszig)	

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			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☒**Tutorial** ☒**Practical** ☒**Seminar**	
Module Code	**cs-103**				
ECTS Credits	**7**				
SWL (hr./sem.)	175				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Type Dept. Code			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**		
Peer Reviewer Name	Name		**e-mail**		
Scientific Committee Approval Date	01/09/2024		**Version Number**		

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 module objectives of logic design typically include the following:** **1.** Understanding Boolean algebra: Logic design involves the use of Boolean algebra to manipulate logical expressions and design digital circuits. Students should be familiar with the basic principles of Boolean algebra, including Boolean operators, truth tables, and Boolean laws. **2.** Designing combinational circuits: Combinational circuits are digital circuits that produce an output based on the current input values. Students should be able to design combinational circuits using basic logic gates such as AND, OR, and NOT gates. **3.** Designing sequential circuits: Sequential circuits are digital circuits that use memory to store information and produce an output based on the current input and the stored information. Students should be able to design sequential circuits using flip-flops and other sequential logic components. **4.** Analyzing and optimizing digital circuits: Students should be able to analyze the behavior of digital circuits using truth tables, timing diagrams, and other tools. They should also be able to optimize digital circuits for speed, power consumption, or other performance metrics. **5.** Using computer-aided design (CAD) tools: Logic design often involves the use of computer-aided design (CAD) tools to simulate and validate digital circuits. Students should be familiar with popular CAD tools such as Verilog, VHDL, and SPICE. **6.** Understanding the limitations of digital circuits: Digital circuits are subject to various limitations such as noise, propagation delay, and power dissipation. Students should be aware of these limitations and understand how to mitigate them in their designs.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**The module learning outcomes of logic design may include the following:** **1.** Demonstrate an understanding of Boolean algebra and its application to digital circuit design. **2.**Design and implement combinational circuits using basic logic gates such as AND, OR, and NOT gates. **3.**Design and implement sequential circuits using flip-flops and other sequential logic components. **4.**Analyze the behavior of digital circuits using truth tables, timing diagrams, and other tools.

	5. Optimize digital circuits for speed, power consumption, or other performance metrics. **6.** Use computer-aided design (CAD) tools such as Verilog, VHDL, and SPICE to simulate and validate digital circuits. **7.** Understand the limitations of digital circuits and how to mitigate them in designs. 8. Identify and analyze different types of digital circuits, such as adders, counters, and memory circuits. **9.** Design and implement digital circuits for specific applications, such as data processing, control systems, or communication systems. **10.** Communicate effectively about digital circuit design, including the ability to read and write technical documents, present designs, and collaborate with others.
Indicative contents	**The indicative contents of logic design may include the following:** **1.** Introduction to digital circuits and logic gates: This includes an overview of digital circuits, logic gates, Boolean algebra, and truth tables. **2.** Combinational logic design: This includes designing combinational circuits using basic logic gates, Karnaugh maps, and Boolean algebra. **3.** Sequential logic design: This includes designing sequential circuits using flip-flops, registers, counters, and other sequential logic components. **4.** Analysis and optimization of digital circuits: This includes analyzing digital circuits using truth tables, timing diagrams, and other tools, as well as optimizing circuits for speed, power consumption, or other performance metrics. **5.** Computer-aided design (CAD) tools: This includes using popular CAD tools such as Verilog, VHDL, and SPICE to simulate and validate digital circuits.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	**the strategies of logic design involve a systematic approach to problem-solving, with an emphasis on simplifying the logic function and optimizing the circuit for performance. Effective documentation and testing are also important to ensure that the circuit meets the requirements and performs as expected.**

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	129	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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
	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
Formative 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	**Week 1: Introduction to digital circuits and logic gates** . Overview of digital circuits and their applications . Introduction to logic gates and Boolean algebra . Truth tables and logic function simplification
Week 2	**Week 2: Combinational logic design** . Designing combinational circuits using basic logic gates . Karnaugh maps and Boolean algebra for circuit simplification
Week 3	**Week 3: Combinational logic design (continued)** . Implementing combinational circuits using logic gates . Testing and validating combinational circuits using simulation tools
Week 4	**Week 4: Sequential logic design** . Introduction to sequential circuits and flip-flops . Designing sequential circuits using flip-flops and registers
Week 5	**Week 5: Sequential logic design (continued)** . Counters and other sequential logic components . Analysis and optimization of sequential circuits
Week 6	**Week 6: Memory circuits** . Designing memory circuits such as RAM and ROM . Understanding the limitations of memory circuits
Week 7	**Week 7: Arithmetic circuits** . Designing arithmetic circuits such as adders and subtractors. . Multipliers and dividers
Week 8	**Week 8: Communication circuits** . Digital circuits for communication systems, such as encoders, decoders, and serial/parallel converters . Understanding digital communications protocols
Week 9	**Week 9: Control circuits** . Digital circuits for control systems, such as timers, counters, and state machines . Applications of control circuits in industrial and consumer systems
Week 10	**Week 10: Computer-aided design (CAD) tools** . Introduction to popular CAD tools such as Verilog, VHDL, and SPICE . Simulation and validation of digital circuits using CAD tools
Week 11	**Week 11: Limitations and challenges of digital circuits** . Understanding the limitations of digital circuits such as noise, propagation delay, and power dissipation . Techniques for mitigating these limitations in design
Week 12	**Week 12: Project work** . Applying the concepts and skills learned in the module to design and implement a digital circuit for a specific application . Documenting the project and presenting the results
Week 13	**Week 12: Project work** . Applying the concepts and skills learned in the module to design and implement a digital circuit for a specific application . Documenting the project and presenting the results
Week 14	**Week 14: Review and exam preparation** . Review of key concepts and skills covered in the module . Practice exams and exam preparation strategies
Week 15	**Week 15: Exam** . covering the material from the module . Review of exam results and feedback
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week 1	**Week 1 - Introduction to Digital Logic and Boolean Algebra** • Introduction to digital logic and digital circuits • Boolean algebra and its laws • Combinational logic circuits: AND, OR, NOT, XOR, NAND, NOR, and XNOR gates • Lab 1: Introduction to logic gates and Boolean algebra
Week 2	**Week 2 - Combinational Logic Design** • Simplification of Boolean expressions using Karnaugh maps • Logic minimization techniques: Quine-McCluskey method • Combinational circuit design: adders, multiplexers, decoders, encoders, and comparators • Lab 2: Design and implementation of combinational circuits using logic gates
Week 3	**Week 3 - Sequential Logic Design** • Sequential circuits: flip-flops, registers, and counters • Synchronous and asynchronous sequential circuits • State diagrams and state tables • Lab 3: Design and implementation of sequential circuits using flip-flops
Week 4	**Week 4 - Finite State Machines** • Finite state machines (FSMs) and their applications • Moore and Mealy machines • State minimization and optimization • Lab 4: Design and implementation of FSMs using flip-flops and combinational circuits
Week 5	**Week 5 - Timing and Clocking** • Timing constraints and clock signals • Clock skew and jitter • Synchronization techniques • Lab 5: Timing analysis and clocking of sequential circuits
Week 6	**Week 6 - Memory and Programmable Logic** • Memory devices: RAM and ROM • Programmable logic devices: CPLD and FPGA • Hardware description languages: VHDL and Verilog • Lab 6: Design and implementation of memory and programmable logic circuits
Week 7	**Week 7 - System-on-Chip Design** • Overview of SoC design • Integration of digital circuits with analog and mixed-signal components • Design challenges and trade-offs • Lab 7: Design and implementation of a simple SoC using FPGA and peripherals

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**

Required Texts	**"Digital Design: Principles and Practices", "Fundamentals of Digital Logic with Verilog Design", "Introduction to Digital Systems", "Digital Electronics: Principles, Devices and Applications", "Logic and Computer Design Fundamentals", "Digital Logic Design: A Rigorous Approach", "Digital Systems Design Using VHDL"**	Yes
Recommended Texts	**"Digital Design: With an Introduction to the Verilog HDL", "Logic Design: A Review of Theory and Practice", "Digital Systems: Principles and Applications", "Digital Logic Circuit Analysis and Design" , "Fundamentals of Digital Logic and Microcomputer Design", "Digital Electronics: Principles, Devices and Applications"**	yes
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Academic English 1**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☒**Lecture** ☐**Lab** ☐**Practical** ☐**Tutorial** ☒**Seminar**	
Module Code	WUO2				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Students will focus on English at a pre-intermediate level concentrating on the receptive skills of reading and listening and the productive skills of writing and speaking. These will include such things as comparatives and superlatives, quantifiers, possessive adjectives and pronouns, vocabulary building, roleplay activities for speaking, reading comprehension and writing short descriptive paragraphs.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Teaching the four English skills(reading, writing, speaking ,listening and translation)
Indicative Contents المحتويات الإرشادية	active contents in learning English refer to the factual points that candidates are expected to know and understand in order to pass an exam or course.

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	3	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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 computer user
Week 2	Digital camera
Week 3	Computer architecture Processor CPU

Week 4	Computer architecture Binary system
Week 5	Computer architecture Hard disk
Week 6	Computer application Speed trap
Week 7	Mid-term Exam
Week 8	Computer application ATM, Data base , barcode
Week 9	Peripheral
Week 10	Peripheral
Week 11	Former student Higer national certificated
Week 12	Former student Higer national certificated
Week 13	Operating system
Week 14	Operating system
Week 15	Graphic user interface
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Oxford English in INFORMATION TECHNOLOGH	Yes
Recommended Texts	Interchange by Jack C. Richards	yes
Websites	A junior English Grammar and Composition	

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	**Human Right and Democracy**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☒**Lecture** ☐**Lab** ☐**Practical** ☐**Tutorial** ☒**Seminar**	
Module Code	WUO4-102				
ECTS Credits	2				
SWL (hr/sem)	**50**				
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		01/09/2023	**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	In order to educate the new generation about Democracy, because these concepts are of great importance, which is clearly evident in Iraq, because one of the most important reasons for the collapse of the security situation in Iraq is the absence of full awareness of the importance of these concepts
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	A- Knowledge and Understanding A1: Knowing the facts about the concept of Democracy and how this concept is applied at the level of countries B- B- Subject-specific skills B1: The student compares and analyzes the reality of democracy in his country and how these concepts are applied internationally to know the weaknesses and negatives of application in his country
Indicative Contents المحتويات الإرشادية	That the student uses these concepts of the subject he learned in his practical and professional life

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	44	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	6	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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	concept of Rights(DefinitionCharacteristics-Categories)
Week 2	Human rights in the divine laws (Christian, Jewish and Islamic religions
Week 3	man rights sources (ainternational sources
Week 4	human Rights Sources (BNational Sources
Week 5	Human rights guarantees (a - guarantees at the national level

Week 6	Human rights guarantees at the international level
Week 7	Mid-term Exam
Week 8	The concept of democracy - forms of democracy (1 - direct democracy
Week 9	Parliamentary democracy (the concept of the representative system - the pillars of the representative system)
Week 10	Forms of the parliamentary system (1- the council system, 2- the presidential system)
Week 11	- Parliamentary system
Week 12	Parliament* (the mechanism of the parliamentary system “election” - the concept of election - the electorate)
Week 13	The concept of semi-direct democracy - manifestations of semi-direct democracy
Week 14	Organizing the election process
Week 15	Organizing the election process
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Human rights, children and democracy Dr. Maher Saleh	Yes
Recommended Texts	Allawi Al-Jubouri and others - Lectures on democracy - Dr. Faisal Shatnawi	yes
Websites	Google	

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 Architectur**			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Practical** ☐**Tutorial** ☒**Seminar**	
Module Code	**cs-121**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
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**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	A- Aims: Goal: The main goal of this course is to provide students with the knowledge related to digital design, computer architecture and assembly language. Objectives: • Understand Logic gates • Design Combinational and Sequential Circuits • Write and Analyze Assembly programs
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	this course introduces students to basic concepts about computer architecture from security perspectives. Its emphasis is on the lower level abstraction of a computer system. Topics included: digital logic, instruction set, ALU design, memory and assembly language programming. The course offers programming practice with an assembly language to provide practical application of concepts presented in class
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Intended Learning Outcomes (ILOs): Upon successful completion of this course students will be able to … A-Knowledge and understanding: with the ability to … A1) Understand the Boolean algebra theorems and properties. A2) Understand the main concepts of gate-level minimization. A3) Understand the combinational logical circuits. A4) Understand the sequential logical circuits. A5) Understand the main components of a computer system. A6) Understand the information representation in a computer A7) Understand the main structure of an assembly language. A8) Understand the main concept of a virtual memory. . B- Intellectual skills: with the ability to … B1) Simplify Circuits B2) Convert Boolean functions into standard and canonical forms B3) Link truth table, Boolean functions and circuit diagrams together. B4) Identify the different types of circuits.

	B5) Identify the different types of registers. B6) Relate C programs into Assembly language. B7) Identify the different parts of a virtual memory. B8) Identify the different encoding of information. B9) Identify different types of overflow attacks. C- Subject specific skills – with ability to … C1) Design combinational circuits C2) Design sequential circuits. C3) Develop an assembly program. C4) Analyze and Debug a C and Assembly programs. D- Transferable skills – with ability to D1) Debug and Analyze programs in Linux OS Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs] Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering 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	71	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	104	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	digital Systems and Binary Numbers
Week 2	boolean Algebra and Logic Gates

Week 3	gate Level Minimization
Week 4	Combinational Circuits
Week 5	Sequential Circuits.
Week 6	Register and Memory
Week 7	Mid-term Exam
Week 8	Introduction to Computer System
Week 9	Introduction to Computer System
Week 10	Information Representation: Integer and Float
Week 11	Program Representation: Data Movement and Control
Week 12	Program Representation: Function and Virtual Memory
Week 13	Program Representation: Heap and Data
Week 14	System Calls
Week 15	Revision
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	(1). Construct an Arithmetic Unit capable of performing 4-bit subtraction and Addition using 2's complement method. Use Parallel Adders and other necessary logic gates.
Week 2	2). Construct a logical Unit using logic gates capable of performing 4-bit, Bitwise ORing, ANDing, XORing and inversion.
Week 3	Construct an 4-bit ALU unit which can perform the following operation;
Week 4	Construct a 2-bit Carry Look Ahead Adder using logic gates.
Week 5	Study and Construct a 1-digit BCD/Decimal adder using parallel adders and other necessary logic gates

Week 6	Construct a Binary Multiplier using basic logic gates.
Week 7	Mid-term Exam
Week 8	Construct a Binary Divider using basic logic gates.
Week 9	Subtraction with 1's complement method using parallel adders and other necessary logic gates.
Week 10	Construction of BCD Subtractor with 9'S complement method using parallel adders and logic gate
Week 11	Construction of BCD Subtractor with 10'S complement method using parallel adders and logic gates
Week 12	Binary magnitude comparators (up to 4 bits) using parallel adder and logic gates
Week 13	Construct a Binary 4-bit and 8-bit adder using logic gates.
Week 14	Construct a Serial in Serial out 4-Bit register.
Week 15	Construct a 4-Bit Universal Shift register.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	. Digital Design, M. Mano and Michael D. Ciletti, Pearson, 6th edition, 2019	Yes
Recommended Texts	2. Randal E. Bryant and David R. O'Hallaron, Computer Systems A Programmer's Perspective, 3rd edition, Pearson, 2016.	yes
Websites	Google, Course website: elearning.ju.edu.jo	

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**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	Numerical Analysis			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Practical** ☒**Tutorial** ☐**Seminar**	
Module Code	cs-123				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code			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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	A- The Goal: The main goal of this course is to enable students to understand, develop, analyze approximate solutions to algebraic, transcendental, differential equations, derivatives, integral, and hard problems; and implement the solutions using software such as MATLAB. ABET: The main Students Outcome as in ABET: 1- Analyze a complex computing problem and to apply principles of computing and other relevant disciplines to identify solutions. **2-** 2- Design, implement, and evaluate a computing-based solution to meet a given set of computing requirements in the context of the program's discipline. **3-** 3- Apply computer science theory and software development fundamentals to produce computing-based solutions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**A-** Knowledge and Understanding A1: The ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must take into account the impact of engineering solutions in global, economic, environmental and societal contexts A2: Ability to work effectively in a team whose members provide leadership together, create a collaborative and inclusive environment, set goals, plan tasks, and achieve goals A3: The ability to develop and conduct appropriate experiments, analyze and interpret data, and use engineering judgment to draw conclusions A4: The ability to acquire and apply new knowledge as needed, using appropriate learning strategies. 1 A5: The ability to communicate effectively with a range of audiences **B-** Subject-specific skills B1: The ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics B2: The ability to apply engineering design to produce solutions that meet specific needs while taking into account public health, safety and welfare, as well as global, cultural, social, environmental and economic factors.
Indicative Contents المحتويات الإرشادية	This Course Specification provides a concise summary of the main features of the course and the learning outcomes that a typical student might reasonably be expected to achieve and demonstrate if he/she takes full advantage of the learning opportunities that are provided. It should be cross-referenced with the programme specification.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	daily exams

	Quarterly exams practical exams Attendance and active participation in the lecture Online exams and assignments Prepare the required reports according to the given topic

Student Workload (SWL)

الحمل الدراسى للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسى المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسى غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسى الكلى 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 and explanation curriculum vocabulary Solution of non-linear equations, Newton Raphson method for approximating, Lagrange approximation.

Week 2	Numerical differentiation and numerical integration, The Solutions

Week 3	of Integral equations, Trapezoidal method Simpsons method
Week 4	Simpsons method(3/8))
Week 5	Fourier series for odd and even functions ,Half range Fourier sin and cosine series
Week 6	Formation of Partial differential equations
Week 7	**Mid-term Exam**
Week 8	Types of partial differential equations,wave equation,heat equation
Week 9	Numerical differentiation, Euler method, modified Euler method
Week 10	Rung Kutta method, Rung Kutta-merson method
Week 11	Numerical analysis,Elimination and iterative methods
Week 12	Cramer's rule, solve by inverse matrices
Week 13	Exercises review and solutions
Week 14	Exercises review and solutions
Week 15	Lecture Asynchronous AS/Teams
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	A- Required book(s), assigned reading and audio-visuals: A.1 Text Book: Stephen C. Chapra and Rymond P. Canale, Numerical Methods for Engineerins, Edition 8, Mc Craw Hill Education, 2018. A.2 MATLAB USER MANUAL from Moler, Cleve B. (2004), Numerical Computing with Matlab, 2004, SIAM, Philadelphia, PA. It can be downloaded along with software from http://www.mathworks.com/moler/	Yes
Recommended Texts	A- Recommended books, materials and media: 2. Todd Young and Martin J. Mohlenkamp (2012), Introduction to Numerical Methods and Matlab Programming for Engineers, Department of Mathematics, Ohio University, Athens. http://www2.mansfield.edu/mathematics/program-course-goals-objectives-and-outcomes/index.cfm	yes
Websites	Google	

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	قيد المعالجة(راسب)	(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	Work Ethics			**Module Delivery**	
Module Type	**Suport**			☒**Theory** ☒**Lecture** ☐**Lab** ☐**Practical** ☐**Tutorial** ☒**Seminar**	
Module Code	uni-104				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code			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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Professional ethics is a set of rules, principles and standards of conduct He must be accompanied by it, and the owner of the profession undertakes to practice it in his profession towards the work and its clients Colleagues, subordinates, superiors, profession, society, self and self, and prepare their comments He remained one of the most eloquent men of his time. Varieties with this term, a mixture of all subjects experienced with it.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	First, by defining “ethics” and then defining it. It is better for us, as we review the ethics of the profession, to begin. (profession) linguistically and idiomatically, and in order for this to be a prelude to what comes after that, morals are an integrated system All human relations are organized, and upon them social, economic and political life is based.
Indicative Contents المحتويات الإرشادية	1.1 Compliance and Ethics Professionals strictly refrain from assisting with Acts of misconduct, instigation or participation in it. 2.1 Compliance and Ethics Professionals are obligated to take the necessary steps To prevent acts of misconduct by affiliated employers she has. 3.1 Compliance and Ethics Professionals must exercise judgment proper with regard to answering or participating in all investigations The official and legal government of the affiliated employer or for inquiries about it.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Professional work ethics or professional ethics is defined as the living conscience of professional work, so that business performance is not limited to fulfilling its minimum responsibilities only, but rather depends on the system of right versus wrong and the impact of this action on the individual, the company and the society to which the system is affiliated.

Student Workload (SWL)

الحمل الدراسى للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	28	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسى غير المنتظم للطالب خلال الفصل	22	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسى الكلى 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	The concept of professional ethics
Week 2	The honesty
Week 3	Challenges and their impact on professional ethics
Week 4	Sources of professional ethics
Week 5	General constituents of professional ethics
Week 6	Means of establishing professional ethics
Week 7	**Mid-term Exam**
Week 8	Good example
Week 9	Challenges and their impact on professional ethics
Week 10	Social responsibility
Week 11	The basic foundations of professional ethics
Week 12	Regulations, laws and legislation
Week 13	Humility and good dealing
Week 14	Accuracy in setting regulations and instructions
Week 15	Conflict of interest
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	religious source ، social source	Yes
Recommended Texts	Professional political resource	yes
Websites	Google	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A –** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	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	قيد المعالجة(راسب)	(45-49)	More work required but credit awarded
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Arabic Language			**Module Delivery**	
Module Type	Core			☒Theory ☐Lecture ☐Lab ☐Practical ☐Tutorial ☒Seminar	
Module Code	WUO1				
ECTS Credits	2				
SWL (hr./sem.)	50				
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**	E-mail	
Peer Reviewer Name		Name	**e-mail**	E-mail	
Scientific Committee Approval Date		01/09/2024	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الؤرشادية

Module Objectives أهداف المادة الدراسية	تتضمن أهداف المادة الدراسية للغة العربية العديد من الأهداف الرئيسية التي يجب على الطلاب تحقيقها ومن بين هذه الأهداف: ١- تعلم اللغة العربية بطلاقة وفهم قواعدها النحوية والصرفية والأملائية. ٢- تطوير مهارات القراءة والكتابة والإستماع والتحدث باللغة العربية. ٣- فهم االتراث اللغوي والثقافة العربية وتطبيقه في الحياة اليومية. ٤- تحسين قدرة الطلاب على التواصل بشكل فعال مع الآخرين في المواقف الإجتماعية والأكاديمية. ٥- تنمية المهارات البحثية والتحليلية والنقدية.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	تشمل نتائج التعلم لمادة اللغة العربية العديد من المهارات والمعارف التي يجب على الطلاب اكتسابها، ويمكن تلخيصها فيما يلي : ١- القدرة على فهم وتحليل النصوص الأدبية والعلمية باللغة العربية. ٢- تحسين مهارات الكتابة والقراءة والإستماع والتحدث باللغة العربية. ٣- تطوير القدرة على التواصل بشكل فعال مع الآخرين باللغة العربية. ٤- فهم االتراث اللغوي والثقافة العربية وتطبيقه في الحياة اليومية. ٥- تنمية المهارات البحثية والتحليلية والنقدية والإبتكارية.
Indicative Contents المحتويات الؤرشادية	تشمل المحتويات الإرشادية لمادة اللغة العربية العديد من النواحي المختلفة للغة العربية، وتشمل بشكل عام: ١- الحروف والأصوات العربية الأرقام. ٢- النحو والصرف والؤملاء. ٣- الأدب والثقافة العربية. ٤- القراءة والكتابة والإستماع والتحدث باللغة العربية. ٥- البلاغة والؤعراب وال رتاكيب اللغوية. ٦- اللغة العربية لأغراض خاصة، مثل اللغة العربية . يف المجالإت العلمية والأكاديمية والإجتماعية والتجارية.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	تتمثل الأستراتيجية الرئيسية التي ستم تبنيها في تقديم هذه الوحدة في تشجيع الطلاب على المشاركة في التدريبات ، مع تحسين مهارات التفك ت النقدي لديهم وتوسيعها في نفس الوقت. سيتم تحقيق ذلك من خلال الفصول والبرامج التعليمية التفاعلية ومن خلال النظر في أنواع التجارب البسيطة التي تتضمن بعض أنشطة أخذ العينات التي تهم الطلاب.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	22	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	28	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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 الاسبوعى النظري	
Week 1	دراسة الحروف والأصوات العربية والأرقام
Week 2	دراسة النحو والصرف، وتعلم القواعد النحوية والصرفية الأساسية.
Week 3	تعلم القواعد الأملائية والترقيم الصحيح، وتدريب الطلاب على الأملاء الصحيح للكلمات والجمل.
Week 4	دراسة الأدب والثقافة العربية الأساسية، وتعريف الطلاب بالتراثاللغوي والثقافي العربي.
Week 5	تطوير مهارات القراءة والكتابة، وتدريب الطلاب على فهم النصوص الأدبية والعلمية والتعبير عن أفكارهم بشكل دقيق.
Week 6	البلاغة والأعراب والتراكيب اللغوية، وتعليم الطلاب كيفية استخدام هذه الأدوات بشكل صحيح في الكتابة
Week 7	تطوير مهارات الإستماع والتحدث باللغة العربية، وتحسين قدرة الطلاب على التواصل بشكل فعال مع الآخرين في مختلف المواقف الإجتماعية والأكاديمية.
Week 8	مراجعة عامة للمواد الدراسية وتدريب الطلاب على امتحانات النهاية، وإجراء تقييم شامل لأداء الطلاب خلال الفصل الدراسي ..
Week 9	تحسين قدرة الطلاب على التواصل بشكل فعال مع الآخرين في المواقف الإجتماعية والأكاديمية.
Week 10	فهم التراث اللغوي والثقافي العربي وتطبيقه في الحياة اليومية
Week 11	تنمية المهارات البحثية والتحليلية والنقدية والإبتكارية
Week 12	اللغة العربية لأغراض خاصة، مثل اللغة العربية في المجالات العلمية والأكاديمية والإجتماعية والتجارية.
Week 13	البلاغة والؤعراب والتراكيب اللغوية
Week 14	دراسة النحو والصرف، وتعلم القواعد النحوية والصرفية الأساسية.
Week 15	تعلم القواعد الؤملائية والترقيم الصحيح، وتدريب الطلاب على الأملاء الصحيح للكلمات والجمل.
Week 16	التحضير والمراجعة للامتحان النهائي

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	النحو, اقسام الكلام, الاسم , الفعل , الحرف, انواع المعارف , العلم , الضمائر,اسماء الاشارة , الاسماء الموصوله, المعرف بال, المعرف بالاضافة , المثنى و اعرابه, الجمع, جمع مذكر السالم, جمع مؤنث السالم , الادب , معلقة زهير مع الشرح , بواعث النهضة الادبية في العصر الحديث , موسوعة العشر الحر ,بدر شاكر السياب, نازك الملائكة, التاء المربوطة و التاء المبسوطة , علامات الترقيم , الغاء الضاء و الضاد	Yes
Recommended Texts	**النصوص الادبية القديمة والقصص القص يه الحديثة والنصوص الصحفية والاعلامية والنصوص العلمية والاكاديمية**	yes
Websites	Googl.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	قيد المعالجة(راسب)	(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	Fundamentals of Programming 2			**Module Delivery**	
Module Type	**Core**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Practical** ☒**Tutorial** ☒**Seminar**	
Module Code	cs-122				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code			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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	This course aims to introduce students to fundamental concepts of object oriented programming with Java, gives an introduction to event driven programming and graphical user interface, exception handling, files manipulation and recursion. The topics covered in this course provide a foundation for more advanced courses in Computer Science and Information Systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**A.** Knowledge and Understanding A1.ConceptsandTheories: 1. Lists the concepts of OOP 2. Lists the concepts of Inheritance 3. Lists the concepts of GUI 4. Lists the concepts of File management and Exception handling A2.Professional Responsibility: - Abide by laws and regulations when using computer networks. **B.** Subject-specific skills B1. Problem solving skills: - Supply the student with the ability to solve different problems related to the topics B2.ModelingandDesign: - Learn how to design a complete java project B3.ApplicationofMethodsandTools: - Learn how to implement a complete java project **C.** Critical-Thinking Skills C1. Analytic skills: - Learn how to analyze a problem C2. Strategic Thinking: - Understand the required strategy to solve problems C3.Creative thinking and innovation: - Design the student's GUI according to a given problem **D.** General and Transferable Skills (other skills relevant to employability and personal development) D1. Communication: - Express and communicate ideas in written and oral forms. D2.Teamwork and Leadership: - Be cooperative members of a team D3. Organizational and Developmental Skills: - Plan for automating of systems D4.Ethical and Social Responsibility: - Understand that they are accountable for their actions and there must be a balance between economic growth and the welfare of the society and environment.
Indicative Contents المحتويات الإرشادية	A. Knowledge and Understanding A1.ConceptsandTheories: 1. Lists the concepts of OOP 2. Lists the concepts of Inheritance 3. Lists the concepts of GUI 4. Lists the concepts of File management and Exception handling A2.Professional Responsibility: - Abide by laws and regulations when using computer networks.

	B. Subject-specific skills B1. Problem solving skills: - Supply the student with the ability to solve different problems related to the topics B2.ModelingandDesign: - Learn how to design a complete java project B3.ApplicationofMethodsandTools: - Learn how to implement a complete java project C. Critical-Thinking Skills C1. Analytic skills: - Learn how to analyze a problem C2. Strategic Thinking: - Understand the required strategy to solve problems C3.Creative thinking and innovation: - Design the student's GUI according to a given problem General and Transferable Skills (other skills relevant to employability and personal development) D1. Communication: - Express and communicate ideas in written and oral forms. D2.Teamwork and Leadership: - Be cooperative members of a team D3. Organizational and Developmental Skills: - Plan for automating of systems D4.Ethical and Social Responsibility: - Understand that they are accountable for their actions and there must be a balance between economic growth and the welfare of the society and environment.

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	82	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	93	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	**controlling access to members, using this reference**
Week 2	**Composition enumerations**
Week 3	**Introduction, to define a function and return statement.**
Week 4	**garbage collection and method finalize, static class members**
Week 5	**Passing parameters. passing by value, passing by reference, type of functions**
Week 6	**final instance variables**
Week 7	**Mid-term Exam**

Week 8	**Functions and types of argument**
Week 9	**data abstraction and encapsulation**
Week 10	sequential text files
Week 11	**String , member functions of string , string liberties**
Week 12	**relationship between super- and sub-classes**
Week 13	**Structures, types of defined structures , structures with structures, array of structures**
Week 14	**Polymorphism – polymorphism examples**
Week 15	**creating and using interfaces**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعى للمختبر	
Week 1	**controlling access to members, using this reference**
Week 2	**Composition enumerations**
Week 3	**Introduction, to define a function and return statement.**
Week 4	**garbage collection and method finalize, static class members**
Week 5	**Passing parameters. passing by value, passing by reference, type of functions**
Week 6	**final instance variables**
Week 7	**Mid-term Exam**
Week 8	**Functions and types of argument**
Week 9	**data abstraction and encapsulation**
Week 10	sequential text files
Week 11	**String , member functions of string , string liberties**
Week 12	**relationship between super- and sub-classes**
Week 13	**Structures, types of defined structures , structures with structures, array of structures**
Week 14	**Polymorphism – polymorphism examples**
Week 15	Final

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	-Daniel Liang, 2012, Introduction to Java Programming. 9th ed. Prentice Hall	Yes

Recommended Texts	Problem Solving with Java / Koffman, Elliot B. 2nd ed Addison-Wesley, 2002, ISBN: 0- 201-72214-3	Yes
Websites	Google	

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	قيد المعالجة(راسب)	(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 structure**			**Module Delivery**	
Module Type	**Elective**			☒**Theory** ☒**Lecture** ☒**Lab** ☐**Practical** ☒**Tutorial** ☐**Seminar**	
Module Code	**Sc-124**				
ECTS Credits	**6**				
SWL (hr./sem.)	**150**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	**The objectives of a data structure module typically include:** **1.** Understanding the fundamental concepts of data structures: This includes understanding the different types of data structures (e.g., arrays, linked lists, stacks, queues, trees, graphs, etc.), their properties, and how they are used to solve various problems. **2.** Implementing data structures: This involves writing code to implement data structures in a specific programming language, such as C++, Java, Python, or JavaScript. **3.** Analyzing data structures: This includes analyzing the time and space complexity of operations performed on data structures, such as insertion, deletion, searching, and sorting. 4. Choosing appropriate data structures: This involves selecting the most appropriate data structure for a given problem based on its time and space complexity requirements and other factors such as ease of use, maintainability, and scalability. **5.** Applying data structures: This involves using data structures to solve real-world problems, such as database management, network routing, and image processing. **6.** Understanding data structure algorithms: This includes understanding the algorithms used to implement data structures, such as binary search trees, hash tables, and graph traversal algorithms. **7.** Designing efficient algorithms: This involves designing algorithms that are both correct and efficient, taking into account the specific data structures used and the problem to be solved. **Overall, the objectives of a data structure module are to provide students with a deep understanding of how data structures work, how they are implemented and analyzed, and how they can be used to solve real-world problems efficiently and effectively.**

	The learning outcomes of a data structure module typically include: **1**. Knowledge of fundamental data structures: Students should be able to demonstrate an understanding of the different types of data structures, their properties, and how they are used to solve various problems. **2**. Ability to implement data structures: Students should be able to write code to implement data structures in a specific programming language, such as C++, Java, Python, or JavaScript.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**3**. Analytical skills: Students should be able to analyze the time and space complexity of operations performed on data structures, such as insertion, deletion, searching, and sorting. **4.** Ability to choose appropriate data structures: Students should be able to select the most appropriate data structure for a given problem based on its time and space complexity requirements and other factors such as ease of use, maintainability, and scalability. **5.** Problem-solving skills: Students should be able to apply data structures to solve real-world problems, such as database management, network routing, and image processing. **6**. Understanding of data structure algorithms: Students should be able to demonstrate an understanding of the algorithms used to implement data structures, such as binary search trees, hash tables, and graph traversal algorithms. **7**. Ability to design efficient algorithms: Students should be able to design algorithms that are both correct and efficient, taking into account the specific data structures used and the problem to be solved. **Overall, the learning outcomes of a data structure module are to equip students with the knowledge, skills, and abilities necessary to understand, implement, analyze, and apply data structures and related algorithms to solve real-world problems efficiently and effectively.**
Indicative Contents المحتويات الإرشادية	**The indicative contents of a data structure module typically include:** **1.** Introduction to data structures: This includes an overview of data structures, their properties, and how they are used to solve various problems. **2.** Arrays: This includes an introduction to arrays, their properties, and how they are used to store and manipulate data.

	3. Linked Lists: This includes an introduction to linked lists, their properties, and how they are used to store and manipulate data. **4.** Stacks and Queues: This includes an introduction to stacks and queues, their properties, and how they are used to store and manipulate data. **5.** Trees: This includes an introduction to trees, their properties, and how they are used to store and manipulate hierarchical data.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**There are several strategies that can be used when working with data structures:** **1.** Choosing the right data structure: One of the most important strategies is to choose the right data structure for the problem at hand. This involves understanding the properties and trade-offs of different data structures and selecting the one that is most appropriate for the specific problem. **2.** Analyzing the time and space complexity: It is important to analyze the time and space complexity of operations performed on data structures. This involves understanding how the data structure is implemented and the cost of each operation in terms of time and memory. **3.** Implementing data structures efficiently: When implementing data structures, it is important to use efficient algorithms and data structures that minimize the time and space complexity of the operations performed on them. **4.** Testing and debugging: As with any software development, testing and debugging are critical when working with data structures. It is important to test the data structure with a variety of inputs and edge cases to ensure that it works correctly and efficiently. **5.** Modularizing code: Modularizing code can make it easier to work with data structures by breaking down complex tasks into smaller, more manageable pieces. This can make it easier to test and debug code, and can also make it easier to reuse code in other projects. **Overall, the key strategies for working with data structures include choosing the right data structure, analyzing the time and space complexity, implementing efficiently, testing and debugging, modularizing code, and documenting code.**

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	75	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	75	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Here is a possible delivery plan for a 15-week syllabus on data structures:
Week 1	**Week 1: Introduction to Data Structures** • Overview of data structures and their properties • Types of data structures: arrays, linked lists, stacks, queues, trees, and graphs • Basic operations on data structures: searching, insertion, deletion, and sorting • Implementing a simple data structure in a programming language

Week 2	**Week 2: Arrays and Linked Lists** • Introduction to arrays and linked lists • Implementing arrays and linked lists in a programming language • Basic operations on arrays and linked lists: searching, insertion, deletion, and sorting
Week 3	**Week 3: Stacks and Queues** • Introduction to stacks and queues • Implementing stacks and queues in a programming language • Basic operations on stacks and queues: push, pop, enqueue, and dequeue
Week 4	**Week 4: Trees** • Introduction to trees • Types of trees: binary trees, binary search trees, AVL trees, and B-trees • Implementing trees in a programming language • Basic operations on trees: searching, insertion, deletion, and traversal
Week 5	**Week 5: Graphs** • Introduction to graphs • Types of graphs: directed and undirected graphs, weighted and unweighted graphs • Implementing graphs in a programming language • Basic operations on graphs: searching, traversal, shortest path, and minimum spanning tree
Week 6	**Week 6: Hash Tables** • Introduction to hash tables • Implementing hash tables in a programming language • Basic operations on hash tables: searching, insertion, and deletion

Week 7	**Week 7: Advanced Data Structures** • Introduction to advanced data structures: priority queues, heaps, tries, and suffix trees • Implementing advanced data structures in a programming language • Basic operations on advanced data structures: searching, insertion, deletion, and sorting
Week 8	**Week 8: Algorithm Analysis** • Analyzing the time and space complexity of algorithms • Big O notation and other complexity measures • Techniques for improving algorithm efficiency
Week 9	**Week 9: Sorting Algorithms** • Introduction to sorting algorithms: bubble sort, insertion sort, selection sort, merge sort, quicksort, and heap sort • Implementing sorting algorithms in a programming language • Analyzing the time and space complexity of sorting algorithms
Week 10	**Week 10: Searching Algorithms** • Introduction to searching algorithms: linear search, binary search, hash search • Implementing searching algorithms in a programming language • Analyzing the time and space complexity of searching algorithms
Week 11	**Week 11: Advanced Graph Algorithms** • Introduction to advanced graph algorithms: Dijkstra's algorithm, Bellman-Ford algorithm, Floyd-Warshall algorithm • Implementing advanced graph algorithms in a programming language • Analyzing the time and space complexity of advanced graph algorithms
Week 12	**Week 12: Dynamic Programming** • Introduction to dynamic programming • Implementing dynamic programming algorithms in a programming language • Analyzing the time and space complexity of dynamic programming algorithms

Week 13	**Week 13: Divide and Conquer** • Introduction to divide and conquer algorithms • Implementing divide and conquer algorithms in a programming language • Analyzing the time and space complexity of divide and conquer algorithms
Week 14	**Week 14: Backtracking** • Introduction to backtracking algorithms • Implementing backtracking algorithms in a programming language • Analyzing the time and space complexity of backtracking algorithms
Week 15	Week 15: Review and Project • **Review of all data structures and algorithms covered in the course** • **Final project to apply data structures and algorithms to a real-world problem**
Week 16	**Preparatory week before the final exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week 1	**Lab Week 1: Introduction to Data Structures** • Overview of data structures and their properties • Types of data structures: arrays, linked lists, stacks, queues, trees, and graphs • Basic operations on data structures: searching, insertion, deletion, and sorting • Implementing a simple data structure in a programming language
Week 2	**Lab Week 2: Arrays and Linked Lists** • Introduction to arrays and linked lists • Implementing arrays and linked lists in a programming language • Basic operations on arrays and linked lists: searching, insertion, deletion, and sorting
Week 3	**Lab Week 3: Stacks and Queues** • Introduction to stacks and queues • Implementing stacks and queues in a programming language • Basic operations on stacks and queues: push, pop, enqueue, and dequeue

Week 4	**Lab Week 4: Trees** • Introduction to trees • Types of trees: binary trees, binary search trees, AVL trees, and B-trees • Implementing trees in a programming language
Week 5	**Lab Week 5: Graphs** • Introduction to graphs • Types of graphs: directed and undirected graphs, weighted and unweighted graphs • Implementing graphs in a programming language • Basic operations on graphs: searching, traversal, shortest path, and minimum spanning tree
Week 6	**Lab Week 6: Hash Tables** • Introduction to hash tables • Implementing hash tables in a programming language • Basic operations on hash tables: searching, insertion, and deletion
Week 7	**Lab Week 7: Advanced Data Structures** • Introduction to advanced data structures: priority queues, heaps, tries, and suffix trees • Implementing advanced data structures in a programming language • Basic operations on advanced data structures: searching, insertion, deletion, and sorting

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**"Data Structures and Algorithms in Java", "Introduction to Algorithms" , "Data Structures and Algorithms in Python" , Data Structures: Abstraction and Design Using Java", "Data Structures and Algorithms Made Easy: Data Structures and Algorithmic Puzzles"**	Yes
Recommended Texts	**1.** "Data Structures and Algorithms in Java" by Robert La fore This book covers a wide range of data structures and algorithms, and provides clear explanations and examples using the Java programming language. **2.** "Data Structures and Algorithm Analysis in C++" by Mark Allen Weiss - This book provides a clear introduction to data structures and algorithms using the C++ programming language. **3.** "Data Structures and Algorithms with JavaScript" by Michael McMillan - This book provides an introduction to data structures and algorithms using the JavaScript programming language, and includes exercises and examples to help students build their programming skills.	Yes
Websites	Google	

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	قيد المعالجة(راسب)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Object-Oriented Programming 1**			**Module Delivery**	
Module Type	**Basic**			☒**Theory** ☐**Lecture** ☒**Lab** ☐**Practical** ☒**Tutorial** ☒**Seminar**	
Module Code	cs-201				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	3	
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1- The module aims to introduce fundamental object-oriented programming concepts using C++, focusing on classes, objects, inheritance, and polymorphism, while enhancing problem-solving skills. 2- Students will learn to design, implement, and debug C++ programs using best practices in object-oriented design.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to apply object-oriented programming principles in C++ to design and develop efficient software solutions, utilizing classes, inheritance, polymorphism, and encapsulation. They will also be able to debug, test, and optimize C++ programs for real-world applications.
Indicative Contents المحتويات الإرشادية	The "Object-Oriented Programming 1 (C++)" module covers essential C++ syntax, control structures, and functions, along with foundational object-oriented principles such as classes, objects, inheritance, and polymorphism. Advanced topics include operator overloading, exception handling, and file I/O. Practical programming exercises reinforce the application of these concepts in real-world scenarios.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy for delivering the "Object-Oriented Programming 1 (C++)" module is to foster active student engagement through hands-on programming exercises, encouraging practical application of concepts. This will be achieved through a combination of lectures, interactive coding tutorials, and real-world problem-solving tasks, helping students refine their coding abilities while developing critical thinking skills. Collaborative projects and continuous feedback will further support the learning process.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	69	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	81	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem)	**150**		

الحمل الدراسي الكلي للطالب خلال الفصل	

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Overview for functions and parameter transmission, inline functions
Week 2	function overloading and default arguments
Week 3	Introduction to OOP and its main features
Week 4	Defining a Simple Class
Week 5	Defining a Simple Class, with inline Member Functions
Week 6	Constructors and destructors functions
Week 7	Mid-term Exam

Week 8	Friends functions concept
Week 9	Friend class
Week 10	Constant Members and Scope Operator,
Week 11	Member Initialization List methods and Static members
Week 12	Pointers to objects and reference members
Week 13	Class object members
Week 14	Define simple Object Arrays
Week 15	Object Arrays
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week 1	C++ Program to write functions and inline function with parameter transmission
Week 2	C++ Program to deal with function overloading and default arguments
Week 3	C++ Program to deal with function overloading and default arguments
Week 4	OO Program to define a Simple Class
Week 5	OO Program to define a Class with Inline Member Functions
Week 6	OO Programs deal with Constructors and destructors functions
Week 7	Mid-term Exam
Week 8	OO Program to write Friends functions
Week 9	OO Program to write Friend class
Week 10	OO Program deals with Constant Members and Scope Operator,
Week 11	OO Program deals with Member Initialization List, and Static members
Week 12	OO Program deals with pointers to objects and reference members
Week 13	OO Program deals with pointers to objects and reference members
Week 14	OO Program to write Class object members
Week 15	OO Program to write object arrays

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Joyce Farrell, "Object-Oriented Programming Using C++" , Fourth Edition, Course Technology, 2009.	Yes
Recommended Texts	Bjarne Stroustrup, “Programming Principles and Practice Using C++”, Second Edition, Addison-Wesley, 2014.	Yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Computer Graphics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Practical** ☒ **Tutorial** ☒ **Seminar**	
Module Code	cs-202				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	3	
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The module aims to introduce the fundamental principles of computer graphics, including transformations, clipping, and shading, and develop practical skills in using

	programming tools like MATLAB and OpenGL. Students will learn to design and implement basic 2D/3D graphics applications and simulations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to apply fundamental computer graphics concepts and implement basic 2D/3D graphics using programming tools. They will also be able to develop and evaluate interactive graphics applications using transformations, shading, and rendering techniques.
Indicative Contents المحتويات الإرشادية	The module covers key concepts in computer graphics, including 2D/3D transformations, rasterization, clipping, shading, and rendering techniques. Practical topics include implementing basic drawing algorithms, applying texture mapping, and using programming tools like MATLAB and OpenGL for visual simulations.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy for delivering this module is to blend theoretical concepts with practical programming sessions, allowing students to apply graphics techniques through hands-on projects. Interactive lectures, lab exercises, and group projects will be used to reinforce learning and develop problem-solving skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	71	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	79	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Computer Graphics: Overview of computer graphics: Applications and history. Cathode Ray Tube (CRT) and RGB monitors. Frame Buffer and Raster-Scan Displays.
Week 2	Vector Concepts: Introduction to vectors: Unit vectors, vector measurements, and manipulation. Vector operations: Addition, subtraction, scaling, dot product, and cross product.
Week 3	Line Drawing Algorithms: Standard line equations. Digital Differential Analyzer (DDA) algorithm. Bresenham's Line Drawing Algorithm.
Week 4	Circle Drawing Algorithms: Equation of a circle. Circle drawing using Polar and Bresenham's Circle Algorithm.
Week 5	Ellipse Drawing Algorithms: Ellipse equations and properties. Drawing ellipses using polynomial and polar methods.
Week 6	2D Transformations - Translation: Point translation. Implementation of 2D translation using matrices.
Week 7	Mid-term Exam
Week 8	2D Rotation: Rotation around the origin. Rotation around a specific point using matrices.
Week 9	2D Scaling: Scaling around the origin. Scaling around a specific point.
Week 10	2D Reflection: Reflection across the X-axis, Y-axis, and the origin. Reflection across Y = X, Y = -X, and other custom lines.

Week 11	2D Shearing: X-shear, Y-shear, and XY-shear. Mathematical representation and practical applications.
Week 12	Matrix Representation of 2D Transformations: Homogeneous coordinates and transformation matrices. Combining transformations using matrix multiplication.
Week 13	Windowing and Viewport Mapping: Concepts of windowing and viewport transformations. Implementing mapping from window to viewport.
Week 14	Clipping Algorithms: Clipping lines and polygons. Cohen-Sutherland line clipping and Sutherland-Hodgman polygon clipping.
Week 15	Polygon Drawing and Final Exam Preparation: Polygon filling techniques. Review and preparation for final assessment.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week 1	Mathlab Environment identify, Identify Mathlab Objects
Week 2	Implementing Line Drawing Algorithms: Coding DDA and Bresenham's Line Drawing Algorithms. Experimenting with different slopes and positions.
Week 3	Implementing Circle Drawing Algorithms: Implementing mid-point and Bresenham's Circle Drawing Algorithms.
Week 4	Drawing ellipses using polynomial and polar methods. Visualizing different ellipse properties.
Week 5	2D-Translate in point : 2D Transformations Implementation - Translation Coding translation transformations for points and shapes
Week 6	Implementing 2D Rotation: Rotation around origin and specific points (2D-Rotate in origin + 2D-Rotate in point)
Week 7	Mid-term Exam
Week 8	Implementing 2D Scaling: Implementing scaling transformations (2D-Scaling in origin +2D-Scaling in point)
Week 9	Implementing 2D Reflection: Reflection of shapes across X, Y axes, and custom lines (2D-Reflect {X,Y,O}, 2D-Reflect{Y= X, Y= -X},point, Y=mx+b)
Week 10	Implementing Shearing Transformations: Coding shearing transformations along X, Y, and XY (2D-Shear-X, 2D-Shear-Y and 2D-Shear- XY)
Week 11	Composite 2D Transformations: Implementing multiple transformations sequentially using matrices (Matrix represent 2D-Transformation)
Week 12	implementing Windowing and Viewport Transformations: Writing code for windowing and viewport mapping (Mapping { Windowing and viewport})
Week 13	Implementing Line and Polygon Clipping: Coding Cohen-Sutherland and Sutherland-Hodgman algorithms.
Week 14	Creating and Filling Polygons: Drawing and filling simple polygons.
Week 15	Final Project Presentation and Review: Project presentations and feedback.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Hughes, J. F., Van Dam, A., McGuire, M., Sklar, D. F., Foley, J. D., Feiner, S. K., & Akeley, K. (2013). *Computer graphics: Principles and practice* (3rd ed.). Addison-Wesley Professional.	Yes
Recommended Texts	Hearn, D., Baker, M. P., & Carithers, W. (2015). *Computer graphics with OpenGL* (4th ed.). Pearson.	yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Information Retrieval**			**Module Delivery**	
Module Type	**Elective**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Practical** ☐ **Tutorial** ☒ **Seminar**	
Module Code	cs-203				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	3	
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The module aims to provide students with a solid understanding of the foundational theories and practical techniques in Information Retrieval, focusing on text

	representation, indexing, and search algorithms. Students will also develop hands-on skills in building and evaluating simple IR systems for real-world applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to understand key concepts and models in Information Retrieval and develop basic IR systems. They will also be able to evaluate IR systems using standard performance metrics and apply these techniques to real-world scenarios.
Indicative Contents المحتويات الإرشادية	The module covers key topics in Information Retrieval, including text representation, indexing, query processing, ranking algorithms, evaluation metrics, and practical applications such as web search, text classification, and recommender systems. Advanced topics like semantic search, link analysis, and social media mining are also explored.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy for delivering this module is to combine theoretical lectures with hands-on practical sessions, allowing students to apply concepts through real-world programming tasks. Active learning will be encouraged through interactive discussions, group projects, and continuous feedback to enhance problem-solving skills.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	103	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Information Retrieval: Definition and scope of Information Retrieval. IR vs. Data Retrieval. Basic IR models: Boolean and Vector Space Model.
Week 2	Text Representation and Processing: Document representation: Bag-of-Words model. Preprocessing: Tokenization, Stemming, Stopword Removal.
Week 3	Inverted Index and Data Structures: Inverted Index structure. Building and storing indexes.
Week 4	Query Processing: Query types: Boolean, phrase, and proximity queries. Query operations and ranking principles.
Week 5	Ranking Algorithms: Term Frequency-Inverse Document Frequency (TF-IDF). Cosine Similarity.
Week 6	Evaluation of IR Systems: Evaluation metrics: Precision, Recall, F-measure. Mean Average Precision (MAP).
Week 7	Mid-term Exam
Week 8	Web Search and Crawling: Web search basics and challenges. Web crawling and spidering.

Week 9	Text Classification and Clustering: Introduction to text classification. Text clustering algorithms: K-Means.
Week 10	Introduction to Recommender Systems: Collaborative filtering and Content-based filtering. Applications in IR.
Week 11	Semantic Search and NLP: Basic NLP techniques for IR. Using word embeddings for semantic similarity.
Week 12	Social Media and Opinion Mining: Sentiment analysis. Opinion mining techniques.
Week 13	Advanced IR Techniques: Cross-language IR. Personalized search.
Week 14	Final Project and Presentation
Week 15	Project Work, Evaluation and Optimization
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week 1	Introduction to IR Tools and Setup: Setting up the environment (Python/Java).
Week 2	Introduction to text processing libraries (NLTK/Scikit-Learn).
Week 3	Text Processing Techniques: Implementing tokenization, stemming, and stopword removal.
Week 4	Building a Simple Inverted Index: Creating an inverted index for a sample document collection.
Week 5	Implementing Boolean Queries: Designing and implementing basic Boolean query operations.
Week 6	Implementing TF-IDF and Cosine Similarity: Calculating TF-IDF scores. Implementing cosine similarity for ranking documents.
Week 7	Mid-term Exam
Week 8	Implementing a Web Crawler: Building a basic web crawler using Python. Extracting and indexing web page content.
Week 9	Link Analysis with PageRank: Implementing the PageRank algorithm. Analyzing a small web graph.
Week 10	Text Classification: Implementing Naive Bayes classifier for text classification.
Week 11	Building a Simple Recommender System: Using collaborative filtering to build a recommendation system
Week 12	Implementing Sentiment Analysis: Performing sentiment analysis on Twitter data using Python libraries.
Week 13	Semantic Search: Using word embeddings (Word2Vec or BERT) to implement semantic search.
Week 14	Mini-Project Development: Developing a small IR system (e.g., a mini search engine or document classifier).
Week 15	Final Project Presentation and Review: Project presentations and feedback.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to Information Retrieval by Manning, C. D., Raghavan, P., & Schütze, H. (Updated Edition)	Yes
Recommended Texts	Interactive Information Seeking, Behaviour and Retrieval by Ian Ruthven & Diane Kelly (2018) Baeza-Yates, R., & Ribeiro-Neto, B. (2011). *Modern Information Retrieval: The Concepts and Technology behind Search* (2nd Edition). Addison-Wesley.	yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Databases Fundamentals**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Practical** ☒ **Tutorial** ☒ **Seminar**	
Module Code	cs-204				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	3	
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1- The module aims to introduce fundamental object-oriented programming concepts using C++, focusing on classes, objects, inheritance, and polymorphism, while

	enhancing problem-solving skills. 2- Students will learn to design, implement, and debug C++ programs using best practices in object-oriented design.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to apply object-oriented programming principles in C++ to design and develop efficient software solutions, utilizing classes, inheritance, polymorphism, and encapsulation. They will also be able to debug, test, and optimize C++ programs for real-world applications.
Indicative Contents المحتويات الإرشادية	The "Object-Oriented Programming 1 (C++)" module covers essential C++ syntax, control structures, and functions, along with foundational object-oriented principles such as classes, objects, inheritance, and polymorphism. Advanced topics include operator overloading, exception handling, and file I/O. Practical programming exercises reinforce the application of these concepts in real-world scenarios.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy for delivering the "Object-Oriented Programming 1 (C++)" module is to foster active student engagement through hands-on programming exercises, encouraging practical application of concepts. This will be achieved through a combination of lectures, interactive coding tutorials, and real-world problem-solving tasks, helping students refine their coding abilities while developing critical thinking skills. Collaborative projects and continuous feedback will further support the learning process.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	74	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Database Systems and DBMS Concepts
Week 2	Database Architectures and Data Independence
Week 3	Client-Server Architecture and Data Models
Week 4	Entity Relationship (ER) Data Model
Week 5	Advanced ER Modeling and Conceptual Design
Week 6	Relational Model Concepts and Constraints
Week 7	Mid-term Exam
Week 8	Mapping ER Diagrams to Relational Models
Week 9	Relational Algebra – Syntax and Operations

Week 10	Structured Query Language (SQL) – Data Definition Language (DDL)
Week 11	SQL for Data Manipulation (DML)
Week 12	Advanced SQL Queries
Week 13	Database Integrity and Security
Week 14	Database Normalization and Design Refinement
Week 15	Database Design and Implementation Project
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Database Environment and SQL Basics
Week 2	Creating Tables and Schema Design
Week 3	Implementing ER Diagrams into SQL Tables
Week 4	Basic Data Manipulation – Inserting and Retrieving Data
Week 5	Advanced Data Retrieval Techniques
Week 6	Implementing Joins in SQL
Week 7	Mid-term Exam
Week 8	Working with Subqueries and Nested Queries
Week 9	Using Aggregation Functions in SQL
Week 10	Implementing Integrity Constraints in SQL
Week 11	Creating Views in SQL
Week 12	Implementing Triggers and Stored Procedures
Week 13	Database Security – User Management and Permissions

Week 14	Database Backup and Recovery
Week 15	Final Project Development, Implementation, Presentations and Evaluation

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Silberschatz, A., Korth, H. F., & Sudarshan, S. (2020). *Database system concepts* (6th ed.). McGraw-Hill	Yes
Recommended Texts	Sciore, E. (2020). *Database Design and Implementation* (2nd ed.). Springer.	yes
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Theory of Computation**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Practical** ☒ **Tutorial** ☒ **Seminar**	
Module Code	cs-205				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	2		**Semester of Delivery**	3	
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The module aims to introduce the fundamental concepts of computational theory, including automata, formal languages, and Turing machines, to understand the limits

	of computation. Students will develop a deep understanding of algorithmic problem-solving and the theoretical foundations of computer science.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to analyze and classify formal languages and automata, construct and evaluate computational models, and apply the concepts of decidability and complexity. They will also be able to solve problems using Turing machines and understand the theoretical limits of computation.
Indicative Contents المحتويات الإرشادية	The indicative contents of the "Computational Theory" module include foundational topics such as formal languages, automata theory (finite automata, pushdown automata), regular and context-free grammars, and Turing machines. It also covers topics like decidability, complexity classes (P, NP), and reductions, providing a comprehensive understanding of the theoretical underpinnings of computation and problem-solving. Practical applications of computational models are explored through problem sets and case studies.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy for delivering the "Computational Theory" module is to promote conceptual understanding through a blend of theoretical instruction and practical problem-solving. This will be achieved through lectures, interactive discussions, and problem-based learning activities, encouraging students to actively engage with abstract concepts. Regular assignments and collaborative projects will help reinforce the application of theory to real-world computational challenges.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	45	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	55	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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

Week 1	Introduction to Computational Theory and Languages
Week 2	Regular Expressions and Properties of Regular Languages
Week 3	Regular Languages and Finite Automata
Week 4	Deterministic Finite Automata (DFA) and Non-Deterministic Finite Automata (NFA).
Week 5	Convert NFA to DFA, Convert NFA with e-move to NFA
Week 6	Context-Free Languages , Context-Free Grammars (CFGs)
Week 7	Mid-term Exam
Week 8	Regular grammar, Left linear grammar, Right linear gramma
Week 9	Derivations, parse trees, and ambiguity in CFGs
Week 10	Chomsky normal form and Greibach normal form
Week 11	Convert from CNF to GNF
Week 12	Pushdown Automata (PDA)
Week 13	Converting CFGs to PDAs and vice versa.
Week 14	Turing Machine and Fundamental Concepts

Week 15	Turing Machine Modifications and Computable Sets
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1-H.R.Lewis And G.H Papadimitiou,"Elements Of The Theory Of Computation", Prentig-Hall, 1981. 2-R.W.Floyd And R.Beigel,"The Languae Of Machine:An Introduction To Computability And Formal Languages"Computer Science Press, Network,.	Yes
Recommended Texts	M.Sipser."Introduction To The Theory Of Computation" ,Boston Pws Pub ,1996.	yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Baath Party Crimes**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Practical** ☐ **Tutorial** ☒ **Seminar**	
Module Code	WU05				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	2		**Semester of Delivery**	3	
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	تهدف المادة الى تعريف الطلبة بالاحداث التي مر بها العراق في الحقبة التي تولى فيها نظام حزب البعث الحكم.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	سنتناول هذه المادة من ناحية جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام٢٠٠٥م والجرائم النفسية والاجتماعية وأثارها، وأبرز انتهاكات النظام البعثي في العراق والجرائم البيئية لنظام البعث وجرائم المقابرالجماعية.
Indicative Contents المحتويات الإرشادية	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	38	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	جرائم نظام البعث وفق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠٥.
Week 2	مفهوم الجرائم وأقسامها.
Week 3	انواع الجرائم الدولية.
Week 4	القرارات الصادرة من المحكمة الجنائية العليا.
Week 5	الجرائم النفسية والاجتماعية وأثارها، وأبرز انتهاكات النظام البعثي في العراق/الجرائم النفسية.
Week 6	الجرائم الاجتماعية.
Week 7	Mid-term Exam
Week 8	الجرائم البيئية لنظام البعث في العراق.
Week 9	التلوث الحربي والإشعاعي وانفجار الالغام.
Week 10	تدمير المدن والقرى (سياسة الأرض المحروقة).
Week 11	تجفيف الاهوار.
Week 12	تجريف بساتين النخيل والأشجار والمزروعات.
Week 13	جرائم المقابر الجماعية.
Week 14	احداث مقابر الإبادة الجماعية المرتكبة من النظام البعثي في العراق.
Week 15	التصنيف الزمني لمقابر الإبادة الجماعية في العراق للمدة ١٩٦٣- ٢٠٢٣.

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	مقرر دراسي للجامعات الحكومية والاهلية صادر عن وزارة التعليم العالي والبحث العلمي	Yes
Recommended Texts		yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**System Analysis and Design**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Practical** ☐ **Tutorial** ☐ **Seminar**	
Module Code	cs-221				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	4	
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The module aims to equip students with a comprehensive understanding of the concepts and methodologies in system analysis and design. It focuses on building analytical skills for identifying system requirements, developing design specifications,

	and understanding implementation strategies for creating structured and efficient information systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to analyze system requirements, design effective system models, and develop structured system specifications. They will also demonstrate skills in evaluating system feasibility, creating data flow diagrams, and applying implementation and maintenance strategies for system development.
Indicative Contents المحتويات الإرشادية	The module covers key topics in system analysis and design, including system concepts, types of systems, and principles of system analysis. Topics include requirements gathering, feasibility studies, data flow diagrams, system modeling, database design, and user interface design. Advanced topics include implementation strategies, system evaluation, testing, and maintenance procedures.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy for delivering this module is through structured lectures to introduce key concepts and methodologies, supported by interactive class discussions to deepen understanding. Emphasis will be placed on case studies and real-world scenarios to illustrate practical applications, enhancing students' analytical and critical thinking skills in system analysis and design.

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	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Systems and System Analysis: Definitions of a system and common types of systems. General system principles and characteristics.
Week 2	Stages of System Analysis and Design: Overview of the system development life cycle (SDLC). Different stages: System analysis, design, and implementation.
Week 3	System Approach and Requirements Analysis: System approach and understanding system requirements. User, technical, and system requirements analysis.
Week 4	Feasibility Studies: Types of feasibility: Technical, economic, and operational. Assessing costs and benefits of proposed systems.
Week 5	Presenting the Feasibility Study Report: Structure and components of a feasibility study report. Methods for presenting assessment results.
Week 6	Data Flow Diagrams (DFD): Concept of data flow diagrams. Components of a DFD: Processes, data stores, data flows, and external entities.
Week 7	Mid-term Exam
Week 8	Fact Finding Techniques: Techniques: Interviews, questionnaires, observation, and document review. Identifying and gathering system requirements.
Week 9	System Design and Specifications: Overview of system design and its stages. Creating system and program specifications.

Week 10	Database Design Concepts: Database schema: Logical and physical database design. Organizing physical data and database structures.
Week 11	Input Design and Error Handling: Stages of input capture and error prevention techniques. Principles of input specification and design.
Week 12	Output Design and Report Generation: Types of output, output specifications, and report design principles. Designing various types of reports and output control mechanisms.
Week 13	Implementation Planning and System Testing: Tasks of implementation: Planning and control. System testing strategies and test data preparation.
Week 14	System Evaluation and Maintenance: System evaluation procedures: Cost-benefit analysis, quality assurance. Maintenance and review concepts: Amendment procedures and system audits.
Week 15	Project Presentation: Student presentations on system analysis and design projects.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to System Development Tools: Overview of system development tools (e.g., Microsoft Visio, Lucidchart). Setting up and understanding basic functions.
Week 2	Developing Data Flow Diagrams (DFD): Creating context-level and level-1 DFDs. Using symbols and notations for DFD components.
Week 3	Requirement Gathering and Analysis Techniques: Practicing interviews and questionnaires to gather system requirements. Simulating a system survey to identify user needs.
Week 4	Conducting a Feasibility Study: Performing a feasibility study for a sample system. Presenting feasibility reports with cost-benefit analysis.
Week 5	Designing a Logical Database Schema: Creating logical schema diagrams for a system. Understanding entity-relationship diagrams (ERD).
Week 6	Physical Database Design and Normalization: Implementing physical database schema using normalization techniques. Practicing up to the third normal form (3NF).
Week 7	Mid-term Exam
Week 8	Designing User Interfaces: Creating sample input forms and error-handling mechanisms. Practicing good UI design principles for capturing inputs.
Week 9	Implementing Data Flow Diagrams in System Design: Using DFDs to represent the flow of data in a system. Creating hierarchical DFDs to depict complex systems.
Week 10	Creating Flowcharts for System Processes: Designing flowcharts for system processes and sub-processes. Understanding flowchart symbols and best practices.
Week 11	Report Design and Output Specification: Generating sample reports from system outputs. Applying report design principles and output controls.
Week 12	System Testing and Documentation: Preparing system test data and creating test cases. Documenting testing procedures and results.

Week 13	File Conversion and Data Handling: File conversion techniques and data validation. Error detection and control mechanisms in data handling.
Week 14	System Implementation and Handover: Preparing handover documentation and system manuals. Planning user training and handover strategies.
Week 15	Project Demonstration: Final project demonstration and evaluation.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Kendall, K. E., & Kendall, J. E. (2023).** *Systems Analysis and Design* (11th ed.). Pearson.	Yes
Recommended Texts	**Valacich, J. S., George, J. F., & Hoffer, J. A. (2023).** *Modern Systems Analysis and Design* (10th ed.). Pearson.	yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Modern Programming Languages 1**			**Module Delivery**	
Module Type	**Elective**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Practical** ☐ **Tutorial** ☐ **Seminar**	
Module Code	cs-222				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	4	
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The module aims to provide a comprehensive understanding of Python programming fundamentals and advanced concepts, equipping students to implement problem-

	solving techniques and build interactive applications. It also focuses on practical applications in data analysis, web development, and machine learning.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to write, test, and debug Python programs using fundamental and advanced concepts. They will also be able to apply Python for data analysis, web scraping, and building machine learning models.
Indicative Contents المحتويات الإرشادية	The module covers core Python programming topics, including syntax, data structures, control flow, and functions. Advanced topics include object-oriented programming, file handling, exception management, data analysis, web scraping, and machine learning. The content also explores practical applications using Python libraries like `pandas`, `numpy`, and `scikit-learn`.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary strategy for delivering this module is through structured lectures to explain theoretical concepts, complemented by coding demonstrations and interactive discussions. Students will engage in real-world problem-solving through case studies and programming assignments, reinforcing their understanding of Python programming and its applications.

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	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Python Programming: Overview of programming languages and Python's role. Setting up the Python environment. Basic syntax, variables, and data types. Writing and executing simple Python scripts.
Week 2	Control Structures in Python Decision making: if, elif, and else statements. Loops: for and while loops. Using break, continue, and pass statements.
Week 3	Functions and Modules: Defining and calling functions. Function arguments, return values, and scope. Organizing code using modules and the import statement.
Week 4	Data Structures in Python: Lists, tuples, and sets: creation, manipulation, and operations. Dictionaries: key-value pairs and common methods. Understanding list comprehension.
Week 5	Object-Oriented Programming (OOP) Concepts: Introduction to classes and objects. Defining attributes and methods. Concepts of inheritance, encapsulation, and polymorphism.
Week 6	File Handling in Python: Reading and writing files. File operations: opening, closing, and manipulating file pointers. Handling exceptions during file operations.
Week 7	Mid-term Exam

Week 8	Exception Handling: Understanding errors and exceptions. Using try, except, else, and finally statements. Creating custom exceptions.
Week 9	Working with Libraries and Packages: Using standard Python libraries (e.g., math, random). Installing and using external packages (numpy, pandas). Understanding the pip package manager.
Week 10	Introduction to Data Analysis with Python: Using pandas for data manipulation. Understanding dataframes and series. Basic data analysis techniques: filtering and grouping data.
Week 11	Introduction to Web Scraping: Basics of HTML and CSS. Using BeautifulSoup and requests for scraping. Storing and processing scraped data.
Week 12	Working with APIs: Understanding RESTful APIs. Making requests using the requests library. Parsing and handling JSON data.
Week 13	Introduction to Machine Learning with Python: Overview of machine learning concepts. Using scikit-learn for implementing basic ML algorithms. Simple projects: classification and regression.
Week 14	Advanced Python Topics: Understanding decorators and generators. Multithreading and multiprocessing. Using Python for automation.
Week 15	Project Presentations: Student presentations on final projects.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Python Environment Setup and Basic Syntax: Setting up Python (Anaconda, Jupyter Notebook, or IDEs). Writing and executing simple scripts. Lab exercises on basic syntax, variables, and input/output operations.
Week 2	Control Flow Exercises: Implementing decision-making constructs (if, elif, else). Looping structures (for and while loops). Hands-on exercises: building simple control-flow based programs.
Week 3	Functions and Modular Programming: Creating and calling user-defined functions. Using built-in functions. Lab exercises on organizing code into modules.
Week 4	Implementing Python Data Structures: Creating and manipulating lists, tuples, sets, and dictionaries. Writing code using list comprehension and dictionary operations.

Week 5	Object-Oriented Programming Implementation: Defining classes and creating objects. Implementing class inheritance and polymorphism. Practical exercises on building OOP-based projects
Week 6	File Handling Operations: Reading from and writing to files. Creating a script to process data files. Handling exceptions during file operations.
Week 7	Mid-term Exam
Week 8	Error Handling Exercises: Implementing try and except blocks. Creating custom error messages. Developing programs to handle runtime errors.
Week 9	Working with Python Libraries: Using numpy for numerical computations. Creating and manipulating dataframes using pandas. Lab tasks using data analysis libraries.
Week 10	Data Analysis with pandas: Filtering, sorting, and grouping data using pandas. Performing data aggregation and basic analysis. Lab exercises on small data analysis projects.
Week 11	Web Scraping Project: Using BeautifulSoup and requests to scrape web data. Extracting and storing data in CSV format. Lab project: building a simple web scraper.
Week 12	Working with APIs: Making API requests and handling responses. Extracting and processing JSON data. Lab project: Building a Python program to interact with an external API.
Week 13	Implementing Machine Learning Models: Implementing basic ML models using scikit-learn. Training and testing a simple classification model. Lab project: Analyzing and visualizing model performance.
Week 14	Automation Projects with Python: Using os, shutil, and subprocess for system automation. Automating data processing tasks. Lab exercises on file automation and system management.
Week 15	Project Presentation: Final project demonstration and presentation.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Zelle, J. (2016).** *Python Programming: An Introduction to Computer Science* (3rd Edition). Franklin, Beedle & Associates Inc.	Yes
Recommended Texts	**Guttag, J. (2016).** *Introduction to Computation and Programming Using Python: With Application to Understanding Data* (2nd Edition). MIT Press. **McKinney, W. (2017).** *Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython* (2nd Edition). O'Reilly Media.	Yes

	Lutz, M. (2013). *Learning Python* (5th Edition). O'Reilly Media.	
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	**Visual Programming**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Practical** ☐ **Tutorial** ☐ **Seminar**	
Module Code	cs-223				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	4	
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The module aims to provide students with a comprehensive understanding of Visual Basic programming, focusing on both fundamental and advanced concepts of visual programming. Students will develop skills to create user interfaces, implement event-driven programming, and build database-connected applications using Visual Basic.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to design and develop user interfaces using Visual Basic, implement event-driven programming, and apply object-oriented principles. They will also be able to connect Visual Basic applications to databases, perform error handling, and deploy fully functional software applications.
Indicative Contents المحتويات الإرشادية	The module covers fundamental concepts of Visual Basic, including programming basics, control structures, and user interface design. It also addresses advanced topics like event-driven programming, object-oriented programming, database connectivity, error handling, and application deployment. Additionally, topics like file handling, creating graphical user interfaces (GUIs), and connecting Visual Basic applications to databases using ADO.NET are explored.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy for delivering this module is through structured lectures to explain key programming concepts, supported by coding demonstrations to reinforce theoretical knowledge. Interactive discussions, case studies, and real-world scenarios will be used to illustrate practical applications. Students will be encouraged to engage in active problem-solving and participate in group activities to enhance their learning experience.

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	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Visual Programming and Visual Basic: Overview of Visual Programming concepts. Introduction to Visual Basic environment (IDE). Understanding projects, solutions, and forms.
Week 2	Programming Basics and Visual Elements: Data types, variables, and constants. Using controls: TextBox, Label, Button, ComboBox, and ListBox. Creating and managing forms.
Week 3	Control Structures and Loops: Implementing decision-making (If...Else, Select Case). Looping structures (For, While, Do...Loop). Building programs using control flow and loops.
Week 4	Procedures and Functions in Visual Basic: Creating and using subroutines and functions. Parameter passing and return values. Understanding scope and lifetime of variables.
Week 5	Event-Driven Programming Concepts: Handling form and control events (Click, Load, TextChanged). Understanding event procedures. Building interactive programs using event-driven techniques.
Week 6	Working with Arrays and Collections: Single and multi-dimensional arrays. Using ArrayList and Collection classes. Array manipulation: Sorting and searching.
Week 7	Mid-term Exam

Week 8	File Handling and Data Persistence: Reading from and writing to text files. Managing file operations using StreamReader and StreamWriter. Using file dialogs and exceptions for file management.
Week 9	Database Connectivity Using ADO.NET: Introduction to database concepts and ADO.NET architecture. Connecting to databases (SQL Server, Access). Executing queries and displaying data using DataGridView.
Week 10	Designing User Interfaces: Principles of good interface design. Implementing menus, toolbars, and status bars. Using graphical controls: PictureBox and Timer.
Week 11	Object-Oriented Programming in Visual Basic: Understanding classes and objects. Implementing properties, methods, and constructors. Inheritance, encapsulation, and polymorphism in Visual Basic.
Week 12	Error Handling and Debugging: Using Try...Catch...Finally for error handling. Understanding debugging techniques in Visual Basic. Using breakpoints, step-through, and watch windows.
Week 13	Building and Deploying Visual Basic Applications: Creating standalone applications. Packaging and deploying Visual Basic projects. Using ClickOnce deployment and setup wizards.
Week 14	Advanced Visual Basic Concepts: Using LINQ for data manipulation. Implementing multithreading and asynchronous operations. Building custom controls.
Week 15	Project Presentations: Student presentations on final projects.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Visual Basic IDE: Setting up the Visual Studio environment. Creating a simple Visual Basic project. Familiarization with basic controls and properties.
Week 2	Building Basic Visual Applications Using common controls (TextBox, Button, Label). Implementing simple arithmetic operations. Building a basic calculator.
Week 3	Control Structures and Event Handling: Implementing decision-making programs. Using If...Else and Select Case structures. Lab exercises on building interactive applications.
Week 4	Creating and Using Procedures: Defining and calling subroutines and functions. Building programs using modular design. Lab: Creating reusable functions for calculations.

Week 5	Event-Driven Programming in Practice: Handling form events (Load, Resize) and control events. Implementing event-driven programs using Buttons and TextBoxes. Building a temperature converter using event handling.
Week 6	Working with Arrays and Data Structures: Implementing programs using arrays. Sorting and searching arrays using Visual Basic. Lab project: Managing a student score list using arrays.
Week 7	Mid-term Exam
Week 8	File Handling Operations: Writing programs to read from and write to text files. Implementing a simple text editor using StreamReader and StreamWriter. Lab exercises on managing file operations and data storage.
Week 9	Connecting to a Database: Establishing a database connection using ADO.NET. Performing CRUD operations on a sample database. Displaying data using DataGridView.
Week 10	Designing User Interfaces: Implementing menu systems, toolbars, and status bars. Building a user-friendly interface with icons and images. Lab project: Creating a simple media player interface.
Week 11	Object-Oriented Programming in Visual Basic: Defining classes and creating objects. Implementing a simple inventory management system. Lab exercises on using OOP concepts in Visual Basic.
Week 12	Error Handling and Debugging: Implementing error handling using Try...Catch. Debugging programs using breakpoints and step-through. Lab project: Creating a file manager with error handling.
Week 13	Building Visual Basic Applications: Building and packaging standalone applications. Creating an installer for a Visual Basic project. Lab project: Packaging and deploying a small application.
Week 14	Advanced Visual Basic Programming: Implementing LINQ queries in Visual Basic. Using threads for parallel processing. Lab exercises on multithreading and custom controls.
Week 15	Project Demonstration: Final project presentations and evaluation.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	**Deitel, P., & Deitel, H. (2016).** *Visual Basic: How to Program* (6th Edition). Pearson.	Yes
Recommended Texts	**Gaddis, T. (2016).** *Starting Out With Visual Basic* (7th Edition). Pearson. **Bradley, J., & Millspaugh, A. (2016).** *Programming in Visual Basic 2015* (6th Edition). McGraw-Hill.	yes
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Multimedia**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Practical** ☐ **Tutorial** ☐ **Seminar**	
Module Code	cs-224				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	4	
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The module aims to provide students with a comprehensive understanding of multimedia systems, focusing on integrating text, graphics, audio, video, and animation. Students will develop skills in multimedia content creation, editing, and

	system design, applying tools and techniques to build interactive multimedia applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to understand the core components and principles of multimedia systems, including text, graphics, audio, video, and animation. They will be able to design and develop multimedia projects, integrate various media elements, and apply multimedia tools to create interactive applications.
Indicative Contents المحتويات الإرشادية	The module covers core topics in multimedia systems, including an introduction to multimedia components (text, graphics, audio, video, and animation) and their formats. Topics include multimedia hardware and software, data compression techniques, and multimedia authoring tools. Advanced content includes designing interactive multimedia systems, multimedia communication, and exploring emerging trends like virtual and augmented reality.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary strategy for delivering this module is through structured lectures to explain multimedia concepts, supported by visual aids and interactive discussions to clarify complex topics. Real-world case studies, demonstrations of multimedia tools, and the use of multimedia authoring software will be incorporated to enhance practical understanding and engage students in critical thinking and creative content development.

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	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	2	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
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	Introduction to Multimedia: • Elements of Multimedia System. • Categories of Multimedia. • HyperText and HyperMedia. • Components of Multimedia. • Multimedia Research Topics and Projects. • Multimedia Projects.
Week 2	• Applications of Multimedia. • Multimedia on the Web. • HyperText Transfer Protocol (HTTP). • HyperText Markup Language (HTML). • Extensible Markup Language (XML). • Multimedia Data Basics.
Week 3	Graphics and Image Data Representation: • Digital Images. • Image Representation (Data Structures bitmap representation). • Image Digitalization. • Sampling. • Quantization. • Spatial resolution and quantization.
Week 4	Type of image: • Binary Images. • Gray-Scale Images. • Color Images. • Multispectral Images. • Image file formats.
Week 5	Arithmetic and Logical Operations on Images (Image Algebra).
Week 6	Image Histogram:
Week 7	Mid-term Exam

Week 8	Histogram modification: a- Histogram stretch. b- Histogram shrink. c- Histogram slide.
Week 9	Histogram equalization
Week 10	Image compression techniques: 1- Lossless Compression. 2- Lossy Compression.
Week 11	Compression System Model:
Week 12	Huffman Code.
Week 13	Basics of Digital Audio (20th 21st):
Week 14	Compression of Audio (25th)
Week 15	Video Basics (26th) Video Compression.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Setting up MATLAB programming language. Introduction to MATLAB.
Week 2	Entering Matrix. Colon Operator. Basic Matrix Functions.
Week 3	Variables. Arithmetic Operators. Function. Relational and Logical Operations.
Week 4	Read Image. Print image. Adding Title.
Week 5	Convert color image to binary image. Calculate the Histogram.
Week 6	Implementation the Hypermedia and Hypertext.
Week 7	Mid-term Exam
Week 8	Implementation of Digital Audio
Week 9	MIDI Audio (MIDI vs. Digital Audio, Multimedia System Sounds, and Audio File Formats)
Week 10	implementation Animation
Week 11	Using Video

Week 12	Using Video
Week 13	Case study :Making Multimedia
Week 14	The Stages of a Multimedia Project
Week 15	Case study: Multimedia on the Web

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Ze-Nian Li & Mark S. Drew. (2016).** *Multimedia Systems*. Springer.	Yes
Recommended Texts	**Li, Z., Drew, M., & Liu, J. (2014).** *Fundamentals of Multimedia* (2nd Edition). Springer **Parekh, R. (2006).** *Principles of Multimedia*. Tata McGraw-Hill Education.	yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Smart Systems**			**Module Delivery**	
Module Type	**Elective**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Practical** ☐ **Tutorial** ☐ **Seminar**	
Module Code	cs-225				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	2		**Semester of Delivery**	4	
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	01/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The module aims to introduce students to the fundamental principles and technologies of smart systems, including IoT, AI, and data analytics. It equips students with the skills to design, implement, and evaluate smart systems in various applications.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	By the end of the module, students will be able to apply core concepts of smart systems, including IoT, data analytics, and AI techniques, to real-world applications. They will also develop skills to design, implement, and evaluate smart systems for various industries.
Indicative Contents المحتويات الإرشادية	The module covers topics such as the fundamentals of smart systems, sensors, IoT architecture, data analytics, and machine learning techniques. It also includes advanced concepts like security, human-computer interaction, robotics, and the ethical implications of smart systems.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy for delivering this module is to use theoretical lectures and interactive discussions to build foundational knowledge of smart systems. Emphasis will be placed on case studies, real-world examples, and engaging class activities to enhance conceptual understanding and encourage critical thinking.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**75**		

Module Evaluation تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

Week 1	Introduction to Smart Systems: Definition and characteristics of smart systems.
Week 2	Technologies driving smart systems. Applications in various industries.
Week 3	Sensors and Actuators: Types of sensors and their roles. Integration of actuators with sensors. Sensor networks and data acquisition.
Week 4	Internet of Things (IoT): Introduction to IoT and its architecture. IoT communication protocols and standards. Designing and implementing IoT devices.
Week 5	Data Analytics for Smart Systems: Importance of data in smart systems. Data collection, storage, and management. Introduction to data analytics and visualization tools.
Week 6	Artificial Intelligence in Smart Systems: Role of AI in smart systems. Overview of AI techniques: Rule-based, machine learning, and neural networks. Intelligent decision-making and automation.
Week 7	Mid-term Exam
Week 8	Machine Learning for Smart Systems: Supervised vs. unsupervised learning. Key ML algorithms. Implementing ML in smart systems.
Week 9	Edge and Cloud Computing in Smart Systems: Concepts and applications of edge computing. Cloud computing: Infrastructure and integration. Balancing edge and cloud processing.
Week 10	Smart Systems Architecture and Design: Principles of smart system design. Hardware and software components. System integration and testing.
Week 11	Security and Privacy in Smart Systems: Security challenges in smart systems. Encryption, authentication, and access control. Privacy concerns and data protection.
Week 12	Human-Computer Interaction (HCI) in Smart Systems: Importance of HCI in smart systems. Designing user-centric interfaces. Interaction methods: Voice, gesture, and touch.
Week 13	Robotics and Automation in Smart Systems: Role of robotics in smart systems. Basics of robot programming and control. Automation in manufacturing and service industries

Week 14	Ethical and Social Implications of Smart Systems: Ethical issues in smart systems development. Impact on jobs and society. Legal and regulatory considerations.
Week 15	Group discussion: The future of smart systems.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Hemanth, J., & Balas, V. E. (Eds.). (2017).** *Smart Systems and IoT: Innovations in Computing*. Springer.	Yes
Recommended Texts	**Russell, S., & Norvig, P. (2020).** *Artificial Intelligence: A Modern Approach* (4th ed.). Pearson.	yes
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A –** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	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.