

			Republic of Iraq - Ministry of Higher Education and Scientific Research Mosul University/College of Computer Science and mathmatics/Software Dept. Bachelor's degree in Software Science (First cycle) Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr Program Curriculum (2023 - 2024)				جمهورية العراق - وزارة التعليم العالي والبحث العلمي جامعة الموصل / كلية علوم الحاسوب والرياضيات / قسم البرمجيات بكالوريوس علوم في البرمجيات (الدورة الأولى) أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوروبية - كل وحدة اوروبية = ٢٥ ساعة المنهاج الدراسي للعام ٢٠٢٣-٢٠٢٤															
Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)					Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code				
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)		Semn (hr/w)	hr/sem	hr/sem				hr/sem			
UGI	One	1	UOMCSSW1101	Democracy and Human Rights	الديمقراطية وحقوق انسان	Arabic	2							3	33	17	50	2.00	B			
		2	UOMCSSW1102	Logic design	تصميم منطقي	English	2			2		2	1	3	93	107	200	8.00	C			
		3	UOMCSSW1103	Computer	حاسوب	English	1			2			1	3	48	27	75	3.00	B			
		4	UOMCSSW1104	Discrete Structures	هياكل متقطعة	English	2					2	1	3	63	37	100	4.00	C			
		5	UOMCSSW1105	Algorithms and Structured Programming (1)	خوارزميات وبرمجة مهيكلية (1)	English	2			2		2	1	3	93	107	200	8.00	C			
		6	UOMCSSW1106	Mathematics	الرياضيات	English	2					2	1	3	63	62	125	5.00	S			
							Total	11	0	6	0	8	5	18	393	357	750	30.00				
	Two																					
		Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)					Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code			
								CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)		Semn (hr/w)	hr/sem	hr/sem				hr/sem		
			1	UOMCSSW1201	Algorithms and Structured Programming (2)	خوارزميات وبرمجة مهيكلية (2)	English	2			2		2	1	3	93	107	200	8.00	C	Algorithms and Structured Programming (1)	
			2	UOMCSSW1202	Computer Organization	تنظيم حاسوب	English	2			2		2	1	3	93	107	200	8.00	C	logic design	
			3	UOMCSSW1203	Introduction of Statistics and Probability	الاحصاء والاحتمالية	English	2					2	1	3	63	37	100	4.00	S		
			4	UOMCSSW1204	assembly language	لغة التجميع	English	2			2		1	1	3	78	72	150	6.00	C		
5	UOMCSSW1205		English Language (1)	اللغة الانكليزية	English	2							3	33	17	50	2.00	B				
6	UOMCSSW1206	Arabic language	اللغة العربية	Arabic	2							3	33	17	50	2.00	B					
					Total	12	0	6	0	7	4	18	393	357	750	30.00						
UGII	Three	1	UOMCSSW2101	Object Oriented Programming (1)	البرمجة الكيائية (1)	English	2			2			1	1	3	78	72	150	6.00	C		
		2	UOMCSSW2102	Software Engineering (1)	هندسة البرمجيات (1)	English	2			2			1	1	3	78	72	150	6.00	C		
		3	UOMCSSW2103	Data Structure (1)	هياكل بيانات (1)	English	2			2			1	1	3	78	72	150	6.00	C		
		4	UOMCSSW2104	Software Systems	أنظمة البرمجيات	English	2			2				1	3	63	37	100	4.00	C		
		5	UOMCSSW2105	Database	قواعد البيانات	English	2			2				1	3	63	37	100	4.00	C		
		6	UOMCSSW2106	Numerical Methods	طرق عددية	English	2							3	33	17	50	2.00	S			
		7	UOMCSSW2107	Arabic language	اللغة العربية	Arabic	2							3	33	17	50	2.00	B			
						Total	12	0	10	0	3	5	18	393	307	700	30.00					
		Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)					Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code			
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem						
			1	UOMCSSW2201	Object Oriented Programming (2)	البرمجة الكيائية (2)	English	2			2			1	1	3	78	72	150	6.00	C	البرمجة الكيائية (1)

	Four	2	UOMCSSW2202	Software Engineering (2)	هندسة برمجيات (2)	English	2		2		1	1	3	78	72	150	6.00	C	هندسة البرمجيات (1)
		3	UOMCSSW2203	Data Structure (2)	هياكل بيانات (2)	English	2		2		1	1	3	78	72	150	6.00	C	هياكل بيانات (1)
		4	UOMCSSW2204	Design of Distributed Data	تصميم قواعد البيانات	English	2		2			1	3	63	37	100	4.00	C	
		5	UOMCSSW2205	Computability Theory	النظرية الاحتمالية	English	2			2	1	3	63	37	100	4.00	C		
		6	UOMCSSW2206	English Language (1)	اللغة الانكليزية	English	2					3	33	17	50	2.00	B		
		7	UOMCSSW2206	Baath Party crimes	جرائم حزب البعث	English	2					3	33	17	50	2.00	B		
						Total	14	0	8	0	5	5	21	426	324	750	30.00		
Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem				
UGIII	Five	1	UOMCSSW3101	Artificial Intelligence	ذكاء اصطناعي	English	2		2		1	1	3	78	72	150	6.00	C	
		2	UOMCSSW3102	Compilers Design	تصميم مترجمات	English	2		2		1	1	3	78	72	150	6.00	C	Computability Theory
		3	UOMCSSW3103	Software Project Management	إدارة مشاريع برمجيات	English	2				2	1	3	63	37	100	4.00	C	Software Engineering (2)
		4	UOMCSSW3104	Software Requirement	متطلبات البرمجيات	English	2		2		1	1	3	78	72	150	6.00	C	Software Engineering (2)
		5	UOMCSSW3105	Computer Architecture	معمارية الحاسوب	English	2		2		1	1	3	78	72	150	6.00	C	Assembly language
		6	UOMCSSW3106	English Language	اللغة الانكليزية	English	2						3	33	17	50	2.00	B	English Language
						Total	12	0	8	0	6	5	18	408	342	750	30.00		
	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem				
UGIII	Six	1	UOMCSSW3101	Intelligent techniques	تقنيات ذكائية	English	2		2		1	1	3	78	72	150	6.00	C	Artificial Intelligence
		2	UOMCSSW3102	Software engineering tools	أدوات هندسة البرمجيات	English	2		2		1	1	3	78	72	150	6.00	C	Software engineering(2)
		3	UOMCSSW3103	Software fault tolerance	سامحية الاخطاء للبرمجيات	English	2		2		1	1	3	78	72	150	6.00	C	Software engineering(2)
		4	UOMCSSW3104	Operating Systems	نظم تشغيل	English	2		2		1	1	3	78	72	150	6.00	C	Computer Architecture
		5	UOMCSSW3105	Network and Websites Engineering	شبكات وهندسة مواقع الويب	English	2		2		1	1	3	78	72	150	6.00	C	Computer
		6																	
						Total	10	0	10	0	5	5	15	390	360	750	30.00		
Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem				
UGIV	Seven	1	UOMCSSW4101	Information Security	امن المعلومات	English	2		2		1	1	3	78	72	150	6.00	C	
		2	UOMCSSW4102	Software Development Techniques	تقنيات تطوير البرمجيات	English	2				2	1	3	63	62	125	5.00	C	
		3	UOMCSSW4103	Image and Signal Processing (1)	معالجة الصور والاشارة(1)	English	2		2		1	1	3	78	72	150	6.00	C	
		4	UOMCSSW4104	Design of real Time System	تصميم نظم الزمن الحقيقي	English	2		2		1	1	3	78	72	150	6.00	C	
		5	UOMCSSW4105	Software reliability	وثوقية البرمجيات	English	2				2	1	3	63	62	125	5.00	C	
		6	UOMCSSW4106	English Language(4)	اللغة الإنكليزية (4)	English	2						3	33	17	50	2.00	B	
						Total	12	0	6	0	7	5	18	393	357	750	30.0		
	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL	USSWL	SWL	ECTS	Module Type	Prerequisite Module(s) Code
						CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)		hr/sem	hr/sem	hr/sem				
UGIV		1	UOMCSSW4201	Computer Network Security	امن شبكات الحاسوب	English	2		2		1	1	3	78	72	150	6.00	C	Information Security
		2	UOMCSSW4202	Software Quality Assurance	ضمان جودة البرمجيات	English	2					1	3	33	17	50	2.00	C	

Eight	3	UOMCSSW4203	Image and Signal Processing (2)	معالجة الصور والاشارة (2)	English	2		2		1	1	3	78	72	150	6.00	C	Image and Signal Processing (1)
	4	UOMCSSW4204	Open Source	مفتوحة المصدر	English	2				2	1	3	63	37	100	4.00	E	
	5	UOMCSSW4205	Internet of Things	انترنت الأشياء	English	2		2		1	1	3	78	72	150	6.00	C	Network and Websites Engineering
	6	UOMCSSW4206	Project	مشروع التخرج	English	2		2		1	1	3	78	72	150	6.00	C	
						Total	12	0	8	0	6	6	18	408	342	750	30.0	
					Total	95	0	62	0	47	40	144	3204	2746	5950	240.0	Must be 240 ECTS	
Note: The student should complete 4 weeks of Summer Internships to fulfil the requirements of the Bachelor's degree																		
Structured SWL (hr/w) type	CL	Class Lecture	Module type	B	Basic learning activities	SWL:	Student Workload											
	Lab	Laboratory		C	Core learning activity		SSWL:		Structured SWL									
	Pr	Practical Training		S	Suport or related learning activity		USSWL:		Unstructured SWL									
	Tut	Tutorial		E	Elective learning activity													
	Lect	Online lecture	Note: Columns O, Q and R are progrmaed, protected and should not be edited															
	Semn	Seminar																

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	UOMCSSW1102		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	2	Semester of Delivery	1
Administering Department	SW	College	CS
Module Leader	Tawfeeq Mokdad Tawfeeq	e-mail	E-mail : tawfeeq.m.flaih@uomosul.edu.iq
Module Leader's Acad. Title	Asst. prof	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/6/2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understanding Digital Systems: Learn and understand the core principles of digital systems and how they function. 2. Binary Logic Mastery: Gain a clear understanding of binary logic and how it forms the basis for digital computing and design. 3. Comprehension of Logic Gates: Understand the functioning of basic logic gates (AND, OR, NOT) and more complex gates (NAND, NOR, XOR, XNOR), as well as how to combine these gates to create digital circuits. 4. Boolean Algebra Proficiency: Develop a strong understanding of Boolean algebra, including how to simplify Boolean expressions and how these expressions are used in logic design. 5. Sequential and Combinational Logic: Learn the difference between sequential and combinational logic, and how to design circuits using each type of logic. 6. Logic Minimization Techniques: Understand and apply logic minimization techniques, such as Karnaugh maps and Quine-McCluskey method, to simplify logic designs.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcomes of a logic design course are the specific knowledge, skills, and abilities that a student should possess after completing the course. While these can vary based on the specific course and institution, they typically include: 1. Understanding Fundamental Concepts: The students will have a firm grasp of binary systems, digital signals, logic gates, and Boolean algebra. 2. Proficiency in Logic Minimization Techniques: Students will know how to use Karnaugh maps and Quine-McCluskey method to simplify logic circuits. 3. Hands-On Experience: Students will gain practical experience in implementing logic circuits, either physically with electronic components or virtually using design and simulation software. 4. Knowledge of Different Logic Families: Students will learn about different logic families (like TTL, CMOS), their characteristics, and the advantages and disadvantages of each.
Indicative Contents المحتويات الإرشادية	The indicative contents for a first course on Logic Design will typically cover the following areas: 1. Introduction to Digital Systems: Discussion of what digital systems are and how they function, including basics of analog vs digital signals. 2. Binary Systems and Codes: Understanding of binary numbers, binary arithmetic, binary codes like Gray Code, BCD, etc. 3. Logic Gates and Circuits: Introduction to basic logic gates (AND, OR, NOT), universal gates (NAND, NOR), and more complex gates (XOR, XNOR). 4. Boolean Algebra and Logic Simplification: An in-depth look at Boolean algebra, its laws and rules, and its application to logic design. Techniques for logic simplification, such as De Morgan's laws and Karnaugh maps, would also be included.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Learning and teaching logic design, particularly digital logic design, requires a deep understanding of binary systems, gates, Boolean algebra, and much more. Here are some effective strategies to facilitate learning and teaching of this subject. Using Visual Tools: Visual representations can greatly enhance understanding in this field. Using diagrams to explain concepts such as truth tables, Karnaugh maps, and logic gates. Software like Circuit maker can be used to virtually design and test digital circuits. Starting with basic binary arithmetic, explaining the importance of 0s and 1s in digital logic design. Moving to basic logic gates (AND, OR, NOT), and gradually introduce more complex ones (NAND, NOR, XOR, XNOR). Utilizing Hands-On Learning: Incorporating practical exercises whenever possible. This could involve using breadboards and basic electronic components or using software to design and simulate circuits.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	122	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Numbering systems_1 (Decimal, Binary, Octal and Hexadecimal)
Week 2	Numbering systems_2 (Decimal, Binary, Octal and Hexadecimal)
Week 3	Base conversion (Decimal, Binary, Octal and Hexadecimal)
Week 4	Base conversion (Gray code)
Week 5	Base conversion (BCD, EX-3, 2421)
Week 6	Arithmetic Operation (Addition)
Week 7	Arithmetic Operation (Subtraction: Normal, 1's complement, 2's complement)
Week 8	Arithmetic Operation (Multiplication)
Week 9	Arithmetic Operation (Division)
Week 10	Basic logic gates_1
Week 11	Basic logic gates_2
Week 12	Logic circuit simplification using Boolean algebra_1
Week 13	Logic circuit simplification using Boolean algebra_2
Week 14	Logic circuit simplification using Karnaugh map_1
Week 15	Logic circuit simplification using Karnaugh map_2
Week 16	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Basic logic gates (AND, OR, NOT)
Week 2	Lab 2: Basic logic gates (XOR,XN OR)
Week 3	Lab 3: Truth Table
Week 4	Lab 4: Boolean Function
Week 5	Lab 5: Boolean Expression
Week 6	Lab 6: Boolean Algebra - 1
Week 7	Lab 7: Boolean Algebra - 2
Week 8	Lab 8: De-Morgan theorem - 1
Week 9	Lab 9: De-Morgan theorem - 2
Week 10	Lab 10: Combinational Circuits
Week 11	Lab 11: Combinational Circuits simplification using Boolean Algebra - 1
Week 12	Lab 12: Combinational Circuits simplification using Boolean Algebra - 2
Week 13	Lab 13: Combinational Circuits simplification using Karnaugh map -1
Week 14	Lab 14: Combinational Circuits simplification using Karnaugh map -2
Week 15	Lab 15: Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	M. M. Mano,2016, "Digital Design", Prentice Hall	
Recommended Texts	Thomas I. Floyd, 2006, "Digital Fundamentals", Prentice Hall	
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		Module Delivery	
Module Type	Basic		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW1103			
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	3	Semester of Delivery		1
Administering Department	SW	College	CS	
Module Leader	Jamal Salahaldeen Majeed Alneamy		e-mail	Jamal_alneamy@uomosul.edu.iq
Module Leader's Acad. Title	Assistant 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	1/6 /2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	None		Semester	
Co-requisites module	Computer Skills (2)		Semester	2

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

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

	4. Describe the different types of software: operating systems, application software and Explain the terms shareware, freeware, end-user license agreement. 5. Describe the different types of menus. 6. Demonstrate searching, sorting and changing views for files and folders. 7. Describe the different file types. 8. Demonstrate how to compress and decompress files and folder. 9. Demonstrate the usage of removable media for storing files. 10. Connect basic peripheral devices. 11. Demonstrate logging on and off a computer network. 12. Understand the different types of networks. 13. Identify the purpose of a browser in accessing information on the World Wide Web (WWW) and navigate the Web. 14. Understand how to deal with web browser tools such as: bookmarks, display and hide built-in toolbars, deleting browsing history and print web pages. 15. Use search engines. 16. Understand how electronic mail works including the components of electronic mail message, electronic mail address, and electronic mail options. 17. Understand how social media works. 18. Explain the essential concepts of cloud storage. 19. Identify the benefits and risks of network computing. 20. Identify the security issues with electronic mails. 21. Identify risks to personal and organizational data. 22. Describe the protected web sites, use of digital certificates, encryption-decryption, and uses of firewall and how to get protected from hackers etc. 23. Explain different types of viruses (including worms, Trojans etc) and clean viruses and worm-infected system with appropriate software. 24. Explain privacy issues, good passwords and access right. 25. Describe the concept of backup and its importance to data recovery.
Indicative Contents المحتويات الإرشادية	Computer System Overview - Describe the main functional blocks of a computer system and their sequential processing of information. Hardware Components - Explain the functions of different hardware components such as CPU, storage systems, RAM, ROM, etc. - Identify common input and output devices and their roles in computer systems. Computing and End-User Devices

- Compare and contrast different types of computing and end-user devices.

Software Types

- Describe the different types of software, including operating systems and application software.

Removable Media and Peripheral Devices

- Demonstrate the usage of removable media for storing files.
- Connect basic peripheral devices to a computer.

Computer Networking

- Demonstrate logging on and off a computer network.
- Understand different types of networks.

Web Browsing and Search Engines

- Identify the purpose of a browser in accessing information on the World Wide Web (WWW) and navigate the Web.
- Understand how to use web browser tools such as bookmarks, toolbars, deleting browsing history, and printing web pages.
- Utilize search engines for information retrieval.

Electronic Mail and Social Media

- Understand how electronic mail works, including the components of an email message, email address, and email options.
- Understand how social media works.

Cloud Storage

- Explain the essential concepts of cloud storage.

Network Computing and Security

- Identify the benefits and risks of network computing.
- Identify security issues related to electronic mails.
- Identify risks to personal and organizational data.
- Describe protected websites, digital certificates, encryption-decryption, firewall usage, and protection against hackers.

Viruses and Privacy Issues

- Explain different types of viruses (including worms, Trojans) and demonstrate virus removal with appropriate software.

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	122	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Computer fundamentals-01
Week 2	Computer fundamentals-02
Week 3	Mathematical questions to convert between different memory capacity units
Week 4	Mathematical questions for storage device
Week 5	Basic computer operation and file management-01
Week 6	Basic computer operation and file management-02
Week 7	Mid-term Exam-01
Week 8	Internet, www and email-01
Week 9	Internet, www and email-02
Week 10	information security-01
Week 11	information security-02
Week 12	Word processing, presentation and spreadsheet
Week 13	Microsoft PowerPoint
Week 14	Microsoft Excel
Week 15	Mid-term Exam-02
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)		
المنهاج الاسبوعي للمختبر		
	Material Covered	
Week 1	Lab 1:Windows 10	
Week 2	Lab 2:Windows 10	
Week 3	Lab 3:Windows 10	
Week4	Lab 4: Microsoft Office (WORD)	
Week 5	Lab 5: Microsoft Office (WORD)	
Week 6	Lab 6: Microsoft Office (WORD)	
Week 7	Lab 7: Mid-term Exam-01.	
Week 8	Lab8: Microsoft Office (PowerPoint)	
Week 9	Lab 9: Microsoft Office (PowerPoint)	
Week 10	Lab 10: Microsoft Office (PowerPoint)	
Week 11	Lab 11: Microsoft Office (Excel)	
Week 12	Lab 12: Microsoft Office (Excel)	
Week 13	Lab 13: Microsoft Office (Excel)	
Week 14	Lab 14: Microsoft Office (Excel)	
Week 15	Lab 15: Mid-term Exam-02	
Week 16	Lab 16: Preparatory week before the final Exam	
Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	- Computer Organization and Design" by David A. Patterson and John L. Hennessy - Computer Architecture: A Quantitative Approach" by John L. Hennessy and David A. Patterson	Yes
Recommended Texts	- Web Design with HTML, CSS, JavaScript, and jQuery Set by Jon Duckett - Principles of Information Security by Michael E. Whitman and Herbert J. Mattord - CompTIA Security+ Get Certified Get Ahead: SY0-501 Study Guide by Darril Gibson	No
Websites	- TechTerms: https://techterms.com/ - Computer Hope: https://www.computerhope.com/ - Google Web Fundamentals: https://developers.google.com/web/fundamentals - National Institute of Standards and Technology (NIST) Computer Security Resource Center: https://csrc.nist.gov/ - OWASP (Open Web Application Security Project): https://owasp.org/	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Discrete structures		Module Delivery
Module Type	Core		☒ Theory Lecture Lab Tutorial Practical Seminar
Module Code	UOMCSSW1104		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	4	Semester of Delivery	
Administering Department	SW	College	CS
Module Leader	Maha abd allellah mohammad	e-mail	Mahaabd77@uomosul.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Master
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/6 /2023	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. The course aims to study discrete structures in terms of the use of algebraic laws. 2. Charts and shapes 3. To reach an easy and clear way for students 4. To solve all material issues related to discontinuous structures. 5. In addition to studying quantifiers and predicates logic 6. Studying the different groups, theories and schemes so that the student can solve the duties required of him and the exercises with simplicity, ease and clarity.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learn how to solve algebraic laws, groups and Venn diagrams correctly, efficiently and clearly 2. The subjects studied in discrete structures are either definite or indefinite. The term finite structures is sometimes used to refer to fields of discrete mathematics that deal with finite groups, 3. especially in fields of business relevance. 4. Discrete mathematical structures have gained wide importance over the recent decades due to their wide applications in computer science. 5. Discrete mathematics terms and notations are useful for studying and expressing problems of objects in computer programming and algorithms. 6. Some branches of discrete mathematics are also useful in studying some business and economic issues.
Indicative Contents المحتويات الإرشادية	The topics studied in discrete mathematics are either definite or indeterminate. The term finite mathematics is sometimes used to refer to fields of discrete mathematics that deal with finite groups, especially in fields of business relevance. Discrete mathematics has gained wide importance in recent decades due to its wide applications in computer science. Discrete mathematics terms and notations are useful for studying and expressing problems of objects in computer programming and algorithms. Some branches of discrete mathematics are also useful in studying some business, economic, institutional and trade issues.

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

	integers. Discrete mathematics has gained wide importance in recent decades due to its wide applications in computer science. Discrete mathematics terms and notations are useful for studying and expressing objects in computer programming and algorithms. Some branches of discrete mathematics are also useful in studying some business and economic issues.
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	
	Assignments	2	10% (10)	2 and 12	
	Projects	1	10% (10)	Continuous	
	Report	1	10% (10)	13	
Summative assessment	Midterm Exam	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Definition to discrete structure
Week 2	Biconditional statement,

	Type of statements
Week 3	Algebra of propositions
Week 4	Laws of Algebra propositions
Week 5	Define of Predicates logic
Week 6	Define of quantifiers and examples
Week 7	Sets theory
Week 8	Type of set operation
Week 9	Venn diagram in details
Week 10	Laws of set operation and type
Week 11	Define of Cartesian product
Week 12	types of relations
Week 13	Graphs of relation, construct the relation
Week 14	How to solve laws of relations
Week 15	Other approaches to computability
Week 16	Preparatory week before the final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Discrete Mathematics and Its Applications_7th_Edition	Yes
Recommended Texts		No

	Foreman, M., Akihiro Kanamori, eds. Handbook of Set Theory. 3 vols., 2010. Each chapter surveys some aspect of contemporary research in set theory. Does not cover established elementary set theory.	
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	Algorithms and Structured Programming (1)		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW1105			
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	5	Semester of Delivery		1
Administering Department	SW	College	CS	
Module Leader	Hanan Hamid Ali		e-mail	Hanan_hamidali@uomosul.edu.iq
Module Leader's Acad. Title	Assistant professor		Module Leader's Qualification	M.Sc.
Module Tutor	Zahraa Mazeen Alkattan		e-mail	Zahraa.alkattan@uomosul.edu.iq
Peer Reviewer 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	Algorithms and Structured Programming (2)	Semester	2

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of programing through the application of instruction. 2. To understand input , output instruction . 3. This course deals with the basic operation in any program code. 4. This is the basic subject for all programs. 5. To understand how to analysis any problem to solve it by programs. 6. To perform a good programmer .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Recognize how instruction works in program code. 2. List the various terms of programing. 3. Summarize what is meant by a basic instruction. 4. Discuss the simple programming and the perfect programing . 5. Describe the problem and how to solve it by programing. 6. Identify the basic elements of any program code. 7. Discuss the precedence of operator . 8. Discuss the various of idea to solve any program .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - programing Theory</u> Flowcharts, simple sequential flowchart , branched flowchart , Loop flowchart [15 hrs] Identifier names , variables and data types (Integer ,float ,double , char) Input and output statements (cin and cout statements). [15 hrs] Operators (arithmetic ,relational and logical) + , - , * , / , % , > , < , && , , ! precedence of operator ((, ++ , -- , * / % , + - , ?) . [10 hrs] The control statements(first type) , Nested control statement. (nested if statement) [15 hrs] Part II (of control statement) Switch Case selected [10 hrs] <u>Part B - The control statements(second type)</u> Looping first type , For loop and Nested for loop , Looping second type (While loop and Nested while loop, Looping third type (Do..... while loop) (20 hrs) Statement working with loop (Break , continue). [10 hrs] Functions (Simple functions) . (10 hrs)

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	122	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	6	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	6	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 - simple sequential flowchart
Week 2	branched flowchart
Week 3	Identifier names , variables and data types
Week 4	Input and output statements
Week 5	Operators (arithmetic ,relational and logical)
Week 6	precedence of operator
Week 7	The control statements(first type)
Week 8	Nested control statement
Week 9	The control statements(second type)
Week 10	Looping first type
Week 11	Looping second type
Week 12	Looping third type
Week 13	Statement working with loop
Week 14	Functions
Week 15	Simple function
Week 16	Input and output statements

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to the language
Week 2	Lab 2: .input ,output instruction
Week 3	Lab 3: variables and constants, Assignment operator Arithmetic and Logical operators
Week 4	Lab 4: Control Decision (if and switch case)
Week 5	Lab 5: Looping statement (for)
Week 6	Lab 6: Looping statement (while and do while)
Week 7	Lab 7: simple functions

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	.C++ from control structures through objects, eighth edition , by Tony Gaddis	no
Recommended Texts		No
Websites		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C – Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Computational mathematics2		Module Delivery	
Module Type			☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code				
ECTS Credits				
SWL (hr/sem)				
Module Level	1	Semester of Delivery		2
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader	Ahmed Amer Mohammed		e-mail	aahmedamer68@uomosul.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail	
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date	15/06/2023	Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Provide the basic base for the elementary types of coordinates and applications. 2. Integration of algebraic functions and transcendental functions and the application of integrals to solve problems of mathematics, engineering and physics. 3. The student learned matrices and learned the properties of matrices 4. The student's ability to calculate a system of equations using matrices 5. Learn sequences and series.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Elementary types of coordinates and applications 2. Learn techniques integration. 3. Applications of integrations to solve mathematics, engineering and physics problems. 4. Expanding on many of the functions that were taken in the previous stages. 5. Learn the sequences and series and convergence and divergence methods.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A</u> Integration: Introduction of Integrations, Types of integrations, Integrations of special functions, such as: Algebraic functions, Trigonometric functions, Natural logarithm function, Exponential function, Exponential and logarithmic function bases other than e, Hyperbolic functions, Inverse of trigonometric functions, Inverse of hyperbolic functions, ceiling and floor functions. Techniques of integration: Integration using substitution, Integration by parts, Integration of Trigonometric (power, product), Trigonometric substitutions, Rational functions and partial fractions, Rationalizing substitutions, Integration of rational function in sine and cosine, Integral by hyperbolic substitution, Improper Integral, Comparison test for improper Integrals, King property integration. <u>Part B</u> Applications of integration: Definition of Areas and types of areas, Definition Volumes and types of volumes, length of curves in the plane, Areas of Surfaces of revolution. matrices and learned the properties of matrices, calculate a system of equations using matrices Introduction about Sequences, formula of sequences, types of sequences, convergent and divergent of sequences, Testing for monotonicity for sequences, Introduction about series and formula of series, geometric series, Test convergence and divergence of series, Introduction of polynomials, Maclaurin polynomial, Taylor polynomial.

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

	came from and taking realistic applications on that.
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Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل		Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل		Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	10% (30)	5, 9, 13	LO #1-3
	Assignments	5	1% (5)	2,4,6,8,10	LO # 1-4
	Projects / Lab.				
	Report	1	1% (5)	12	
Summative assessment	Midterm Exam	1r. and half	10% (10)	7	LO # 1-3
	Final Exam	3hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Integration: Introduction of Integrations, Types of integrations, Integrations of special functions, such as: Algebraic functions, ceiling and floor functions.
Week 2	Trigonometric functions, Natural logarithm function, Exponential function, Exponential and logarithmic function bases other than e.

Week 3	Hyperbolic functions, Inverse of trigonometric functions, Inverse of hyperbolic functions.
Week 4	Techniques of integration: Integration using substitution, Integration by parts, Integration of Trigonometric(power, product).
Week 5	Trigonometric substitutions, Rational functions and partial fractions.
Week 6	Rationalizing substitutions, Integration of rational function in sine and cosine, Integral by hyperbolic substitution.
Week 7	Mid-term Exam + Improper Integral, Comparison test for improper Integrals, King property integration.
Week 8	Applications of integration: Definition of Areas and types of areas, Definition Volumes, Types of volumes.
Week 9	matrices Properties of matrices and finding the determinant
Week 10	inverse of the matrix
Week 11	. system of linear equations using matrices
Week 12	Maclaurin polynomial
Week 13	Introduction about Sequences, formula of sequences, types of sequences
Week 14	Introduction of polynomials, Maclaurin polynomial, Taylor polynomial.
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	THOMAS' CALCULUS, 4 th edition , 2018 BY: GEORGE B. THOMAS, JR., JOEL HASS, CHRISTOPHER HEIL and MAURICE D. WEIR	Yes
Recommended Texts	CALCULUS, 9 th edition , 2020 BY: JAMES STEWART, DANIEL CLEGG and SALEEM	Yes

	WATSON.	
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	Algorithms and Structured Programming (2)		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW1203			
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	9	Semester of Delivery		2
Administering Department	SW	College	CS	
Module Leader	Hanan Hamid Ali		e-mail	Hanan_hamidali@uomosul.edu.iq
Module Leader's Acad. Title	Assistant professor		Module Leader's Qualification	M.Sc.
Module Tutor	Zahraa Mazeen Alkattan		e-mail	Zahraa.alkattan@uomosul.edu.iq
Peer Reviewer 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	Algorithms and Structured Programming (1)	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of programing through the application of instruction. 2. To understand input , output instruction . 3. This course deals with the basic operation in any program code. 4. This is the basic subject for all programs. 5. To understand how to analysis any problem to solve it by programs. 6. To perform a good programmer .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Recognize how instruction works in program code. 2. List the various terms of programing. 3. Summarize what is meant by a basic instruction. 4. Discuss the simple programming and the perfect programing . 5. Describe the problem and how to solve it by programing. 6. Identify the basic elements of any program code. 7. Discuss the precedence of operator . 8. Discuss the various of idea to solve any program .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – function</u> : Definition of functions , examples , Definition of default argument , Definition of recursive functions , Definition of call by reference functions , [20 hrs] <u>Part B – arrays</u> : Definition of 1D , examples , Definition of 2D, main and second diagonal , examples [20 hrs] <u>Part C – string</u> : Definition of string ,read and write string, Definition of string function , examples [15 hrs] <u>Part D- structures:</u> Definition of structures , read structurer , write structures, examples, Definition of nested structure , examples [20 hrs] <u>Part E - files</u> : Definition files , Open files , closing filse , rewind , Fgetc, fputc functions, examples , Fgets , fputs function , examplies , Fread and fwrite with arraye and structures [20 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	122	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	8
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	9	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	15	15% (15)	Continuous	All
	Report	0	0% (0)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	15% (15)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	introduction
Week 2	Default argument function
Week 3	Recursive function
Week 4	Call by reference function
Week 5	one Dimensional Array
Week 6	Two Dimensional Array
Week 7	Function to manipulate Arrays
Week 8	String of characters
Week 9	Function to manipulate strings
Week 10	Structures
Week 11	Array of structures
Week 12	Nested structure
Week 13	Files
Week 14	Files working with characters
Week 15	Files working with string
Week 16	fread and fwrite instruction

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: apply Default argument function , Recursive function
Week 2	Lab 2: apply Call by reference function
Week 3	Lab 3: apply one Dimensional Array , Two Dimensional Array
Week 4	Lab 4: apply Function to manipulate Arrays
Week 5	Lab 5: apply String of characters , Function to manipulate strings
Week 6	Lab 6: apply Structures , Array of structures , Nested structure
Week 7	Lab 7: apply Files working with characters , Files working with string , fread and fwrite

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	C++ from control structures through objects, eighth edition , by Tony Gaddis	No
Recommended Texts		No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C – Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer Organization		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOMCSSW1205		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	11	Semester of Delivery	2
Administering Department	SW	College	CS
Module Leader	Tawfeeq Mokdad Tawfeeq	e-mail	E-mail : tawfeeq.m.flaih@uomosul.edu.iq
Module Leader's Acad. Title	Asst. prof	Module Leader's Qualification	M.Sc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/6/2023	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. Design and Analysis: Gain the ability to design and analyze various types of digital circuits, including adders, multiplexers, decoders, memory units, and more. 2. Understanding of Flip Flops and Memory Elements: Develop a comprehension of various types of flip-flops and memory elements, and understand their use in creating larger systems such as registers and counters. 3. Problem-Solving Skills: Enhance problem-solving skills, critical thinking, and creativity in the context of digital logic design.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Design and Analysis of Logic Circuits: Students will be able to design and analyze combinational and sequential circuits. This includes basic gates, adders, multiplexers, decoders, and other digital circuits. 2. Problem-Solving Skills: Students will develop strong problem-solving skills, allowing them to tackle complex logic design problems effectively. 3. Understanding of Memory Elements: Students will understand the operation of different types of flip-flops, latches, and other memory elements. They will also know how these elements are used to design registers, counters, and more complex memory structures. 4. Ability to Work in Teams: If collaborative projects are included in the course, students will gain experience in working as part of a team to design and implement complex logic circuits. 5. Relating Theory to Practice: Students will be able to relate theoretical concepts to practical real-world applications, recognizing the significance and utility of logic design in various technological applications. 6. Understanding of Timing Issues: Students will understand timing issues in digital circuits, including setup and hold times for flip-flops, and how to design circuits that meet timing requirements.
Indicative Contents المحتويات الإرشادية	The indicative contents for a second course on Logic Design will typically cover the following areas: 1. Combinational Logic Circuits: Study of combinational logic design, including adders, subtractors, multiplexers, decoders, and encoders. 2. Sequential Logic Circuits: Discussion of sequential logic, flip-flops, latches, counters, and registers. 3. Memory and Programmable Logic Devices: Examination of memory units, memory organization, and devices like Read-Only Memory (ROM), Programmable Read-Only Memory (PROM), and Programmable Logic Arrays (PLA). 4. Logic Families: Introduction to different logic families like TTL, ECL, and CMOS, and comparison of their characteristics and applications. 5. Finite State Machines: Explanation of the concept of state, state diagrams, state tables, and how to design finite state machines. 6. Introduction to VHDL/Verilog: Basics of hardware description languages, their syntax, and semantics, and how they are used to design and test digital circuits.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Learning and teaching logic design, particularly digital logic design, requires a deep understanding of binary systems, gates, Boolean algebra, and much more. Here are some effective strategies to facilitate learning and teaching of this subject. Using Visual Tools: Visual representations can greatly enhance understanding in this field. Using diagrams to explain concepts such as truth tables, Karnaugh maps, and logic gates. Software like Circuit maker can be used to virtually design and test digital circuits. Starting with basic binary arithmetic, explaining the importance of 0s and 1s in digital logic design. Moving to basic logic gates (AND, OR, NOT), and gradually introduce more complex ones (NAND, NOR, XOR, XNOR). Utilizing Hands-On Learning: Incorporating practical exercises whenever possible. This could involve using breadboards and basic electronic components or using software to design and simulate circuits.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

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

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Digital logic design circuits - 1
Week 2	Digital logic design circuits - 2
Week 3	Arithmetic circuits (Adders, Subtractors)
Week 4	Comparators
Week 5	Digital logic design circuits using arithmetic components
Week 6	Decoders
Week 7	Encoders
Week 8	Multiplexers
Week 9	De-Multiplexers
Week 10	Latches and Flip Flops
Week 11	Asynchronous counters
Week 12	synchronous counters
Week 13	Shift registers (PIPO,SIPO,PISO and SISO)
Week 14	Memory (RAM and ROM)
Week 15	Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Application of Binary adders (half-full adders)
Week 2	Application of Binary subtraction and binary adder_subtractors
Week 3	Application of Encoder
Week 4	Application of Decoder
Week 5	Application of Multiplexers
Week 6	Application of De-multiplexers
Week 7	Application of Sequential circuits
Week 8	Application of Latches (SR_latch and D_latch)
Week 9	Application of Flip-flops
Week 10	Application of Master-slave flip-flop(SR , JK, D and T)
Week 11	Application of Counters and Registers
Week 12	Application of Counters and Registers
Week 13	Memory (Static RAM)
Week 14	Memory (ROM)
Week 15	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	M. M. Mano,2016, “Digital Design”, Prentice Hall	
Recommended Texts	Thomas I. Floyd, 2006, “Digital Fundamentals”, Prentice Hall	
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	Statistics		Module Delivery	
Module Type			☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code				
ECTS Credits				
SWL (hr/sem)				
Module Level	1	Semester of Delivery		2
Administering Department	Type Dept. Code	College	Type College Code	
Module Leader			e-mail	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	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- Providing the student with statistical information to support his knowledge. 2 - Introducing students to the methods of applying statistical laws and obtaining results. 3- Benefiting from the application of statistical laws in scientific research. 4- Introducing the student to how to collect data and classify them in different types of tables 5- Identify the measures of central tendency and their characteristics 6- The relationship between the scales 7- Identify the measures of dispersion and the coefficient of variation
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Students acquire general knowledge in statistics 2- Enabling the identification and classification of information 3- The ability to use statistical indicators on the data. 4- The student acquires the skill by making a report on a specific subject related to the subject. 5- The ability to use the engineering presentation of the data.
Indicative Contents المحتويات الإرشادية	Part1: An introduction to statistics, its types, variables and their types, the sum symbol, and some characteristics of the sum process. Some important notes for the sum process with examples for the sum process . The multiplication process for variables, as well as the multiplication process for variables with constants a, b, and the properties of the multiplication process Some important notes for the multiplication process with examples for the multiplication process Part2: Data presentation methods, tabular data presentation, frequency distribution of data, total range, number of classes , class length, lower and upper bound of a class, class center with some examples The proportionate frequency distribution, examples, the clustered frequency distribution, examples Geometric data display, charts, examples, pie-chart, examples, histogram, frequency polygon, examples Part3 :Measures of central tendency, the arithmetic mean of ungrouped data, examples Arithmetic mean for grouped data, examples, properties of the arithmetic mean, examples, weighted mean for ungrouped data, examples Harmonic mean and geometric mean with examples. The median data is not tabulated The median for classified data, with examples. the mode, examples, the relationship between the arithmetic mean, the median, and the mode , examples. Part4: Measures of dispersion, concept of dispersion, types of dispersion, absolute measures of dispersion (range, mean deviation), examples. <i>Absolute measures of dispersion (standard deviation, variance)</i> , relative measures of dispersion (coefficient of variation), Examples .Measures of relative dispersion (standard score), examples

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Write something like: The main strategy to be adopted in presenting this material is to encourage students to participate in theoretical and laboratory exercises, while improving and expanding their thinking skills at the same time. This will be achieved through simple interactive classes and tutorials.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل		Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل		Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	An introduction to statistics, its types, variables and their types, the sum symbol, and some characteristics of the sum process.
Week 2	Some important notes for the sum process with examples for the sum process
Week 3	The multiplication process for variables, as well as the multiplication process for variables with constants a, b, and the properties of the

	multiplication process
Week 4	Some important notes for the multiplication process with examples for the multiplication process
Week 5	Data presentation methods, tabular data presentation, frequency distribution of data, total range, number of classes, class length, lower and upper bound of a class, class center with some examples
Week 6	The proportionate frequency distribution, examples, the clustered frequency distribution, examples
Week 7	Geometric data display, charts, examples, pie-chart, examples, histogram, frequency polygon, examples
Week 8	Mid-term Exam + Measures of central tendency, the arithmetic mean of ungrouped data, examples
Week 9	Arithmetic mean for grouped data, examples, properties of the arithmetic mean, examples, weighted mean for ungrouped data, examples
Week 10	Harmonic mean and geometric mean with examples. The median data is not tabulated
Week 11	The median for classified data, with examples
Week 12	Mid-term Exam + the mode, examples, the relationship between the arithmetic mean, the median, and the mode , examples
Week 13	Measures of dispersion, concept of dispersion, types of dispersion, absolute measures of dispersion (range, mean deviation), examples
Week 14	Absolute measures of dispersion (standard deviation, variance), relative measures of dispersion (coefficient of variation), examples
Week 15	Measures of relative dispersion (standard score), examples
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction the Minitab program and the steps to access it and its installation on the computer.
Week 2	Lab 2: Data entry instructions to the program (Read ,Set ,Insert)
Week 3	Lab 3:Use (Let, Add, subt)statements to perform simple arithmetic operations
Week 4	Lab 4: Use (multiply , divide , raise)statements to perform simple arithmetic operations
Week 5	Lab 5: Use (Sum ,SSQ,.....)statements to perform simple statistical operations
Week 6	Lab 6: Use (Mean , Median,...) statements to perform measures of central tendency
Week 7	Lab 7:Use (R N, RN miss ,...)statement to use rows instead of columns
Week 8	Lab 8: Use statement to perform measure of variation
Week 9	Lab 9:instructions for entering matrices and performing arithmetic operations on them
Week 10	Lab 10: the definitions of the most important lists in the program and how to conduct statistical analyzes
Week 11	Lab 11: Application for(Read ,Set ,Insert)
Week 12	Lab 12: Application for (Let, Add, subt)statements
Week 13	Lab 13: Application for (multiply , divide , raise)statements
Week 14	Lab 14: Application for(Sum ,SSQ,.....)statements
Week 15	Lab 15: Application for(Mean , Median,...) statements

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	هرمز حنا امير المشهداني، محمود الدكتور تأليف الإحصاء مبادئ 1989	Yes
Recommended Texts		No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Microprocessors and assembly language		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW2103			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	1	Semester of Delivery		3
Administering Department	SW	College	CS	
Module Leader	Baydaa Sulaiman Bahnam		e-mail	baydaa_sulaiman@uomosul.edu.iq
Module Leader's Acad. Title	Assist. Professor		Module Leader's Qualification	Master.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	Software System		Semester	4

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	The aim of this course is to know the evolution of microprocessor, components of the processor, 8086 CPU Architecture, the 8086 addressing mode, segment the memory, 8086 registers and 8086 instructions. The student will be able to write an assembly program using 8086 emulator.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Introduction to microprocessor. 2. 8086 Microprocessor. 3. Registers of 8086; Logical and physical address. 4. Pins and Signals of 8086. 5. Addressing Mode of 8086. 6. 8086 instructions. Data copy/transfer instructions. 7. Arithmetic and logical instructions 8. Arithmetic and logical instructions. 9. Multiplication and Division instructions 10. Variables, Arrays and constants. 11. Branch instructions. 12. Flag manipulation and Processor Control Instructions. 13. Shifting bits instructions. 14. Rotating bits instructions. 15. Stack.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] <u>Part B - Analogue Electronics</u> Fundamentals

	Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] 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	Learn about microprocessor components, Evolution of microprocessor, 8086 CPU Architecture, addressing data in memory, Segmented memory, Segment offsets, Logical and physical address, Registers of 8086, Addressing mode, 8086 Architecture pins, 8086 instructions, Examples about each instruction, Programs, Debug commands, Assembly program using 8086 emulator.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

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

Module Evaluation

تقييم المادة الدراسية

	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
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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 microprocessor. Block Diagram of a Microcomputer CPU, memory, input/output port, system bus. Evolution of microprocessor. Generations of microprocessor.
Week 2	8086 Microprocessor Features. Architecture of 8086 Microprocessor (Bus Interface Unit, Execution Unit, Instruction queue). 8086 has Pipelining Architecture.
Week 3	Programming Model. Registers of 8086, General purpose registers, Pointers registers, Index registers. Addressing data in memory.
Week 4	Segmented memory. Segment Registers. Advantages of segmented memory. Segment offsets. Logical and physical address, Examples to find the physical address. Types of Segmentation. Flags Registers. Examples of how the flag register changed
Week 5	Pins and Signals of 8086. Addressing Mode of 8086. Examples
Week 6	8086 Instructions. Types of 8086 instructions. Data copy/Transfer instructions. Mov instruction. The Mov instructions that are not allowed. Examples to execute Mov instructions. LAHF, SAHF instructions. Examples
Week 7	Exam
Week 8	Arithmetic and logical instructions (ADD, ADC, SUB, SBB, CMP). Examples
Week 9	Arithmetic and logical instructions (AND, TEST, OR, XOR) , (INC, DEC, NOT, NEG). Examples
Week 10	Multiplication and Division instructions (MUL, IMUL, DIV, IDIV) , (CBW, CWD) instructions. Examples
Week 11	Variables, Arrays and constants. LEA instruction. XCHG instruction. Examples.
Week 12	Branch instructions. Unconditional jumps, Conditional jumps Instructions. Loop instruction. Flag manipulation and Processor Control Instructions. Flag manipulation (CLC, CMC, STC, CLD, STD, CLI. STI) , machine control instructions (NOP, HLT, WAIT, ESC, LOCK)
Week 13	Programs about 8086 instructions
Week 14	Shifting bits instructions (SHR, SAR, SHLSAL). Examples Rotating bits instructions (ROR, RCR, ROL, RCL). Examples
Week 15	Stack (PUSH, POP instructions). Examples
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: DEBUG program, Running the DEBUG program, Debug commands: Register command
Week 2	Lab 2: Debug commands: Dump command, Enter Command, Fill Command and Move Command
Week 3	Lab 3: Debug commands: Compare Command, Search Command, Assemble Command, Unassemble Command, Hexadecimal Addition and Subtraction Command
Week 4	Lab 4: Exam
Week 5	Lab 5: Install emulator 8086, Apply programs using 8086 emulator (Execute programs about the instructions: MOV, ADD, ADC)
Week 6	Lab 6: Apply programs using 8086 emulator (Execute programs about the instructions: SUB, SBB)
Week 7	Lab 7: Apply programs using 8086 emulator (Execute programs about the instructions: AND, OR, XOR)
Week 8	Lab 8: Apply programs using 8086 emulator (Execute programs about the instructions: MUL, IMUL)
Week 9	Lab 9: Apply programs using 8086 emulator (Execute programs about the instructions: DIV, IDIV)
Week 10	Lab 10: Exam
Week 11	Lab 11: Apply programs using 8086 emulator (Execute programs about the instructions: NOT, NEG)
Week 12	Lab 12: Apply programs using 8086 emulator (Execute programs about the instructions: variable and array)
Week 13	Lab 13: Apply programs using 8086 emulator (Execute programs about the instructions: variable and array)
Week 14	Lab 14: Apply programs using 8086 emulator (Execute programs about the instructions: Conditional jumps)
Week 15	Lab 15: Apply programs using 8086 emulator (Execute programs about the instructions: Conditional jumps)
Week 16	Lab 16: Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		Yes
Recommended Texts	8086 Microprocessors and its Applications. Nagoor Kani. Mc Graw Hill India. 2013 8088 and 8086 Microprocessors: Programming, Interfacing, Software, Hardware, and Applications. Triebel, Walter A;Singh, Avtar. Pearson Education UK, 2013. The X86 Microprocessors: Architecture and Programming 8086 to Pentium (Old Edition). Das, Lyla B. Dorling Kindersley. 2010. "IBM PC assembly language and programming" , Peter Abel , 2007.	No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 – 100	Outstanding Performance
	B - Very Good	جيد جدا	80 – 89	Above average with some errors
	C - Good	جيد	70 – 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 – 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 – 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	English Language (1)		Module Delivery	
Module Type	Core		☐ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	UOMCSSW1204			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	10	Semester of Delivery		2
Administering Department	SW	College	CS	
Module Leader	Furat Younis Abdulrazaq		e-mail	f.abayaje@uomosul.edu.iq
Module Leader's Acad. Title	Assistant 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	1 / 6 /2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	None		Semester	
Co-requisites module	English Language (2), English Language (3), English Language (4)		Semester	4,5,7

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To Develop English skills by listening and writing . 2. Learning English and conversation training 3. Conversations in English in the field of computers (Information Technology). 4. The student receives all the information about the computer and at the same time learns and trains the correct pronunciation in this language. 5. conversations between students about everything related to Information Technology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Learning English and conversation training. 2. Listening and writing in English language. 3. Basic information about Information Technology (IT). 4. Learns and trains the correct pronunciation in this language. 5. Learn and write common sentences in the English language. 6. Learn to write words that end or start with the same syllable in the English language. 7. Learn about job interviews. 8. Learn personal presentation in English language.
Indicative Contents المحتويات الإرشادية	<u>Unit 1: working in the IT industry [8hrs]</u> Meeting people: introduction yourself and others. Job in IT: describing your job. Schedules: describing your daily routine and times. Using alphabet. <u>Unit 2: computer systems [8hrs]</u> Computer hardware: describing computer hardware. Computer software: describing computer software. Working with computers: describing tasks. Computer usage: understanding computer usage. <u>Unit 3: websites [8hrs]</u> Website purpose: talk about website. Website analytics: Getting information about websites. Website development: Developing a website. The best website: Talking about your favorite website. <u>Unit 4: databases [8hrs]</u> Database basics: Understanding database products. Data processing: describing data processing steps. Data storage and back-up: talking about data storage and devices. Database systems benefits: using data in company departments.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in the delivery of this units are to encourage students to participate in writing and reading exercises, while improving their listening skills. This will be achieved through student interaction in class and completion of daily assignments (homework).
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	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	Working in the IT industry/ meeting people+ listen, language and vocabulary.
Week 2	Working in the IT industry/ Jobs in IT+ listen, reading, writing, speaking and vocabulary.
Week 3	Working in the IT industry/ Schedules + listen, reading, writing, speaking and vocabulary.
Week 4	Working in the IT industry/ Spelling + listen, reading, writing, speaking and vocabulary.
Week 5	Computer systems / computer hardware + listen, reading, writing, speaking and vocabulary.
Week 6	Computer systems / computer Software + listen, reading, writing and vocabulary.
Week 7	Computer systems / work with computers + listen, reading, writing, speaking and vocabulary.
Week 8	Computer systems / computer usage + listen, reading, writing, speaking and vocabulary.
Week 9	Website purpose/ talk about website + listen, reading, writing, speaking and vocabulary.
Week 10	Website analytics/ Getting information about websites + listen, reading, speaking and vocabulary.
Week 11	Website development / Developing a website + listen, reading, writing, speaking and vocabulary.
Week 12	Database basics / Understanding database products + listen, writing, speaking and vocabulary.
Week 13	Data processing / describing data processing steps + listen, reading, speaking and vocabulary.
Week 14	Data storage and back-up / talking about data storage and devices + listen, reading and writing.
Week 15	Database systems benefits / using data in company departments + listen, speaking and vocabulary.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر : لا يوجد عملي نظري فقط

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	English for information technology , 1 vocational English, course book, Maja Olejniczak, series editor David Bonamy.	Yes
Recommended Texts		
Websites	https://www.youtube.com/watch?v=W0Vu22J_sN8	Book 1 Audio CD

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	اللغة العربية		طريقة اللقاء
Module Type	Core		☐ نظريات ☒ محاضرة ☐ مختبر ☐ برنامج تعليمي ☐ عملي ☐ ندوة
Module Code	UOMCSSW1106		
ECTS Credits	1		
SWL (hr/sem)	25		
مستوى الوحدة	6	الفصل الدراسي	
Administering Department	SW	الكلية	CS
مسؤول الوحدة	رحاب جاسم عيسى	e-mail	Rihabjassim1gmail.com
اللقب العلمي	استاذ مساعد	Module Leader's Qualification	PhD.
Module Tutor		e-mail	
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date		رقم الاصدار	

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
الاسبوع	المادة
الاسبوع 1	اهمية تدريس اللغة للاقسام غير الاختصاص
الاسبوع 2	الكلام ما يتالف منه الاسم ، الفعل، الحرف
الاسبوع 3	الجملة الاسمية: المبتدأ و الخبر
الاسبوع 4	الجملة الفعلية : الفعل والفاعل
الاسبوع 5	انواع المفاعيل
الاسبوع 6	الاملاء: رسم الهمزة والوصل وهمزة القطع و مواقعها في الاسماء و الافعال و الحروف
الاسبوع 7	الهمزة المتوسطة وكتابتها على الالف و الواو و الياء
الاسبوع 8	الهمزة المتطرفة : تنوين الهمزة المتطرفة
الاسبوع 9	كتابة التاء المبسوطة و ابناء المفتوحة الفرق بين الهاء في اخر الكلام و التاء المربوطة
الاسبوع 10	كلمات تكتب بالضاد و اخرى تكتب بالظاء
الاسبوع 11	عشر احرف تزداد بالكلمات مثل الف التفریق و الواو
الاسبوع 12	احرف تكتب ولا تلفظ
الاسبوع 13	احرف تلفظ ولا تكتب مثل هذا و هذه
الاسبوع 14	تطبيقات املاء
الاسبوع 15	تطبيقات نحو
الاسبوع 16	تطبيقات تعبير

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر
لا يوجد

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	متوفرة في المكتبة
المصادر المطلوبة		
المصادر الموصى بها		
المواقع الالكترونية		

Grading Scheme				
مخطط الدرجات				
		التقدير	% الدرجة	المجموعات
امتياز			90 - 100	درجة النجاح (100 - 50)
جيد جدا			80 - 89	
جيد			70 - 79	
متوسط			60 - 69	
مقبول			50 - 59	
راسب (قيد المعالجة)			(45-49)	درجة الرسوب (49 – 0)
راسب			(0-44)	
ملاحظة: سيتم تقريب العلامات العشرية أعلى أو أقل من 0.5 إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال ، سيتم تقريب علامة 54.5 إلى 55 ، في حين سيتم تقريب علامة 54.4 إلى 54. لدى الجامعة سياسة عدم القيام بذلك التغاضي عن "فشل التمرير القريب" لذا فإن التعديل الوحيد للعلامات الممنوحة بواسطة العلامة (العلامات) الأصلية سيكون التقريب التلقائي الموضح أعلاه.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Object-Oriented Programming (1)		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW2101			
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	13	Semester of Delivery		3
Administering Department	SW	College	CS	
Module Leader	Dr. Ann A. Alkazzaz		e-mail	annkazzaz@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Algorithms and Structured Programming (2)	Semester	2
Co-requisites module	Object-Oriented Programming (2)	Semester	4

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Teaching students: 1. How to write readable, reusable, and modular code. 2. Fundamental object-oriented programming concept. 3. Apply OOP concepts to your Python code. 4. Promotes students to enhance their coding ability.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After this course you will be able to 1- Use the basic Python programming concepts (Variables, Loops, and Functions) to instruct a computer to perform some basic tasks. 2- Manipulate common data structures in Python, including lists, tuples, dictionaries and sets. 3- Build an algorithm to solve a problem and then convert it into a program. 4- How to architect larger programs using object-oriented principles. 5- Work with the core libraries used for data processing in Python. 6- Combine all of the above via PyCharm Platform.
Indicative Contents المحتويات الإرشادية	This course includes Introduction to programming concepts (Procedural and Object Oriented Programming) with simple real-life projects thus, students will become familiar with project programming. Procedural Programming – The program consists of data and modules/procedures that operate on the data. The two are treated as separate entities. [8 hrs] Dictionaries- A collection of key-value pairs. It is used to store data values like a map, which, unlike other data types, can hold multiple values as elements [4 hrs] Object Oriented Programming - All computations are carried out using objects. An object is a component of a program that knows how to perform certain actions and how to interact with other elements of the program. [8 hrs] Encapsulations, Abstraction, Inheritance and Polymorphism – The benefits of using object oriented programming concepts in creating programs for real life problems. [8hrs] Python Standard library – Is a collection of modules that are distributed with Python, which provides standardized solutions for many problems that occur in everyday programming. [8 hrs] Coding real-life Projects in the lab. [16 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	To deliver this module effectively, we will focus on engaging students through active participation in exercises and activities that foster critical thinking. This will be accomplished through a combination of lectures and interactive Lab's, as well as Enhancing students' practical skills and proficiency, by introducing them to emerging programming trends, such as, mobile, IOT, e-commerce applications, open source and GUI-based applications.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	122	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	8
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	200		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introducing Programming Concepts
Week 2	Arithmetic, logic, and comparison Operations
Week 3	Introducing Lists, and control statements
Week 4	Dictionaries, Accessing, Adding and Modifying Values
Week 5	Functions (Defining Functions, Passing Arguments, Return Values)
Week 6	Functions, Modules, Bug Busting and Exceptions
Week 7	Classes and Objects (Creating and Using a Class)
Week 8	Classes and Objects (Inheritance)
Week 9	Classes and Objects (Examples on Class Inheritance)
Week 10	Classes and Objects (Importing Classes and Modules)
Week 11	Python Standard Library –Part 1
Week 12	Python Standard Library –Part 2
Week 13	Files and Exceptions
Week 14	Testing code (Testing Functions)
Week 15	Testing code (Testing Classes)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Prepare working environment
Week 2	Lab 2: Arithmetic, logic, and comparison Operations, Control Statements
Week 3	Lab 3: Arithmetic, logic, and comparison Operations, Control Statements
Week 4	Lab 4: Lists, 2D Lists, List Methods, Tuples and Dictionaries
Week 5	Lab 5: Exercises and small Project about functions
Week 6	Lab 6: Exercises and small Project about classes and objects
Week 7	Lab 7: Files and Exceptions

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	How to Think Like a Computer Scientist: Learning with Python	Yes
Recommended Texts	Python Crash Course, 2nd Edition. Copyright © 2019 by Eric Matthes.	No
Websites	Python Tutorial (w3schools.com)	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Software Engineering (1)		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW2102			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	14	Semester of Delivery		3
Administering Department	SW	College	CS	
Module Leader	Marwah Marwan Abdul azzez		e-mail	Marwa_marwan21@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.	
Module Tutor			e-mail	
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date	1/6/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	Software Engineering (2)	Semester	4

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Defining what software engineering is and its special terminology in this field. 2. Study of software development life cycle models with their advantages and disadvantages. 3. Focus on the requirements-gathering stage.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Introducing the basic concepts of software engineering. 2. Discuss the concept of software engineering, and its importance, and enumerate the specifications of a successful software engineer. 3. Explain Software applications and their uses. 4. List Software engineering objectives and process framework clarification. 5. Discuss models of development with explain the properties of each type. 6. Illustrate the management spectrum. 7. Learn risk priority and predefined resources. 8. Calculate project size using LOC and FP. 9. Draw a project scheduling chart. 10. Explain requirement engineering. 11. Determine how to convert scenarios into diagrams using modeling approaches. 12. Discuss software requirement specification (SRS). 13. track SRS illustration example.
Indicative Contents المحتويات الإرشادية	Indicative content for lectures includes the following: <u>Part A- Software and Software Engineering</u> What is software, why is it important, the difference between software engineering, computer science, and system engineering, characteristics of a good software engineer, software applications, the process framework, and software development life cycle (SDLC) models. [10 hrs] <u>Part B- Software Project Management, Estimation, And Scheduling</u> Software project management complexities, the management spectrum, software scope and feasibility, resources, software risks, software sizing, schedule representation. [8 hrs] <u>Part C- Requirements Engineering</u> Analysis concepts and principles, requirements modeling approaches, elements of the analysis model, and software requirements specification (SRS). [8 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

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

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	3 and 12	LO #3 and #10
	Assignments	2	10% (10)	2 and 14	LO #1, #2 and #14
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #11,
Summative assessment	Midterm Exam	1hr	10% (10)	6and 11	LO #1 -to #5 LO #7 -to #10
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction – What is Software engineering
Week 2	Software engineering terminology, its importance, and its difference from other engineering sciences
Week 3	Software Application
Week 4	Goals of Software Engineering and The Process Framework
Week 5	Software Development Life Cycle (SDLC) Models
Week 6	Exam1
Week 7	Software Project Management
Week 8	Resources and Software Risks
Week 9	Software Project Estimation
Week 10	Project Scheduling
Week 11	Exam2
Week 12	Requirement Engineering
Week 13	Requirement Modeling Approaches
Week 14	Software Requirement Specification (SRS)
Week 15	An Example of (SRS)

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Enterprise architecture
Week 2	Lab 2: installation steps
Week 3	Lab 3: requirement diagram notation
Week 4	Lab 4: explain examples
Week 5	Lab 5: class questions
Week 6	Lab 6: Exam1
Week 7	Lab 7: use case diagram notation
Week 8	Lab 8: explain examples
Week 9	Lab 9: class questions
Week 10	Lab 10: Exam2

Week 11	Lab 11: activity diagram notation
Week 12	Lab 12: explain examples
Week 13	Lab 13: class questions
Week 14	Lab 14: Exam3
Week 15	Lab 15: A preparatory week before the Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Roger, S. Pressman, and R. Maxin Bruce. <i>Software engineering: a practitioner's approach</i> . McGraw-Hill Education, 2019.	
Recommended Texts	Mall, Rajib. <i>Fundamentals of software engineering</i> . PHI Learning Pvt. Ltd., 2018.	
Websites	https:// www.rspa.com	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Data Structure (1)		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW2106			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	18	Semester of Delivery		3
Administering Department	SW	College	CS	
Module Leader	Dr. Nadia Maan Mohammed		e-mail	nadia.m.mohammed@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Algorithms and Structured Programming (2)	Semester	2
Co-requisites module	Data Structure (2)	Semester	4

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Development problem solving skills and understanding of data structure. 2. This course deals with the basic concept of data structure. 3. Storing and organizing data in a computer. 4. To perform different types of data structures. 5. Providing a way to efficiently manage large amounts of data, such as large databases and Internet indexing services. 6. Different types of data structures are suitable for different types of applications. For example, (B-Tree) The binary tree is well suited for implementing databases, while compiler implementations usually use hash tables to look up identifiers.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize Data representation, Abstract Data Types, Physical representation of data, Logical representation of data & array definition. 2. Recognize Python language, Variables & constant in python, Python primitive type, Assignment statement with primitive type. 3. Recognize One dimensional array representation in memory, Calculation the address of one dimensional array. 4. Recognize Two dimensional array definition, Calculation the address of two dimensional array. 5. Recognize Multidimensional array definition, Calculation the address of Multidimensional array. 6. Explain Stack, Stack algorithms, Stack application, Convert infix to postfix, Check Matching brackets, Calculation postfix expression. 7. Explain Queue, Queue representation, Queue algorithms, Queue application, and Circular queue. 8. Recognize & Explain Sorting Algorithms, Selection Sort, Insertion Sort, Bubble Sort, Merge Sort. 9. Recognize & Explain Searching Algorithms, Sequential Search, Binary Search.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-

	pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] <u>Part B - Analogue Electronics</u> Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] 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]
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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	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Data representation, Abstract Data Types, Physical representation of data, Logical representation of data & array definition
Week 2	Introduction to Python language, Variables & constant in python, Python primitive type, Assignment statement with primitive type
Week 3	One dimensional array representation in memory, Calculation the address of one dimensional array
Week 4	Two dimensional array definition, Calculation the address of two dimensional array
Week 5	Multidimensional array definition, Calculation the address of Multidimensional array
Week 6	Stack, Stack application
Week 7	Convert infix to postfix
Week 8	Check Matching brackets
Week 9	Calculation postfix expression
Week 10	Queue, Queue representation
Week 11	Queue algorithm, Queue application, Circular queue
Week 12	Sorting Algorithm, Selection Sort, Insertion Sort
Week 13	Bubble Sort, Merge Sort
Week 14	Searching Algorithm, Sequential Search
Week 15	Binary Search
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Python language, Variables & constant in python.
Week 2	Lab 2: Python primitive type, Assignment statement with primitive type.
Week 3	Lab 3: One dimensional array definition in Python, Program for One dimensional array definition in Python.
Week 4	Lab 4: Two dimensional array definition in Python. Program for Two dimensional array definition in Python.
Week 5	Lab 5: Stack representation in Python.
Week 6	Lab 6: Convert infix to postfix.
Week 7	Lab 7: Check Matching brackets.
Week 8	Lab 8: Calculation postfix expression.
Week 9	Lab 9: Queue representation in Python.
Week 10	Lab 10: Queue program in Python.
Week 11	Lab 11: Searching in Array in Python. Sorting in Array in Python.
Week 12	Lab 12: Selection Sort, Insertion Sort.
Week 13	Lab 13: Bubble Sort, Merge Sort.
Week 14	Lab 14: Sequential Search.
Week 15	Lab 15: Binary Search.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Data Structures and Algorithms in Python, Michael T. Goodrich, John Wiley & Sons, 2015.	Yes
Recommended Texts	Python Data Structures and Algorithms, Benjamin Baka Packt Publishing Ltd, 2017.	No
Websites	https://classroom.google.com/c/NTY4NDkxMjAwMjA2	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Software Systems		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW2205			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	1	Semester of Delivery		4
Administering Department	SW	College	CS	
Module Leader	Azam Esam Daood Al-Rawachy		e-mail	Azzam.esam@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	1/6/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Microprocessors and assembly language	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives

أهداف المادة الدراسية

1. Reviewing the architecture and internal organization of the 8086 microprocessor, including registers, flags, and memory addressing modes.
2. Learn about the structure and organization of instructions in the 8086 microprocessor, including instruction formats.
3. Reviewing various addressing modes in the 8086 microprocessor and learn how to effectively access data from different memory locations.
4. Develop a deep understanding of instruction encoding schemes for different instructions in the 8086 microprocessor.
5. Acquire knowledge of two-pass assembler and one-pass assembler concepts and their role in software systems.
6. Understand the purpose and role of a loader in the execution of computer programs.
7. Learn about the different types of loaders and their functions.
8. Familiarize Students with the basic concepts and terminology related to loaders.
9. Gain a comprehensive understanding of absolute loaders and their operation.
10. Learn about the need for relocating loaders and their advantages over absolute loaders.
11. Explore the basic principles and techniques used in relocating loaders.
12. Learn about the steps involved in loading and relocating a program in memory.
13. Study the methods used to handle references to external symbols in a relocating loader.
14. Learn about the use of relocation tables and their role in the loading process.
15. Learn about the tasks performed by linkers, such as resolving symbols and merging object files.
16. Familiarize students with the different types of linkers and their characteristics.
17. Explore the phases involved in the linking process.
18. Understand the tasks performed by a linking loader, such as symbol resolution and relocation.
19. Further delve into the concepts and techniques of linking loaders.
20. Learn about the different linking algorithms and their effects on the final executable.
21. Understand the purpose and functionalities of a linkage editor.
22. Learn how linkage editors modify and combine object files to create executable programs.
23. Learn how macro processors simplify and automate repetitive tasks in code development.
24. Explore the features and capabilities of macro processors.
25. Understand their syntax and usage for defining and expanding macros.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Reviewing the processor organization: By learning the internal architecture of the 8086 microprocessor, understanding how these components work together provides insights into the processor's overall operation. 2. Education and research: Knowledge of the internal architecture of the 8086 microprocessor is valuable for educational purposes and research activities. It forms a foundation for studying computer architecture, microprocessors, and related fields. It also enables Students to explore performance optimization techniques, develop emulators, or simulate the behavior of the processor for experimental purposes. 3. Efficient memory utilization: Understanding the various addressing modes allows programmers to make efficient use of memory resources. By choosing the appropriate addressing mode, programmers can optimize memory usage and improve the overall performance of their programs. 4. Assembling the code: The assembly code needs to be converted into machine code that the 8086 microprocessor can understand and execute. This is achieved by using an assembler, which is a software tool that translates assembly code into machine code. 5. Lexical analysis: The assembler breaks down the assembly code into tokens (instructions, operands, labels, etc.) and assigns meaning to them. 6. Syntax analysis: The assembler checks the syntax of the assembly code to ensure it follows the correct structure and format. 7. Symbol resolution: The assembler resolves symbols, such as labels or variable names, by assigning them memory addresses. 8. Error detection: The assembler detects and reports any errors or inconsistencies in the assembly code, such as undefined symbols or syntax errors. 9. Generation of object code: The assembler generates the corresponding machine code instructions for each assembly instruction in the code. This object code represents the binary representation of the instructions that the 8086 microprocessor can execute.
Indicative Contents المحتويات الإرشادية	Instruction Set of the 8086 Microprocessor: • Overview of the instruction set architecture of the 8086 microprocessor. • Three-Address Instructions: Explanation of instructions that involve three operands, such as arithmetic and logical operations. • Two-Address Instructions: Description of instructions that involve two operands, such as move and compare operations. • One-Address Instructions: Introduction to instructions that operate on a single operand, such as increment and decrement operations. • Zero-Address Instructions: Overview of instructions that operate without explicit operands, such as stack manipulation and control flow instructions. [20 hrs]

Assembler Programming and Algorithms:

- Encoding or Converting from Assembly Language to Machine Code:
- Overview of the process of encoding assembly language instructions into machine code.
- Instruction Format: Understanding the structure of instructions and their representation in binary form.
- Opcode Mnemonics: Explanation of opcode mnemonics and their corresponding binary codes.
- Operand Representation: Description of the encoding of different types of operands, such as registers and memory addresses. [10 hrs]

Two-Pass Assembler Algorithm:

- Explanation of the two-pass assembler algorithm for translating assembly language programs into machine code.
- Pass One: Symbol table creation, identifying labels and their corresponding memory addresses, and resolving forward references.
- Pass Two: Generating machine code by substituting appropriate opcode and operand values based on the symbol table entries. [10 hrs]

One-Pass Assembler Algorithm:

- **Introduction to the one-pass assembler algorithm** for converting assembly language programs into machine code in a single pass.
- **Literal Handling:** Description of techniques for handling literals and generating appropriate machine code.
- **Address Resolution:** Strategies for resolving addresses and generating code in a single pass. [10 hrs]

Loaders

- Introduction to Loader: Overview of loaders and their role in the execution of programs. Different types of loaders and their functions. [10 hrs.]
- Absolute Loader: Explanation of absolute loaders and their operation. Loading programs into fixed memory locations. Handling relocation and linking. [15 hrs.]
- Introduction to Relocating Loader: Introduction to relocatable loaders. Understanding the need for relocation and symbol resolution. [10 hrs.]
- Relocating Loader (Part 1): Detailed study of relocating loaders. Address binding and relocation algorithms. Processing external references and symbols. [15 hrs.]
- Relocating Loader (Part 2): Advanced topics in relocating loaders. Handling multiple modules and libraries. Dynamic linking and shared libraries. [15 hrs]

	Linkers and Macro Processors • Introduction to Linker: Overview of linkers and their role in program linking. Linking process and symbol resolution. [10 hrs.] • Linking Loader (Part 1): Detailed study of linking loaders. Combining object files and resolving external references. Linker scripts and control files. [15 hrs.] • Linking Loader (Part 2): Advanced topics in linking loaders. Linker optimizations and dead code elimination. Link-time code generation. [15 hrs.] • Linkage Editor (Part 1): Introduction to linkage editors. Modifying and customizing object files during the linking process. [10 hrs.] • Linkage Editor (Part 2): Advanced topics in linkage editors. Symbol table manipulation and symbol renaming. Address space layout randomization. [10 hrs.] • Macro Processor in Assembly Language: Understanding the concept of macro processors. Macro definition and expansion. [10 hrs.] • Macro Operators (Part 1): Detailed study of macro operators. Macro parameters and arguments. Handling conditional assembly and repetition. [15 hrs.] Macro Operators (Part 2): • Advanced topics in macro operators. Nested macros and recursive macros. Macro libraries and reuse. [15 hrs.] • Macros versus Procedures: Comparing macros and procedures. Advantages and limitations of each approach. Selecting the appropriate technique for code reuse. [10 hrs.]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The module will employ interactive lectures, hands-on exercises, group discussions, and practical demonstrations to facilitate active learning and deepen understanding. Students will engage in effectively teach Assembler Programming and Algorithms, employ a combination of theoretical explanations and practical exercises. Provide an overview of encoding assembly language instructions into machine code, covering instruction format, opcode mnemonics, and operand representation. Introduce the two-pass assembler algorithm for generating machine code and the one-pass assembler algorithm for handling literals. For Loaders, explain their role in program execution, different types (e.g., absolute and relocatable loaders), and concepts like relocation and linking. Focus on the detailed study of relocating loaders, including address binding and external symbol processing. Similarly, for Linkers and Macro Processors, introduce their roles, discuss linking loaders and linkage editors, and cover macro processors, including macro definition and expansion. Compare macros and procedures, considering their advantages and limitations. Use practical examples and exercises to reinforce learning.

Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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)	
المناهج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Review about Signed & Unsigned Numbers, Multiplication & division, and Floating Point Numbers Representation
Week 2	Review about Register Addressing, Immediate Addressing and Memory Addressing.
Week 3	Three-Address Instructions, Two-Address Instructions, One-Address Instructions And Zero-Address Instructions
Week 4	Assembly language in _ASM blocks within C/C+-01
Week 5	Assembly language in _ASM blocks within C/C+-02
Week 6	Classification of instruction, and converting assembly language instructions into machine code-01
Week 7	Classification of instruction, and converting assembly language instructions into machine code-02
Week 8	Mid-term Exam-01
Week 9	One assembler algorithm supported with examples

Week 10	Two-pass assembler algorithm supported with examples
Week 11	Introduction to Loader, Absolute Loader, and Relocating Loader .
Week 12	Introduction to Linker: Linking Loader and Linkage Editor.
Week 13	Macro processor In Assembly Language
Week 14	Macro Operators.
Week 15	Mid-term Exam-02
Week 16	Preparatory week before the final Exam.

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Overview: 8086 microprocessor Internal Architecture.
Week 2	Lab 2: Review of assembly language "Data Addressing Mode".
Week 3	Lab 3: Review of assembly language "Jump Instructions".
Week 4	Lab 4: Revision of C++ language "String in C++"
Week 5	Lab 5: Revision of C++ language" Files handling in C++"
Week 6	Lab 6: Interfacing Assembly with C++-01.
Week 7	Lab 7: Interfacing Assembly with C++-02.
Week 8	Lab8: Mid-term Exam-01.
Week 9	Lab 9: PASS1 Assembler: Spotting up Labels & comments-Part01.
Week 10	Lab 10: PASS1 Assembler: Spotting up Labels & comments-Part02.
Week 11	Lab 11: PASS1 Assembler: Calculating the Code's length.
Week 12	Lab 12: PASS2 Assembler: Listing File Generation.
Week 13	Lab 13: PASS2 Assembler: Generating Object Code.
Week 14	Lab 14: PASS2 Assembler: Symbol Table Handling.
Week 15	Lab 15: Mid-term Exam-02.
Week 16	Lab 16: Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	- The 8086 Microprocessor: Architecture, Programming, and Interfacing" by Kenneth Ayala. - The Intel Microprocessors: 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium, Pentium Pro Processor, Pentium II, Pentium III, Pentium 4, and Core2 with 64-bit	Yes

	Extensions, 8e" by Barry B. Brey. • Linkers and Loaders" by John R. Levine. • "Introduction to the Theory of Computation" by Michael Sipser. • "System Software: An Introduction to Systems Programming" by Leland L. Beck. • "Programming from the Ground Up" by Jonathan Bartlett. • "Modern X86 Assembly Language Programming: 32-bit, 64-bit, SSE, and AVX" by Daniel Kusswurm. •	
Recommended Texts	• "The 8086/8088 Primer: An Introduction to Their Architecture, System Design, and Programming" by Stephen P. Morse • "The 8086/8088 Primer: An Introduction to Their Architecture, System Design, and Programming" by Stephen P. Morse.	No
Websites	• Intel Developer Zone (https://www.intel.com/content/www/us/en/developer.html) • Microprocessor Tutorials (https://www.tutorialspoint.com/microprocessor/index.htm) • Assembly Language Programming (http://assemblylanguageprogramming.com/) • YouTube: Various YouTube channels offer video tutorials and lectures on the 8086 "The 8-Bit Guy," "Ben Eater," and "Neso Academy." These channels provide visual explanations, demonstrations, and hands-on projects related to the 8086 microprocessor.	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Database		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW2203			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	21	Semester of Delivery		4
Administering Department	SW	College	CS	
Module Leader	Abdullah Hani Ahmed		e-mail	Abdullah.h@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Lecturer		Module Leader's Qualification	Master
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023		Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To know the benefits of database systems. 2. To understand general database concepts. 3. To be able to analyze the business rules. 4. To know how to design database systems using E-R diagrams. 5. To understand all E-R diagrams concepts. 6. To implement database operations using SQL language
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Know the differences between file systems and database systems. 2. List the database systems benefits. 3. Define all database basic concepts. 4. Understand the business rules and its role in database design. 5. Know E-R diagram concepts. 6. Define entity, attributes and relationships. 7. Convert the business rule to E-R diagram. 8. Understand supertype/subtype concepts . 9. Draw E-E-R diagrams.
Indicative Contents المحتويات الإرشادية	Over the past two decades, data has become a strategic asset for most organizations. Databases are used to store, manipulate, and retrieve data in nearly every type of organization, including business, health care, education, government, and libraries. Database technology is routinely used by individuals on personal computers and by employees using enterprise-wide distributed applications. Databases are also accessed by customers and other remote users through diverse technologies, such as Web browsers, smartphones, and intelligent living and office environments.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Designing a database properly is fundamental to establishing a database that meets the needs of the users. Data models capture the nature of and relationships among data and are used at different levels of abstraction as a database is conceptualized and designed. The effectiveness and efficiency of a database is directly associated with the structure of the database. Various graphical systems exist that convey this structure and are used to produce data models that can be understood by end users, systems analysts, and database designers.

Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	67	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic Concepts and Definitions
Week 2	Traditional File Processing Systems
Week 3	The Database Approach
Week 4	Data Modeling
Week 5	Modeling Entities
Week 6	Modeling Attributes
Week 7	Modeling Relationships
Week 8	Degree of A Relationship
Week 9	Cardinality Constraints

Week 10	Other Subjects about Modeling Relationships
Week 11	The Enhanced E-R Model
Week 12	Representing Specialization and Generalization
Week 13	Specifying Constraints in Supertype/Subtype Relationships
Week 14	Defining Supertype/Subtype Hierarchies
Week 15	Case Study
Week 16	Preparatory week before the final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Modern Database Management, Jeffrey A. Hoffer, Twelfth Edition SQL complete references	NO
Recommended Texts		
Websites		

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

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Numerical Methods		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW2104			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	16	Semester of Delivery		3
Administering Department	SW	College	CS	
Module Leader	Shatha Abdullah		e-mail	shathaabdullah@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph D.	
Module Tutor	Shaymaa Ahmmd Jead		e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	10/06/2023	Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	The main objective is for the student to possess capabilities related to the knowledge and skills he acquires through the vocabulary of the theoretical scientific material and practical application. As the student, after completing the numerical methods course in the software section, will have, and learn about the numerical methods used in solving nonlinear equations, complementation, integration, and solving equations and their types. An ability to apply knowledge of computing and mathematics in the field of specialization and in the labor market. The possibility of analyzing problems, determining the appropriate computing requirements, and defining them in order to solve them. And have a distinguished style in designing, implementing and evaluating computer-based systems, processes, components or programs, to meet the required needs in the field of specialization and be able to work effectively in groups to achieve common goals and to serve the public or private sector, and investment companies. He can also communicate and influence effectively with various groups and in various disciplines, because he has the ability to employ his acquired skills in various applications that depend directly or implicitly on mathematical methods and algorithms. Designing and analyzing techniques to give approximate solutions to difficult problems so that he is able to create, analyze, and implement a number of algorithms to reach numerical solutions to problems that are built on a set of continuous changes and fluctuations. And last but not least, the important part is that the student, after completing the curriculum, should be proficient in numerical methods and mathematical tools such as equations, methods and methods of solving on which various applications depend. Among these applications that use numerical methods are the following: 1. Using numerical analysis in estimation and guessing. 2. Using numerical analysis in scientific programming. 3. Numerical analysis is included in the structure and analysis of data tables. 4. The use of numerical analysis in biological and medical applications. 5. Numerical analysis helps in the design and analysis of aircraft control systems. 6. Space Shuttle Return Simulation. 7. Numerical analysis helps analyze the electromagnetic energy of radar detectors. 8. Image and graphic processors. And many other important applications in life, such as predicting earthquakes and volcanoes.....etc. Enabling students to solve a system of algebraic equations by numerical methods in different fields Enable the student to manually solve a system of linear and nonlinear equations using numerical methods Enable the student to solve a system of non-linear equations that are impossible to solve manually using MATLAB Enable the student to deal with advanced software Enabling the student to solve the differential equations individually and in the form of a system of equations and in different ways and compare their results and determine how to reduce the error Enable the student to solve partial differential equations.
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Module Learning Outcomes مخرجات التعلم للمادة الدراسية	How to deal with, reduce and control errors How to deal with systems of linear and nonlinear equations How to deal with linear and non-linear practical data and try to model them. How to deal with data and derive interstitial data How to deal with linear and nonlinear differential equations How to deal with partial differential equations Dealing with software and trying to introduce it to the rest of the subjects The ability to adapt and explore any new program and test it The student is able to solve mathematical models for any issue, whether the conditions are good, numerically fixed, or may be numerically unstable. The matter is not only related to the nature of the issue, but rather the way to solve it. Therefore, the task of numerical analysis is to find stable algorithms to solve, solve and interpret problems with few conditions and complex ones. Where all aspects of the existing problem are studied numerically, and this is done by using theoretical development and understanding of numerical methods, and trying to implement them in the form of computer programs, as these programs are characterized by a large amount of confidence, effectiveness and accuracy, and the efficiency, accuracy and efficiency of these programs are verified. When facing any intractable problem that cannot be solved by direct means, this problem can be replaced by another one that is close to it, as it can be easily and easily solved by employing mathematical and software methods in the use of real analysis, functional analysis, and Boolean and linear algebra. In this method, it is necessary to understand the nature of the error and the problem before approximating it, as this helps to create extrapolations to improve the method of convergence rate of the method and algorithm, and the formulation of the original problem is stable or good. It can analyze mathematical models in applications in order to solve complexities and turn them into highly accurate mathematical models by adopting the principle of creating, analyzing and implementing a set of algorithms to reach digital solutions to problems based on continuous changes and fluctuations. Create, solve, and interpret models by employing numerical analysis in computer graphics, symbolic math, and other areas of computer science.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Theory Part(1)</u> The Numerical Methods curriculum includes a number of important characteristics, which in turn enhance the student's understanding of the rest of the subjects related to mathematics, whether simple or advanced. It begins with matrices as a basis for understanding systems of equations and ends with partial differential equations. The curriculum includes the following vocabulary: 0 Errors and their types, matrices, roots

	of equations - linear and nonlinear, systems of equations - linear and nonlinear, approximation - linear and nonlinear, numerical differentiation, numerical integration, linear and nonlinear regression, differential equations – First degree - linear and nonlinear, molecular differential equations. Theory Part(2): Error Analysis: Absolute & relative Error, Truncation Error.& relative Error The Solution Of Non-Linear fun: Mid point & FP, NR. The Solution Of Linear System $AX=B$: direct method, Inverse of a Matrix Method, Gauss Elimination Methods, Jacobi iterative Method Interpolation & Extrapolation: Numerical Differentiation Interpolation Method: Lagrange Polynomial Method & Inverse Interpolation Method Numerical Integration: Simpson & Trapezoidal Rules The Solution Of DE: Euler's Method Introduction to The Solution Of ordinary DE: Rung-Kutta Method Part B – Practical Part Fundamentals of Matlab, Type of windows in matlab, some of functions in matlab, Conditional statements, Program in matlab_ M: file, The Solution Of Non-Linear fun using Matlab, Matrices and Inverse in Matlab: Write M:file using matlab program to find the Solution Of Linear System $AX=B$, Write M:file using matlab program to find the Solution Of Gauss Elimination Method: Write M:file using matlab program to find the Solution Of Linear System $AX=B$, Jacobi iterative Method, Write M:file using matlab program of Lagrange Polynomial Method & Inverse Interpolation Method, Write M:file of Simpson & Trapezoidal Rules, Write M:file using matlab program of Euler's Method, Introduction to The Solution Of ordinary DE : Write M:file using matlab program of Rung-Kutta Method
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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 examples 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	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Numerical methods & least interval:
Week 2	Error Analysis: Absolute & relative Error
Week 3	Truncation Error.& relative Error
Week 4	The Solution Of Non-Linear fun: Mid point
Week 5	The Solution Of Non-Linear fun: FP & NR.
Week 6	The Solution Of Non-Linear fun.
Week 7	The Solution Of Linear System $AX=B$: direct method, Inverse of a Matrix Method
Week 8	The Solution Of Linear System $AX=B$, d: Gauss Elimination Methods
Week 9	The Solution Of Linear System $AX=B$, Iterative Method: Jacobi iterative Method
Week 10	Interpolation & Extrapolation: Numerical Differentiation
Week 11	Interpolation Method: Lagrange Polynomial Method & Inverse Interpolation Method
Week 12	Numerical Integration: Simpson & Trapezoidal Rules
Week 13	Introduction to The Solution Of ordinary DE: The Solution Of DE: Euler's Method
Week 14	The Solution Of DE: Rung-Kutta Method
Week 15	Preparatory week before the final Exam

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

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	MATLAB Programming for Numerical Analysis Copyright © 2014 by César Pérez López	No
Recommended Texts	Numerical Methods Using MATLAB® Third Edition, G.R. Lindfield & J.E.T. Penny	No

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Object Oriented Programming (2)		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW2202			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	20	Semester of Delivery		4
Administering Department	SW	College	CS	
Module Leader	Dr. Ann A. Alkazzaz		e-mail	annkazzaz@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Object Oriented Programming (1)	Semester	3
Co-requisites module	Information Security	Semester	7

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Teaching students: 1. How to write readable, reusable, and modular Project. 2. How to refactor their code periodically. 3. Manipulate programming errors. 4. How to test and maintain their code.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After this course you will be able to 1. Introducing students to the Object Oriented Programming manner, which give them deep-insight into the related main topics. 2. Design the class diagram and Determine the main phases of the projects that will be created 3. Gaining the student the ability and confidence to improve existing projects toward implementing their own versions of the particular project. 4. Design and implement small projects that pave the way for them to enter the world of markets and meet their needs.
Indicative Contents المحتويات الإرشادية	This course includes Project's planning and requirements definition, class diagram designing, main phases definition, project development, and finally test and maintain their project. Project's planning - s a procedural step in project management, where required documentation is created to ensure successful project completion. Documentation includes all actions required to define, prepare, integrate and coordinate additional plans. . [8 hrs] Class diagram - Type of diagram and part of a unified modeling language (UML) that defines and provides the overview and structure of a system in terms of classes, attributes and methods, and the relationships between different classes. It is primarily designed for developers to provide the conceptual model and architecture of the system being developed. [8hrs] Main phases definition – a way of breaking down projects into more manageable and accurate parts. The number and names of the phases may vary, but some common ones are initiation, planning, execution, monitoring and control, and closure. Each phase has a different focus and requires different skill sets, tasks, processes, stakeholders, and organizations. [8 hrs] Testing and Maintaining - the process of verifying the accuracy and completeness of project deliverables before they are released to the customer. It is an essential part of quality assurance and helps to ensure that the final product meets the customer's expectations [16 hrs] Coding real-life Projects in the lab. [20 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Our primary goal in delivering this module is to engage students through active participation and the development of critical thinking skills. To achieve this, we will survey new in-class learning aid frameworks, comprising of work procedure and communication and display devices, such frameworks enhance students understanding and maintain contact with the instructor as well as make students used to new technology.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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	OOP Concepts (Quick Glance)
Week 2	Planning and Requirements Definition
Week 3	Class Diagram Designing
Week 4	Main Phases Definition
Week 5	Defining Related Libraries
Week 6	Main Screen Designing
Week 7	Classes Development (Create the main class)
Week 8	Classes Development (Create the other classes)
Week 9	Modules and Classes Importing (Connect the classes by importing)
Week 10	Code Refactoring I
Week 11	Classes Inheritance Managing
Week 12	Display Elements Managing
Week 13	Code Refactoring II
Week 14	Testing and Maintenance
Week 15	Experimental Results
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Planning and Requirements Definition
Week 2	Lab 2: Prepare the working environment
Week 3	Lab 3: Start Code the main class
Week 4	Lab 4: Install the additional required libraries
Week 5	Lab 5: improve the main class and Fix the attributes and methods related to the screen design
Week 6	Lab 6: Connect the classes by importing
Week 7	Lab 7: Graphical User Interface developing
Week 8	Lab 8:Testing and Maintain the Project

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Python Crash Course, 2nd Edition. Copyright © 2019 by Eric Matthes.	Yes
Recommended Texts	How to Think Like a Computer Scientist: Learning with Python.	No
Websites	Python Tutorial (w3schools.com)	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Software Engineering (2)		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW2201			
ECTS Credits	6			
SWL (hr/sem)	105			
Module Level	19	Semester of Delivery		4
Administering Department	SW	College	CS	
Module Leader	Marwah Marwan Abdul azzez		e-mail	Marwa_marwan21@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.	
Module Tutor			e-mail	
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date	1/6/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Software Engineering(1)	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Introducing the design stage and its concepts 2. Install user interface design rules 3. Introduction to software testing techniques
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Introducing the design phase of software engineering. 2. Discuss software engineering design and how to transform the analysis model into the design model. 3. Describe design concepts and their definitions. 4. Explain design cohesion and its types. 5. Explain design coupling and its types. 6. Illustrate the Layered Arrangement of Modules. 7. learn architectural design- transform mapping 8. learn architectural design- transaction mapping. 9. Discuss User Interface Design. 10. Illustrate types of UID. 11. Explain Component-Level Design. 12. Determine structured programming notation and how to draw box diagram. 13. Discuss Software Testing Techniques.
Indicative Contents المحتويات الإرشادية	Indicative content for lectures includes the following: <u>Part A- Design Concepts and Principles</u> translating the requirements model into the design model, design concepts, cohesion and coupling, layered arrangement of modules, and structural partitioning. [12 hrs] <u>Part B- Architectural Design, User Interface Design, Component-Level Design, Software Testing Techniques</u> mapping requirements into software architecture, transform mapping, transaction mapping, the user interface design process, types of user interfaces, component-level design, structured programming, software testing techniques, testing activities, and software testing strategy. [14 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while 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.
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	3 and 12	LO #3 and #10
	Assignments	2	10% (10)	2 and 14	LO #1, #2 and #14
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #11,
Summative assessment	Midterm Exam	1hr	10% (10)	6and 11	LO #1 -to #5 LO #7 -to #10
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction –Software engineering Design
Week 2	Design Concepts and Principles
Week 3	Design Concepts
Week 4	cohesion

Week 5	coupling
Week 6	Exam1
Week 7	Layered Arrangement of Modules
Week 8	Transform mapping
Week 9	Transaction mapping
Week 10	User Interface Design
Week 11	Exam2
Week 12	Types of User Interface Design
Week 13	Component-Level Design
Week 14	Structured Programming
Week 15	Software Testing Techniques

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction
Week 2	Lab 2: sequence diagram notation
Week 3	Lab 3: explain examples
Week 4	Lab 4: class questions
Week 5	Lab 5: Exam1
Week 6	Lab 6: user interface diagram notation
Week 7	Lab 7: explain examples
Week 8	Lab 8: class questions
Week 9	Lab 9: Exam2
Week 10	Lab 10: Class diagram notation 1
Week 11	Lab 11: Class diagram notation 2
Week 12	Lab 12: explain examples
Week 13	Lab 13: class questions
Week 14	Lab 14: Exam3
Week 15	Lab 15: A preparatory week before the Final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Roger, S. Pressman, and R. Maxin Bruce. <i>Software engineering: a practitioner's approach</i> . McGraw-Hill Education, 2019.	
Recommended Texts	Mall, Rajib. <i>Fundamentals of software engineering</i> . PHI Learning Pvt. Ltd., 2018.	
Websites	https:// www.rspa.com	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Data Structure (2)		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOMCSSW2204		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	22	Semester of Delivery	
Administering Department	Software Dept.	College	Computer Science and Mathematics
Module Leader	Nadia Maan Mohammed Thabit	e-mail	nadia.m.mohammed@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1 / 6 / 2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Data Structure (1)	Semester	3
Co-requisites module	Artificial Intelligence	Semester	5

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Development problem solving skills and understanding of data structure. 2. This course deals with the basic concept of data structure. 3. Storing and organizing data in a computer. 4. To perform different types of data structures. 5. Providing a way to efficiently manage large amounts of data, such as large databases and Internet indexing services. 6. Different types of data structures are suitable for different types of applications. For example, (B-Tree) The binary tree is well suited for implementing databases, while compiler implementations usually use hash tables to look up identifiers.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize Links, References and Basic Types, Relationship. 2. Recognize a Simple Linked List, The Link Class, The LinkList Class, The link List Algorithms, Inserting, Finding and Deleting and Other Methods. 3. Explain a Stack Linked List. 4. Explain a Queue Linked List. 5. Recognize Doubly Linked Lists, Traversal, Insertion, Deletion, The doubly Linked Algorithm. 6. Explain Tree, Tree Terminology, Path, Root, Parent, Child, Leaf, Levels, Subtree, Visiting, Traversing. 7. Explain Binary Trees, Use Binary Trees, How do Binary Search Trees Work?, Representing the Tree. 8. Recognize & Explain a Binary Search Trees, Tree Efficiency, Inserting, Deleting and Searching a Node. 9. Recognize a Traversing the Tree, Algorithm for Traversing, Inorder, Preorder and Postorder Traversals. 10. Recognize & Explain Searching method, searching in a Linked List, Searching in a Stack Linked List, Searching in a Queue Linked List, Searching in a Doubly Linked List, Searching in a Tree. 11. Recognize & Explain a Hashing, Hash Tables.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs]

	RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] <u>Part B - Analogue Electronics</u> Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] 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]
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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 للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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 - Links, References and Basic Types, Relationship
Week 2	A Simple Linked List, The Link Class, The LinkList Class, The insertFirst() Method, The deleteFirst() Method, The displayList() Method
Week 3	The link List Algorithms, Finding and Deleting Specified Links, The find() Method, The delete() Method, Other Methods
Week 4	Double-Ended Lists, Linked-List Efficiency
Week 5	A Stack Linked List, A Stack Implemented by a Linked List
Week 6	A Queue Linked List, A Queue Implemented by a Linked List
Week 7	Data Types and Abstraction, ADT Lists, ADTs as a Design Tool
Week 8	Doubly Linked Lists, Traversal, Insertion, Deletion, The doubly Linked Algorithm,
Week 9	Tree, Tree Terminology, Path, Root, Parent, Child, Leaf, Levels, Subtree, Visiting, Traversing
Week 10	Binary Trees, Use Binary Trees, How do Binary Search Trees Work?, Representing the Tree, Finding a Node.
Week 11	Binary Search Trees, Tree Efficiency, Inserting, Deleting and Searching a Node, Algorithms for Inserting a Node, Deleting a Node and Searching for a Node
Week 12	Traversing the Tree, Algorithm for Traversing, Inorder, Preorder and Postorder Traversals
Week 13	Searching method, Searching in a Linked List, Searching in a Stack Linked List, Searching in a Queue Linked List
Week 14	Searching method, Searching in a Doubly Linked List, Searching in a Tree
Week 15	Hashing, Hash Tables
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Python language, Links, References and Basic Types, Relationship, Not Position, The Insert Button, The Find Button, The Delete Button.
Week 2	Lab 2: A Simple Linked List, The Link Class, The LinkList Class, The insertFirst() Method.
Week 3	Lab 3: The deleteFirst() Method, The displayList() Method, Finding and Deleting Specified Links.
Week 4	Lab 4: The find() Method, The delete() Method, Other Methods.
Week 5	Lab 5: A Stack Implemented by a Linked List.
Week 6	Lab 6: A Queue Implemented by a Linked List.
Week 7	Lab 7: Data Types and Abstraction, ADT Lists, ADTs as a Design Tool.
Week 8	Lab 8: Doubly Linked Lists, Traversal, Insertion, Deletion, Other Methods.
Week 9	Lab 9: Finding a Node in Binary Search Tree.
Week 10	Lab 10: Inserting a Node in Binary Search Tree.
Week 11	Lab 11: Deleting a Node in Binary Search Tree.
Week 12	Lab 12: Traversing the Tree.
Week 13	Lab 13: Searching in a Linked List, Searching in a Stack Linked List, Searching in a Queue Linked List.
Week 14	Lab 14: Searching in a Doubly Linked List, Searching in a Tree.
Week 15	Lab 15: Hashing, Hash Tables Implementing.
Week 16	Lab 16: Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Data Structures and Algorithms in Python, Michael T. Goodrich, John Wiley & Sons, 2015. 2. Python Data Structures and Algorithms, Benjamin Baka Packt Publishing Ltd, 2017.	Yes
Recommended Texts	Starting out with python, Tony Gaddis, fourth edition, part1, Pearson Publishing Ltd, 2019.	No
Websites	YouTube: Various YouTube channels offer video tutorials and lectures on the Data Structure	

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	Computability Theory		Module Delivery
Module Type	Core		☒ Theory Lecture Lab Tutorial Practical Seminar
Module Code	UOMCSSW2105		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	17	Semester of Delivery	
Administering Department	SW	College	CS
Module Leader	Maha abd allellah mohammad	e-mail	Mahaabd77@uomosul.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	MSc.
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	Name	e-mail	E-mail
Scientific Committee Approval Date	1/6/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Discrete Structures	Semester	1
Co-requisites module	Compilers Design	Semester	5

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. The theory of computability aims to teach the student to use algebraic laws. 2. Laws of algebra of propositions 3. In addition to the study of quantifiers 4. Study different groups, theories and schemes, in addition to studying the type of grammar. 5. the study of DFA and NDFA 6. State deletion algorithms and many topics so that the student can solve issues related to computational theory with ease and clarity.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. In theoretical computer science and mathematics, computational theory is the branch that deals with the effectiveness of solving problems through a computational model using an algorithm. 2. We divide this field into three main sections: autonomy theory and languages, computational theory, and computational complexity theory. 3. Because it is easy to form, it can be analyzed and used to prove results, 4. Because it represents what many consider to be the most powerful 'logical' computational model possible. 5. The possibility of an infinite amount of memory seems to be an unattainable advantage, but any problem decided to be solved by means of a Turing machine will always require only a finite amount of memory. So in principle, 6. Any problem that can (decided) be solved by a Turing machine can therefore be solved by a computer with a limited amount of memory. 7. Computational theory can be considered the creation of models of all kinds in the field of computer science. Therefore, mathematics and logic are used.
Indicative Contents المحتويات الإرشادية	In theoretical computer science and mathematics, computational theory is the branch concerned with the effectiveness of solving problems through a computational model using an algorithm. Computational theory teaches students to solve Finite Automatic, DFA, and NDFA problems, in addition to defining Grammer types and how to represent Finite automata in tables and languages. This field is divided into three main sections: autonomy and languages theory, computational theory, and computational complexity theory. Computer scientists work with a mathematical abstraction of computers called a computing paradigm. Many models are used in computational theory.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Computability theory deals primarily with the question of the extent to which a problem is solvable on a computer. Computational theory relies mostly on the results of the stopping problem. Computational theory in computer science studies the possibility of efficiently solving problems by means of a computer and studies what a computer can calculate at present and the possibility of its development in the future.
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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	
	Assignments	2	10% (10)	2 and 12	
	Projects	1	10% (10)	Continuous	
	Report	1	10% (10)	13	
Summative assessment	Midterm Exam	2hr	10% (10)	7	
	Final Exam	3hr	50% (50)	16	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Theory of computability
Week 2	grammar
Week 3	Type of grammar
Week 4	Quiz
Week 5	Derivation trees for context free grammar
Week 6	Simplification of context free grammar
Week 7	Finite automata and their language
Week 8	Type of finite automata
Week 9	Context free grammer

Week 10	The equivalence of DFA and NDFA
Week 11	Regular expression (RE)
Week 12	Equivalence of FA and (RE)
Week 13	Context sensitive grammar
Week 14	How to solve laws of relations
Week 15	Other approaches to computability
Week 16	Preparatory week before the final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	- Discrete Mathematics and Its Applications_7th_Edition - Introduction to Languages and the Theory of Computation.	Yes
Recommended Texts	Theory and Applications of Computability, In cooperation with the association Computability in Europe.	No
Websites	https://bookauthority.org/books/best-computability-books	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	English Language(2)		Module Delivery	
Module Type	Core		☐ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	UOMCSSW2206			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	24	Semester of Delivery		4
Administering Department	SW	College	CS	
Module Leader	Furat Younis Abdulrazaq		e-mail	f.abayaje@uomosul.edu.iq
Module Leader's Acad. Title	Assistant 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	1 / 6 /2023		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	English Language(1)	Semester	2
Co-requisites module	English Language(3), English Language(4)	Semester	5,7

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To Develop English skills by listening and writing . 2. Learning English and conversation training 3. Conversations in English in the field of computers (Information Technology). 4. The student receives all the information about the computer and at the same time learns and trains the correct pronunciation in this language. 5. conversations between students about everything related to Information Technology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Learning English and conversation training. 2. Listening and writing in English language. 3. Basic information about Information Technology (IT). 4. Learns and trains the correct pronunciation in this language. 5. Learn and write common sentences in the English language. 6. Learn to write words that end or start with the same syllable in the English language. 7. Learn about job interviews. 8. Learn personal presentation in English language.
Indicative Contents المحتويات الإرشادية	<u>Unit 5: E-commerce companies [8hrs]</u> E-commerce companies: listening, writing, reading, speaking and vocabulary. E-commerce features: listening, writing, language, speaking and vocabulary. Transaction security: listening, writing, language, speaking and vocabulary. Online transaction: listening, writing, language, speaking and vocabulary. <u>Unit 6: Network systems [8hrs]</u> Types of network: describe networks and make recommendations. Networking hardware: listening, writing, language, speaking and vocabulary. Talking about the past: listening, writing, language, speaking and vocabulary. Network range and speed: listening, writing, language, speaking and vocabulary. <u>Unit 7: IT support [8hrs]</u> Fault diagnosis: talk about results of an action, language, speaking and vocabulary. Software repair: listening, writing, language, speaking and vocabulary. Hardware repair: listening, writing, language, speaking and vocabulary. Customer service: explain the use of things. listening, writing and vocabulary. <u>Unit 8: IT security and safety [8hrs]</u> Security solutions: listening, writing, language, speaking and vocabulary. Workstation health and safety: listening, writing, language, speaking and vocabulary. Security procedures: listening, writing, language, speaking and vocabulary. Reporting incidents: listening, writing, language, speaking and vocabulary.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in the delivery of this units are to encourage students to participate in writing and reading exercises, while improving their listening skills. This will be achieved through student interaction in class and completion of daily assignments (homework).
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	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	E-commerce companies +listening, speaking and vocabulary. .
Week 2	E-commerce features + listening, writing, language and vocabulary.
Week 3	Transaction security + listening, writing, language and speaking.
Week 4	Online transaction + listening, writing, language, speaking and vocabulary
Week 5	Types of network /describe networks and make recommendations.
Week 6	Networking hardware + listening, writing, language, speaking and vocabulary.
Week 7	Talking about the past + listening, writing, language, speaking and vocabulary.
Week 8	Network range and speed + listening, writing, language, speaking and vocabulary.
Week 9	Fault diagnosis + talk about results of an action, language, speaking and vocabulary.
Week 10	Software repair + listening, writing, language, speaking and vocabulary.
Week 11	Hardware repair + listening, writing, language, speaking and vocabulary.
Week 12	Customer service/ explain the use of things + listening, writing and vocabulary.
Week 13	Security solutions: listening, writing, language, speaking and vocabulary.
Week 14	Workstation health and safety: listening, writing, language, speaking and vocabulary.
Week 15	Security procedures + Reporting incidents/ listening, writing, language, speaking and vocabulary.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر : لا يوجد عملي نظري فقط

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	English for information technology , 1 vocational English, course book, Maja Olejniczak, series editor David Bonamy.	Yes
Recommended Texts		
Websites	https://www.youtube.com/watch?v=W0Vu22J_sN8	Book 1 Audio CD

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Artificial Intelligence		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW3101			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	25	Semester of Delivery		5
Administering Department	SW	College	CS	
Module Leader	Dr. Ibrahim Ahmed Saleh		e-mail	i.hadedi@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	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	Data Structure (2)	Semester	4
Co-requisites module	Intelligent techniques	Semester	6

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide a comprehensive understanding of AI concepts, algorithms, and techniques. 2. To hand -on experience in developing AI systems. 3. To cover a broad range of topics, and fundamentals identifications of AI . 4. To delve into topics like search methods like blind methods and Meta-heuristic methods. 5. To explores ways to model and represent knowledge such as Propositional logic , First-order logic ,Inference rules and proof techniques and Semantic Networks, 6. To effectively utilized intelligent systems, such as expert systems and reasoning engine. 7. To understand knowledge-based agent. 8. To understand how nature language process(NLP) .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Understand the fundamental concepts of artificial intelligence. 2. Apply Search algorithms to apply blind and meta-heuristic methods. 3. Design and implement intelligent systems knowledge representation . 4. Representation of lists and Operator notation Arithmetic 5. Simulating a non-deterministic automaton. 6. Evaluate and assess the performance of artificial intelligence models using appropriate metrics and techniques. 7. Apply natural language processing techniques to process. 8. Design Expert system .
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – problem solving</u> How to solve problem , rules, AI applications, State Space, production system[4 hrs] Strategies Search- Depth-First and Breadth-First Search, Using the State Space to Represent Reasoning with the Predicate[8hrs] Hill-Climbing and Dynamic Programming -The Best-First Search Algorithm Admissibility, Monotonicity, Using Heuristics in Games Complexity Issues. [15 hrs] Best first search - Introduction, The Elements of Counting, Elements of Probability Theory ,Applications of the Stochastic Methodology, Bayes' Theorem [10 hrs] <u>Part B - Retrieving structured information from a database</u> Doing data abstraction

	Knowledge Representation, Strong Method Problem Solving ,Reasoning in Uncertain Situations, The Predicate Calculus, Structures and Strategies for State Space Search [7 hrs] Predicate Logic- Heuristic Search , Stochastic Methods , Building Control Algorithms for State Space Search. [7 hrs] Data representation – Knowledge representation in production rules, tree and list, Definitions, Frame representation ,List representation , relational. [15 hrs] Expert system - Definition, Architecture of ES,ES compound, expert, knowledge engineering , ES examples[7 hrs]. NLP- lexical processing, syntactic processing syntactic processing-assignment , semantic processing, building chat bots with rasa.[7 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy of AI course specialized educational program that focuses on teaching the principles, theories, and applications of artificial intelligence (AI). It is designed to provide students with a comprehensive understanding of AI concepts, algorithms, and techniques, as well as hands-on experience in developing AI systems.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 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 in AI :Definition, AI tree, Relation between data and knowledge , History of AI
Week 2	Problem Solving :How to solve problem , rules, AI applications, State Space, production system
Week 3	Search Methods :Strategies Search, Depth-First and Breadth-First Search, Using the State Space to Represent Reasoning with the Predicate
Week 4	Search Methods :Hill-Climbing and Dynamic Programming The Best-First Search Algorithm Admissibility, Monotonicity, Using Heuristics in Games Complexity Issues
Week 5	Stochastic methods :Introduction, The Elements of Counting, Elements of Probability Theory ,Applications of the Stochastic Methodology, Bayes' Theorem
Week 6	Knowledge representation : introduction , Strong Method Problem Solving ,Reasoning in Uncertain Situations
Week 7	Predicate Logic : The Predicate Calculus, Structures and Strategies for State Space Search
Week 8	Predicate Logic: Heuristic Search , Stochastic Methods , Building Control Algorithms for State Space Search
Week 9	Semantic Networks :Knowledge Representation in semantic networks
Week 10	building control algorithms for state :Introduction ,Recursion-Based Search , Production Systems ,The Blackboard Architecture for Problem Solving
Week 11	production rules :Knowledge representation in production rules, tree and list
Week 12	Frame and scripts :Definitions, Frame representation ,List representation , relational
Week 13	Inference in First-Order Logic: inference rules for quantifier, Conditions for Unification, Steps for Resolution, Explanation of Resolution graph:
Week 14	Expert system :Definition, Architecture of ES,ES compound, export, knowledge engineering , ES examples
Week 15	nature language process :lexical processing, syntactic processing syntactic processing-

	assignment , semantic processing, building chat bots with rasa
Week 16	Preparatory week before the final Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Artificial Intelligence Structures and Strategies for Complex Problem Solving by George F Luger	Yes
Recommended Texts	Artificial Intelligence A Guide to Intelligent Systems Second Edition by Michael Negnevitsky.	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Compilers design		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW3102			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	26	Semester of Delivery		5
Administering Department	SW	College	CS	
Module Leader	Aseel Waleed Ali		e-mail	aseelwaleed@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	Msc
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	Computability Theory		Semester	3
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop the skills of writing program instructions in a high-level language and obtain a program written in a low-level language. 2. To understand the translation process between the computer language "machine language" and the high-level language that the user deals with. 3. This course covers the basic concepts of compiler design. 4. This is the main topic for building software for any language that needs to be deal with. 5. To understand real programming problems. 6. Training students to write code to make a compiler for a new programming language. 6. Training students to write code to make a compiler for a new programming language.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Get acquainted with the Compiler, Assembler, Translator Interpreter & Source program 2. A list of the various terms associated with the compiler such as Components of compiler, Lexical Analyzer & Syntax analyzer, Semantic analyzer, Intermediate Code Generation, Code Generation, Code optimization 3. The translations of a statement, scanners, types of FSA 5. Learning Types of grammar, Syntax analysis (parsing), 6. Deal with the Top Down parsing algorithm 7. Know the functions of First and Follow 8. Learn about LL(1) grammar properties 9. Verify left recursions and Left factoring problems. 10. Trying to Recover from Errors for predictive parsing.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Theoretical</u> Compiler, Translator, Assembler, Interpreters, Source program, Components of a Compiler, Lexical Analyzer, Syntax analyzer , Semantic analyzer, Intermediate Code Generation, Code optimization, The translation of a statement [15 hrs] Scanners, Token representation, Types of FSA, Types of grammar, parsing, Types of parsing, Top-down parsing, Non-Recursive predictive parser, The algorithm. [15 hrs] First and Follow, Ambiguous Grammars, Unambiguous Grammar, . [10 hrs] LL (1) grammar has properties , Left Recursion, Left Factoring. [15 hrs] Error Recovery in Predictive Parsing . [6 hrs] <u>Part B -Practical</u> Programming the comment string diagram . [7 hrs] Designing the Scanner. [20 hrs] Parser program. [10 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	introducing this unit is to encourage students to participate in the exercises, while at the same time improving and expanding their critical thinking skills. This will be achieved through classes and interactive tutorials and by looking at simple types of experiences that include some practical programs that are of interest to the students.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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	Compiler, Assembler, Translator Interpreter & Source program
Week 2	Brief definitions of: Components of compiler, Lexical Analyzer & Syntax analyzer

Week 3	Brief definitions of: Semantic analyzer, Intermediate Code Generation, Code_Generation, Code optimization
Week 4	The translations of a statement, Scanners, Types of FSA
Week 5	Types of grammar, Syntax analysis (parsing), Top down parsing
Week 6	The top down parsing algorithm, Example
Week 7	First and Follow functions
Week 8	Solve some illustrative examples of how to solve the first and flow functions
Week 9	Multiple defined example
Week 10	LL(1) grammar properties
Week 11	Solve some examples to understand the work of LL1 grammar
Week 12	Ambiguous Grammars, examples
Week 13	Left recursions, example, Left factoring
Week 14	Error Recovery for predictive parsing
Week 15	Solve some examples to understand the work of Error Recovery
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: review programme
Week 2	Lab 2: Algorithm1 Programming the comment string diagram using the WHIL statement
Week 3	Lab 3 : Algorithm2 Programming the comment string diagram using the Switch-Case statement
Week 4	Lab 4: Algorithm3 Programming the comments string diagram using a 3D table
Week 5	Lab 5: Start designing the Scanner by reading a file and cutting it into words using spaces
Week 6	Lab 6: Continuing to design the Scanner by cutting the file into pieces by adopting the symbols, the end of the line, and the end of file
Week 7	Lab 7: Continuing to design the scanner after obtaining the words and storing them in an array to be distinguished later
Week 8	Lab 8: Continuing to design the scanner after obtaining the matrix so that the words are distinguished and separated into three matrices
Week 9	Lab 9: Continue designing the Scanner until you get a pair of numbers for each word
Week 10	Lab10: Continue designing the Scanner until you get a pair of numbers for each word
Week 11	Lab11: Start preparing for the Parser program Enter the Parser table, which is three-dimensional
Week 12	Lab 12: Get the Parser program

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Kenneth C. Louden 2005-2006, Compiler Construction Principles & Practice.	Yes
Recommended Texts	R.wilhelem.Compiler Design , Assioson Wesly	No
Websites	https://www.google.iq/books/edition/Modern_Compiler_Implementation_in_C/A3yqQuLW5RsC?hl=en&gbpv=1&printsec=frontcover	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Software Project Management		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW3103			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	27	Semester of Delivery		5
Administering Department	SW	College	CS	
Module Leader	Ashraf Abdulmunim Abdulmajeed		e-mail	ashraf_althanoon@uomosul.edu.iq
Module Leader's Acad. Title	Asst. Prof		Module Leader's Qualification	PhD
Module Tutor	Name (if available)		e-mail	ashraf_althanoon@uomosul.edu.iq
Peer Reviewer Name	Name		e-mail	
Scientific Committee Approval Date	08/06/2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	Software Engineering (2)		Semester	4
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. Planning and Estimation: Determining project scope, deliverables, work breakdown structures (WBS), and project resources, costs, and deadlines. 2. Project Organisation: Project team roles and duties, project organisational structures, communication routes, and reporting procedures. 3. Risk Management: Identifying and assessing software project risks and uncertainties, establishing risk mitigation methods, and monitoring and managing risks throughout the project lifetime. 4. Project Monitoring and Control: Setting metrics, measuring progress against plans, monitoring activities and milestones, spotting deviations, and correcting to keep the project on track. 5. Quality Management: Understanding quality assurance and quality control procedures, setting quality standards and metrics, reviewing and inspecting software development processes, and assuring quality compliance. 6. Change Management: Assessing changes in project scope, requirements, and specifications, gaining approvals, and establishing change management processes to appropriately control and record changes. 7. Team management: Understanding team dynamics, motivation, and leadership, managing disputes and interpersonal difficulties, promoting effective communication and cooperation, and developing high-performing project teams. 8. Stakeholder Management: Identifying project stakeholders, understanding their interests, expectations, and communication requirements, and establishing ways to engage and manage them throughout the project. 9. Project Documentation and Reporting: Creating project plans, status reports, risk registers, and other related papers and conveying project progress, problems, and results to stakeholders. 10. Software Project Closure: Customer acceptance, project appraisal, lessons learned, and project artefact archiving.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Ability to plan software development projects. 2. Determine the appropriate models for building software projects according to the requirements required by the client. 3. Listing and defining the project's internal and external resources. 4. Estimated initial project cost and budget. 5. Monitoring the implementation of the project plan and maintaining its completion. 6. The ability to deal with and analyses risks. 7. Leading and building the work team. 8. The ability to adapt to the changes that may occur in the project during its implementation. 9. Monitoring the project stages during implementation to ensure quality
Indicative Contents المحتويات الإرشادية	1- Introduction to Software Project Management: -Definition and importance of software project management -Key roles and responsibilities of a software project manager -Overview of the software development life cycle and project management methodologies -Project Initiation and Planning:

	2- Project identification and selection -Project charter and scope definition -Stakeholder identification and analysis -Project planning techniques, including work breakdown structure. -Resource estimation and allocation -Project Risk Management: 3- Identifying project risks. -Risk assessment and analysis techniques -Risk mitigation strategies and contingency planning -Monitoring and controlling project risks 4-Project team organization and management -Communication and collaboration within the project team -Tracking project progress and performance -Change management and configuration management 5- Project Monitoring and Reporting: -Metrics and indicators for project monitoring -Status reporting and progress tracking 6- Project Closure and Evaluation: -Project deliverable acceptance and customer satisfaction -Post-project evaluation and lessons learned -Project archiving and knowledge management Software Project Management Tools and Software: 7-Agile Project Management: -Introduction to Agile methodologies -Agile project planning and estimation -Agile team organization and roles -Agile project monitoring and adaptation
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- The main strategy is to introduce students to the importance of successful planning, implementation and delivery of program projects to program project management methodologies. Software project management techniques 2- Improve agile project management skills: iterative and incremental development allows adaptation to changing needs. Promotes teamwork, feedback and self-regulation. Software projects are managed using agile methods such as Scrum and Kanban. 3- The ability to manage hybrid projects by presenting ideas by students that mix these ideas, for example, between two agile methods and a waterfall method to meet the goals of the project so that the student can present agile practices while preserving the characteristics of the structure and documentation of waterfall methodologies. When constraints or dependencies require several approaches, this concept is useful through classroom discussion of ideas presented by students.

	4- Enable the student to discover and analyze risks: identifying, analyzing and managing risks during the project period. Risk identification, analysis, prioritization, mitigation and monitoring are all included. 5- Project management requires good communication and teamwork. This requires clear communication between students within the same group, and frequent discussions. Communication tools and platforms improve group work.
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Student Workload (SWL) الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	67	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Software Project Management, Determining project scope
Week 2	Managing People, Human needs hierarchy, Time distribution, Workspace organisation, The People Capability Maturity Model.

Week 3	Traditional Project Management, Assessing changes in project scope, requirements, and specifications.
Week 4	Linear PMLC Model, Definition, Characteristics, Strengths, Weaknesses, when to use an Incremental Approach.
Week 5	Incremental project management life cycle, Determine the appropriate models for building software projects according to the requirements required by the client.
Week 6	Agile Project Management, Implementing agile projects, Introduction to Agile methodologies, Agile project planning and estimation.
Week 7	First Exam.
Week 8	Agile Project Management, Agile team organization and roles, Agile project monitoring and adaptation.
Week 9	Iterative Project Management Life Cycle Model Characteristics, Strengths, Weaknesses, when to use an Iterative Approach, Types of Iterative PMLC Models.
Week 10	Adaptive Project Management Life Cycle Model, Scope Phase, Plan Phase, Types of Adaptive PMLC Models.
Week 11	Adaptive Software Development. Adaptive Project Framework, Prioritization Approaches, Forced Ranking
Week 12	Dynamic Systems Development Method, Scrum
Week 13	Second Exam.
Week 14	Risk management, Definition, Risk identification, Risk types
Week 15	Risk management process, Risk analysis, Risk planning, Risk monitoring, Risk indicators
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر / لا يوجد مختبر للتطبيق العملي للمادة

	Material Covered
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Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Effective Project Management.	No
Recommended Texts	Introduction to Software Project Management.	No
Recommended Texts	Software Engineering , TENTH Edition.	No

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Software Requirments		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	UOMCSSW3104			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	28	Semester of Delivery		5
Administering Department	SW	College	CS	
Module Leader	Rasha Ghanem Saeed		e-mail	rasha.alsarraj@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Master	
Module Tutor	Name (if available)	e-mail	E-mail	
Peer Reviewer Name	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	Software Engineering (2)	Semester	4
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Making the student familiar with the basic concepts and definitions associated with software requirements. 2. Providing the basic principles and methods that allow the ability to apply them correctly and at the required level according to the market needs. 3. Teaching the student how to elicit software requirements in order to develop software, and meet stakeholders' Satisfaction. 4. Managing the software requirements gathering process and periodic reviews. 5. Achieving well- requirements and quality assurance for software.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Write good requirements. 2. Distinguish between functional and non-functional requirements. 3. Know the Key Success Factors in Requirements Engineering. 4. Modeling Requirements Engineering Artifact. 5. Create Requirements taxonomy and glossary. 6. Tailoring of AM based on project size. 7. Creating a Requirement Life Cycle Process. 8. Know the Issues and problems in Requirements Eliciting. 9. Know the Requirements Eliciting methods and distinguish between them. 10. Elicit requirements using Methods and strategies. 11. Manage the Requirements Elicitation.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Software Requirements Principles</u> Software Requirements I – Introduction, Definitions, Reasons for the importance of requirements, Misconceptions about RE, and Industrial Challenges in RE. Software Requirements II - factors that can be evaluated prior to project initiation, the comparison between functional and non-functional requirements, Characteristics of a Good Requirement. Software Requirements III – Requirements Engineering Artifact Modeling, the purpose of REAM, the elements of an AM, Tailoring of AM, REAM projects roles, and RE taxonomy. Software Requirements IV – Eliciting Requirements, Issues and problems in Requirements Eliciting, Requirements Elicitation Methods, and Managing Requirements Elicitation.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy in 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.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

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

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	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 – 1- Why Has RE Become So Important 2- Misconceptions about RE 3- Industrial Challenges in RE.
Week 2	Key Success Factors in Requirements Engineering.
Week 3	How to distinguish between functional and non-functional requirements, definition and comparison.
Week 4	Characteristics of a Good Requirement part1.
Week 5	Characteristics of a Good Requirement part2.
Week 6	Requirements Engineering Artifact Modeling, the purposes and elements of AM.
Week 7	Exam
Week 8	RE Taxonomy 2- Taxonomy Attributes 3- Glossary.
Week 9	Dynamic Tailoring of an Artifact Model.
Week 10	Organizational Artifact Model Tailoring.
Week 11	Eliciting Requirements, introduction, definition, and importance.
Week 12	Issues and problems in Requirements Eliciting.
Week 13	Requirements Elicitation methods, 1-Business Goals Requirements Elicitation methods. 2- Ethnographic Techniques 3-Prioritization and Ranking of Requirement.
Week 14	4-QualityFunction Deployment Requirements Elicitation methods. (QFD) Method 5-Brainstorming Sessions 6-Tabular Elicitation Techniques
Week 15	Managing Requirements Elicitation.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Requirements Management and Enterprise Architect
Week 2	Relationship Types
Week 3	Requirement Attributes
Week 4	Element Numbering
Week 5	Traceability and relating requirements
Week 6	The Relationship Matrix
Week 7	Exam

Week 8	Change Control
Week 9	Creating quality requirements documentation
Week 10	Additional Requirements Management Features
Week 11	Additional Requirements Management Features
Week 12	Auto Names and Counters
Week 13	Diagram Filters
Week 14	Artifact
Week 15	Project discussion
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	- Software & Systems Requirements Engineering: In Practice, Brian Berenbach Daniel J. Paulish Juergen Kazmeier Arnold Rudorfer.	Yes
Recommended Texts	- Software engineering, Ian Sommerville 9th edition - Software engineering , Pressman 6th and 8th edition	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

معمارية الحاسوب

Module Information				
معلومات المادة الدراسية				
Module Title	Computer Architecture		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW3105			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	29	Semester of Delivery		5
Administering Department	SW	College	CS	
Module Leader	Muna M. Taher		e-mail	dr.muna_taher@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Microprocessors and assembly language	Semester	3
Co-requisites module	Operating Systems	Semester	6

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. This semester describes the main components of a computer. 2. Memory and how to deal with mass storage. 3. Classic internal algorithms and memory and storage management structures are described and we provide a solid working understanding of the algorithms used - their characteristics, advantages and disadvantages. 4. Understanding the input and output devices connected to a computer. 5. Understand the functionality that the operating system needs to provide applications allowing them to control all aspects of these devices.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the basics of computer architecture. 2. Identify the components of the CPU. 3. Memory classifications and how to manage memory and Cache memory. 4. Dealing with memory and how the storage and file transfer process is. 5. Learn about Replacement algorithms for managing data storage methods. 6. What is Swapping 7. What is Segmentation. 8. What is Paging
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction - Fundamentals of computer architecture. ISA and HSA architecture. Classification of computer architecture. Central Processing Unit (CPU). Memory system architecture. [15 hrs] Cache memory. Replacement algorithms. Introduction on file system management. Network Storage management, handling disk problems. File System Implementation. Direct Memory Access (DMA). [15 hrs] Memory devices characteristics. - Virtual Memory Background. Swapping. Contiguous Memory Allocation. Paging. Structure of the Page Table. Main memory. Contiguous Memory Allocation. [15 hrs] Lab1, lab 2, lab 3. [15 hrs] Lab 4, lab 5. [15 hrs] Lab 6, lab 7. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in introducing this unit is to encourage students to improve and expand their critical thinking skills at the same time.

Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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 - Fundamentals of computer architecture. ISA and HSA architecture
Week 2	Classification of computer architecture
Week 3	Central Processing Unit (CPU)
Week 4	Memory system architecture
Week 5	Cache memory
Week 6	Replacement algorithms
Week 7	Introduction on file system management
Week 8	Network Storage management, handling disk problems
Week 9	File System Implementation (FAT, NTFS, VFS)

Week 10	Direct Memory Access (DMA)
Week 11	Memory devices characteristics
Week 12	- Virtual Memory Background -Swapping
Week 13	-Contiguous Memory Allocation
Week 14	Paging -Structure of the Page Table
Week 15	Segmentation Contiguous Memory Allocation
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Linux
Week 2	Lab 2: File System Hierarchy Standard in Linux
Week 3	Lab 3: Command Line Basics(main, whatis, ls, pwd, cd, tree)
Week 4	Lab 3: Command Line Basics(find, locate, whereis, file, stat)
Week 5	Lab 3: Command Line Basics(cal, history, clear, logout, exit)
Week 6	Lab 4: Command Line Basics(mv, cp, rm, mkdir, rmdir)
Week 7	Lab 4: Command Line Basics(touch, isof, fuser, cksum, md5sum)
Week 8	Lab 4: Command Line Basics(in, alias, gzip, gunzip)
Week 9	Lab 4: Command Line Basics(split, shred, watch, env)
Week 10	Lab 5: Advanced Shell Features and Commands (chmod, chown, chgrp)
Week 11	Lab 5: Advanced Shell Features and Commands (umask, su, id)
Week 12	Lab 5: Advanced Shell Features and Commands (groups, who, whoami)
Week 13	Lab 5: Advanced Shell Features and Commands (w, last, lastb)
Week 14	Lab 5: Advanced Shell Features and Commands (lastlog)
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	OPERATING SYSTEM CONCEPTS, NINTH EDITION ABRAHAM SILBERSCHATZ, Yale University PETER BAER GALVIN, Pluribus Networks GREG GAGNE, Westminster College	

	Fundamentals of Computer Organization and Architecture By: Mostafa Abd-El-Barr/ King Fahd University of Petroleum & Minerals (KFUPM)	
Recommended Texts	Introduction to the Command Line, The Fat-Free Guide to Unix and Linux Commands, Second Edition, Nicholas Marsh, 2010.	
Websites		

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

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	English Language (3)		Module Delivery	
Module Type	Core		☐ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	UOMCSSW3106			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	30	Semester of Delivery		5
Administering Department	SW	College	CS	
Module Leader	Furat Younis Abdulrazaq		e-mail	f.abayaje@uomosul.edu.iq
Module Leader's Acad. Title	Assistant 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	1/ 6 /2023		Version Number	1.0

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	English Language(1), English Language(2)		Semester	2,4
Co-requisites module	English Language(4)		Semester	7

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To Develop English skills by listening and writing . 2. Learning English and conversation training 3. Conversations in English in the field of computers (Information Technology). 4. The student receives all the information about the computer and at the same time learns and trains the correct pronunciation in this language. 5. conversations between students about everything related to Information Technology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Learning English and conversation training. 2. Listening and writing in English language. 3. Basic information about Information Technology (IT). 4. Learns and trains the correct pronunciation in this language. 5. Learn and write common sentences in the English language. 6. Learn to write words that end or start with the same syllable in the English language. 7. Learn about job interviews. 8. Learn personal presentation in English language.
Indicative Contents المحتويات الإرشادية	<u>Unit 1: working in IT [8hrs]</u> IT jobs and duties: describing IT- related jobs and duties. IT organization: talking about what IT companies do. IT workplace rules: discussing IT workplace rules. Meeting: make suggestions, agreeing and disagreeing. <u>Unit 2: IT systems [8hrs]</u> System specifications: giving hardware specifications. GUI operations: giving instructions for using a GUI. Multimedia hardware: describing different types of multimedia. Operating systems: explaining OS installation. <u>Unit 3: data communication [8hrs]</u> Internet browsing: describing browser problems. Networks: defining networking concepts. Mobile computing: explaining advantages of mobile devices. Email: specifying information about emails. <u>Unit 4: Administration [8hrs]</u> Spreadsheets and formulae: talking about past actions. Databases: describing how to use databases. Systems administration: explaining sequences of systems administration tasks. Peripherals: explaining how problems occurred.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in the delivery of this units are to encourage students to participate in writing and reading exercises, while improving their listening skills. This will be achieved through student interaction in class and completion of daily assignments (homework).
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	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	IT jobs and duties/ describing IT- related jobs and duties + listen, vocabulary and reading.
Week 2	IT organization/ talking about what IT companies do + listening, writing, language and vocabulary.
Week 3	IT workplace rules/discussing IT workplace rules + + listening, writing, language and vocabulary.
Week 4	Meeting: make suggestions, agreeing and disagreeing + listening, language, speaking, vocabulary.
Week 5	System specifications/giving hardware specifications + listening, language, speaking and vocabulary.
Week 6	GUI operations/giving instructions for using a GUI + listening, language, speaking and vocabulary.
Week 7	Multimedia hardware/ describing different types of multimedia + listening, speaking, vocabulary.
Week 8	Operating systems/explaining OS installation+ listening, writing, language, speaking, vocabulary.
Week 9	Internet browsing/ describing browser problems + listening, writing, language and speaking.
Week 10	Networks /defining networking concepts +listening, writing, language, speaking and vocabulary.
Week 11	Mobile computing /explaining advantages of mobile devices +listening, writing and language.
Week 12	Email /specifying information about emails +listening, writing and language.
Week 13	Spreadsheets and formulae / talking about past actions + listen, writing and vocabulary.
Week 14	Databases /describing how to use databases + listening, writing, language, speaking and vocabulary.
Week 15	Systems administration: explaining sequences of systems administration tasks. Peripherals.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر : لا يوجد عملي نظري فقط

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	English for information technology , 2 vocational English, course book, David Hill, series editor David Bonamy.	Yes
Recommended Texts		
Websites	https://www.youtube.com/watch?v=K3wdqgK_TR4	Book 2 Audio CD

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Intelligent techniques		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW3201			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	31	Semester of Delivery		6
Administering Department	SW	College	CS	
Module Leader	Dr. Ibrahim Ahmed Saleh		e-mail	i.hadedi@uomosul.edu.iq
Module Leader's Acad. Title	Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	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	Artificial Intelligence		Semester	5
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide a comprehensive overview of neural networks, their applications. 2. To explore different types of neural network architectures. 3. To understand the structure and characteristics of each network. 4. To cover the process of training different types of neural networks . 5. to understand the basic concepts and principles of genetic algorithms. 6. to explore different types of genetic algorithm operators. 7. To Learn how to formulate optimization problems in the context of genetic algorithms, 8. To Study different representation schemes for encoding solutions in genetic algorithms, 9. to understand fuzzy logic conceptual and his a mathematical framework that deals with reasoning and decision-making in situations
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Understanding fundamental concepts and principles behind neural networks 2. Able to build and train neural networks using popular frameworks. 3. Understand how to define network architectures, configure hyper parameters, and implement the backpropagation algorithm. 4. Understand the training process of neural networks. 5. Learn how to evaluate the performance of neural networks using appropriate metrics. 6. Understanding of the fundamental concepts and principles behind GA . 7. Able to build and implement genetic algorithms from scratch using a programming language of choice. 8. Understand how to define problem-specific representations, design fitness functions. 9. Understand the optimization and apply swarm method for solve problem. 10. Understand fuzzy logic mathematical framework that deals with reasoning and decision-making.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Neural Network</u> What are neural networks and their historical context? Biological inspiration for artificial neural networks, Overview of the basic components of a neural network , Feedforward Neural Networks: [8hrs] Feedforward Neural Networks: Architecture and structure of feedforward neural networks, Activation functions and their role in neural networks, Forward propagation and the concept of weighted sums[15 hrs] Supervised NN: The concept of backpropagation and its role in training neural networks. Calculation of gradients using chain rule and matrix calculus. Stochastic gradient descent and its variants. RBF , Adaline . [5hrs] Unsupervised NN: The concept of self-organization map (SOM) and its role in training neural networks. Calculation Winning node chain rule and matrix calculus [5 hrs] <u>Part B – Genetic algorithm</u> Introduction to Genetic Algorithms: Evolutionary computation and its applications. Basic concepts of genetic algorithms (population, individuals, fitness, chromosomes, genes, etc.).Overview of the steps involved in a genetic algorithm. Representation and Initialization: Representation schemes for individuals (binary, real-valued,

	permutation, etc.). Initialization methods for the initial population. Fitness Evaluation and Selection: Fitness function design and evaluation. Various selection mechanisms (roulette wheel, tournament, rank-based, etc.). Fitness scaling techniques. Genetic Operators: Crossover operators (one-point, two-point, uniform, etc.). Mutation operators (bit-flip, swap, insertion, etc.). [10 hrs] <u>Part B – optimization methods</u> Introduction to Swarm Optimization: Basic concepts of swarm optimization (particles, fitness, positions, velocities, etc.). Overview of the steps involved in swarm optimization algorithms. Particle Swarm Optimization (PSO): Particle representation and initialization. Velocity update and position update rules. Local and global neighborhood topologies. Inertia weight and its impact on convergence. Ant Colony Optimization (ACO): Basics of ant colony optimization and its inspiration from ant behavior. Pheromone trails and its role in decision-making. Construction and update of pheromone trails. Grey Wolf Optimizer (GWO): and its mimicking of social hierarchy in wolf packs. [7 hrs]. <u>Part B – Fuzzy logic</u> Introduction to Fuzzy Logic: Overview, Introduction to fuzzy sets and fuzzy logic, Motivation for using fuzzy logic in handling uncertainty. Fuzzy Set Theory: Definition and properties of fuzzy sets, Fuzzy set operations, Fuzzy membership functions and their properties Extension principle and fuzzy relations Fuzzy Logic Systems: Fuzzy logic operators (AND, OR, NOT), Fuzzy if-then rules and implications 10 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy of course specialized educational program that focuses on teaching the principles, theories, and applications of intelligence technicals . It provide you with strategies for a neural network , genetic algorithm, optimization methods and fuzzy logic .

Student Workload (SWL) الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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 in neural network
Week 2	The perceptron, delta rule and its Variants
Week 3	Multilayer perceptron neural network
Week 4	Adaptive Linear Neuron (Adaline), Medline neural network
Week 5	Back propagation neural network
Week 6	Radial Basis Function Networks, Function approximation, Data Interpolation
Week 7	Self-Organizing Maps, Competition, Adaptation , Cooperation
Week 8	Introduction in Genetic algorithm Basic Ideas and Concepts
Week 9	A Simple Class of Gas, Analysis,
Week 10	Messy Genetic Algorithms, Alternative Selection, Adaptive Genetic Algorithms, Scheme
Week 11	GA Variants for Real-Valued Optimization Problems
Week 12	Evolutionary Algorithms for Optimization and Search
Week 13	Swarm Coordination and Control Problems
Week 14	Artificial immune systems. Multi-Objective Optimization and Artificial Immune Systems. An Immune Algorithm Based Robust Scheduling Methods.
Week 15	Ant colony optimization. Various ACO. Application of ACO to combinatorial problems.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر		
	Material Covered	
Week 1	Matlab Language	
Week 2	Programming perceptron NN - Matlab	
Week 3	Programming delta rule e NN – Matlab	
Week 4	Programming Adalin & Medline simulated hand-matlab	
Week 5	Programming BPNN simulated hand-matlab	
Week 6	Programming RBF & SOM simulated hand-matlab	
Week 7	Programming SOM simulated hand-matlab	
Week 8	Programming complete GA cycle-matlab programming	
Week 10	Programming GA using Matlab	
Week 11	Programming GA using Matlab	
Week 12	Project recognition using GA	
Week 13	Programming MOO using Matlab	
Week 14	Programming ACO using Matlab	
Week 15	Programming PSO using Matlab	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1. Artificial Intelligence A Guide to Intelligent Systems Second Edition by Michael Negnevitsky. 2. An introduction to neural networks by <i>Kevin Gurney</i> 3. Genetic Algorithms: Theory and Applications by Ulrich Bodenhofer	Yes
Recommended Texts	Neural Network by David Kriesel	Yes
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Software engineering tools		Module Delivery
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOMCSSW3202		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	32	Semester of Delivery	
Administering Department	SW	College	CS
Module Leader	Marrwa Abd-AlKareem Alabajee	e-mail	marrwazedan@uomosul.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Master
Module Tutor	Name (if available)	e-mail	E-mail
Peer Reviewer Name	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	Software Engineering (2)	Semester	4
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. This is the basic subject in software engineering. 2. Computer-Aided Software Engineering (CASE) is the use of software tools to assist in the development and maintenance of software. Tools used to assist in this way are known as CASE Tools. 3. A CASE tool is a computer-based product supporting one or more software engineering activities within a software development process. 4. A CASE environment is a collection of CASE tools and other components together with an integration approach that supports most or all of the interactions that occur among the environment components, and between the users of the environment and the environment itself.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. This course learn the students what is the CASE Tools. 2. Recognize all classifications of CASE Tools. 3. Know the Advantages and disadvantages of CASE Tools. 4. Describe the integrated case environments. 5. Identify the case repository, the role of the repository in I-CASE. 6. Apply a CASE tools in software engineering phases.
Indicative Contents المحتويات الإرشادية	Software Engineering is broadly associated with the development of quality software with increasing use of software preparation standards and guidelines. Software Engineering requires a lot of data collection and information generation. Since the computer itself is a very useful device as the information processor, it may be a good idea to automate software engineering tasks. Computer Aided Software Engineering (CASE) tools instill many software engineering tasks with the help of information created using computer. CASE tools are the software engineering tools that permit collaborative software development and maintenance. CASE tools support almost all the phases of the software development life cycle such as analysis, design, etc., including umbrella activities such as project management, configuration management etc.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Various strategies are applied in delivering this module, first is communication skills, Verbal communication (such as: listening, speaking, reading and writing) and non-verbal communication such as Pointing: by body movements, facial expressions, eyes, voice colouring, silence, and other senses. Pausing several times during the lecture, allowing learners to reinforce what they are learning, such as asking what The main ideas we've learned so far? The learners are assigned to work in the form of a project that includes a number of aspects of the activity. Learner uses web and the search for information are a means towards achieving the goals of the project and its completion.

Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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 CASE tool and What is CASE?
Week 2	Advantage and disadvantage of CASE Tools, Characteristics of CASE Tools.
Week 3	Building blocks for CASE Tools, Classification of CASE Systems.
Week 4	Upper and Lower CASE, Fuggetta's classification , ERD Plus tool.
Week 5	Business Process Engineering tools, Process modeling and management tools , Project planning tools .
Week 6	exam
Week 7	Risk analysis tools, Project management tools, Requirements tracing tools.

Week 8	Metrics and management tools, Documentation tools, System software tools, Quality assurance tools.
Week 9	Database management tools, Software Configuration Management tools, Analysis and design tools, Prototyping and Simulation (PRO/SIM) tools.
Week 10	Interface design and development tools, Prototyping tools, Programming tools, Web development tools.
Week 11	Integration and testing tools, Static analysis tools, Dynamic analysis tools, Test management tools.
Week 12	Client/Server (C/S) testing tools, Reengineering tools, Software maintenance tools
Week 13	exam
Week 14	INTEGRATED CASE ENVIRONMENTS, THE INTEGRATION ARCHITECTURE.
Week 15	THE CASE REPOSITORY, The Role of the Repository in I-CASE, Features and Content.
Week 16	The Data Base Management System DBMS features, The special features of CASE repositories, repository features assist in SCM.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction in project management, What is Microsoft Project?
Week 2	Lab 2: Simple Scheduling
Week 3	Lab 3: Creating a Task List (First part)
Week 4	Lab 4: Creating a Task List (Second part)
Week 5	Lab 5: Setting Up Resources
Week 6	Lab 6: Assigning Resources to Tasks
Week 7	Lab 7: Tracking Progress on Tasks
Week 8	Lab 8: Advanced Scheduling
Week 9	Lab 9: Formatting and Sharing Your Plan (First part)
Week 10	Lab 10: Formatting and Sharing Your Plan (Second part)

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Software Engineering" FIFTH EDITION, Roger S. Pressman, Ph.D.	

Recommended Texts	FUNDAMENTALS OF SOFTWARE ENGINEERING, Fourth Edition, Rajib Mall	
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Software fault tolerance		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	UOMCSSW3203			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	33	Semester of Delivery		6
Administering Department	SW	College	CS	
Module Leader	Rasha Ghanem Saeed		e-mail	rasha.alsarraj@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Master	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	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	Software engineering(2)	Semester	4
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Making the student familiar with the basic concepts and definitions associated with software fault tolerance. 2. Providing the basic principles and methods that allow the ability to apply them correctly and at the required level according to the market needs. 3. Teaching the student how to build software that is fault tolerant in order to tolerate faults, and meet users' Satisfaction and expectations. 4. Achieving well- software fault tolerance and quality assurance for software.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Know software Fault tolerance. 2. Distinguish between fault, error, and failure. 3. Know the reliability and availability and its role in fault tolerance. 4. Building Dependable Fault-tolerant software. 5. Know Fault-tolerance scope of systems. 6. Distinguish among failure modes. 7. Distinguish among fault classes. 8. Distinguish between forward recovery and backward recovery. 9. Know N-Version Programming (NVP) -Design paradigm. 10. Prevent Domino Effect using Conversation Scheme.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Software Fault tolerance Principles</u> Software Fault tolerance I – Introduction, Definitions: Fault -Error -Failure and the Relationship among them. Software Fault tolerance II - Dependable Fault-tolerant Systems, Fault-tolerance scope of systems, Failures and Failure Modes, Fault and Faults Classes. Software Fault tolerance III – Error recovery - Backward Recovery, Forward Recovery -Advantages & Disadvantages, -N-Version Programming (NVP) -Design paradigm for NVP, Objectives, Disadvantages. Software Fault tolerance IV – Fault tolerance Programming Techniques: Assertion, check pointing and Atomic actions, Domino Effect and Conversation Scheme.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy in 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 للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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	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)	
المناهج الاسبوعي النظري	
	Material Covered
Week 1	Introduction – fault tolerance Computing - Fault-tolerant Design - Highly Fault tolerant System.
Week 2	Reliability & Availability with Faulttolerant System.
Week 3	Definitions of: -Fault -Error -Failure and explain the Relationship among them.
Week 4	Dependable Fault-tolerant Systems, Fault Avoidance or Prevention -Fault Removal -Fault/Failure Forecasting -Fault Tolerance.
Week 5	Fault-tolerance scope of systems.
Week 6	Failures and Failure Modes.
Week 7	Exam

Week 8	Faults and Fault Classes.
Week 9	Fault-Tolerance Techniques: -Error recovery - Backward Recovery -Advantages & Disadvantages.
Week 10	Fault-Tolerance Techniques: -Error recovery – Forward Recovery -Advantages & Disadvantages.
Week 11	Types of Redundancy for Software Fault Tolerance.
Week 12	Software Redundancy Recovery Blocks (RcB) -N-Version Programming (NVP) -Design paradigm for NVP, Objectives, Disadvantages.
Week 13	Validation of Fault-Tolerance.
Week 14	Fault tolerance Programming Techniques: Assertion, check pointing and Atomic actions.
Week 15	Domino Effect and Conversation Scheme
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Business Modeling and Enterprise Architect
Week 2	Process Modeling Notation
Week 3	Business Process Model Template
Week 4	Toolbox Elements and Connectors
Week 5	Business Rule Modeling
Week 6	Business Rule Terms
Week 7	Exam
Week 8	Define Business Rules in Natural Language
Week 9	Create Business Domain Model
Week 10	Create Rule Flow Model
Week 11	Use the Rule Composer to Model Business Rules
Week 12	Computational Rule Table
Week 13	Decision Table
Week 14	Validate Rules Modeled in The Rule Composer
Week 15	Generating Executable Business Rules
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- Software Fault Tolerance Techniques.	No
Recommended Texts	- Books about Software Fault Tolerance	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

نظم تشغيل

Module Information				
معلومات المادة الدراسية				
Module Title	Operating System		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW3204			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	34	Semester of Delivery		6
Administering Department	SW	College	CS	
Module Leader	Muna M. Taher		e-mail	dr.muna_taher@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	01/06/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Computer Architecture	Semester	5
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. explain what operating systems are, what they do, and how they are designed and constructed. what the common features of an operating system are and what an operating system does for the user. 2. Explain the Process management. 3. describe the process concept and concurrency as the heart of modern operating systems. A process is the unit of work in a system. Such a system consists of a collection of concurrently executing processes, some of which are operating-system processes (those that execute system code) and the rest of which are user processes (those that execute user code). 4. These lectures cover methods for process scheduling, interprocess communication, process synchronization, 5. What is deadlock and deadlock handling. 6. Also included is a discussion of threads, as well as an examination of issues related to multicore systems and parallel programming.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Introduction to Operating System Structure and its Operations. Identify Operating System Services. 2. Defined the Process, Process Concept and Process State. 3. What is the Operations on Processes and Interprocess Communication? 4. Identify Context Switch. 5. Learn about process Scheduling Algorithms. 6. Identify Deadlocks and its Characterization. 7. Learn Methods for Handling Deadlocks. 8. How can Prevention deadlock.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction – Operating-System Structure, Operating-System Operations, Operating-System Services. Process Concept, introduction to Process Scheduling, Process State. [15] Threads, Scheduling Queues. Operations on Processes. Interprocess Communication. Context Switch. Interprocess Communication (Shared-Memory Systems and Message-Passing Systems). Synchronization. Buffering. Multithreading Models. process scheduling. Communication in Client–Server Systems. Multithreading Models.[15] process scheduling. Scheduling Criteria. Scheduling Algorithms. (First-Come, First-Served Scheduling. Shortest-Job-First Scheduling. Priority Scheduling. Round-Robin Scheduling. Multilevel Queue Scheduling. Multilevel Feedback Queue Scheduling). Algorithm Evaluation. [20 hrs] Deadlocks. Deadlock Characterization. Methods for Handling Deadlocks. Deadlock Prevention. Deadlock Avoidance. Banker’s Algorithm. Recovery from Deadlock. [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in introducing this unit is to encourage students to improve and expand their critical thinking skills at the same time. By learning how to write scheduling algorithms.

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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 – Operating-System Structure Operating-System Operations Operating-System Services

Week 2	Process Concept Process Scheduling Process State
Week 3	Threads Scheduling Queues
Week 4	Operations on Processes Interprocess Communication
Week 5	Context Switch
Week 6	Interprocess Communication Shared-Memory Systems Message-Passing Systems
Week 7	Synchronization Buffering
Week 8	Communication in Client–Server Systems
Week 9	Multithreading Models process scheduling
Week 10	Scheduling Criteria Scheduling Algorithms. First-Come, First-Served Scheduling
Week 11	Shortest-Job-First Scheduling Priority Scheduling
Week 12	Round-Robin Scheduling Multilevel Queue Scheduling
Week 13	Multilevel Feedback Queue Scheduling Algorithm Evaluation
Week 14	Deadlocks Deadlock Characterization Methods for Handling Deadlocks Deadlock Prevention
Week 15	Deadlock Avoidance Banker’s Algorithm Recovery from Deadlock
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to Linux
Week 2	Lab 2: File System Hierarchy Standard in Linux
Week 3	Lab 3: Command Line Basics(main, whatis, ls, pwd, cd, tree, find, locate, whereis, file)
Week 4	Lab 4: Command Line Basics(stat, date, cal, history, clear, logout, exit)
Week 5	Lab 5: Advanced Shell Features and Commands (finger, passwd, useradd, useradd, adduser,deluser)
Week 6	Lab 5: Advanced Shell Features and Commands (groupadd, groupdel, usermod, groupmod,wall,ulimit)

Week 7	Lab 6: Advanced Shell Features and Commands (ps, pgrep, pstree, kill, killall)
Week 8	Lab 6: Advanced Shell Features and Commands (nice, renice, &, bg, fg, jobs, batch)
Week 9	Lab 7: Advanced Shell Features and Commands (at, atq, atrm, crontab)
Week 10	Lab 7: Advanced Shell Features and Commands (nano, vi/vim, cat, tac, wc)
Week 11	Lab 7: Advanced Shell Features and Commands (more, less, grep, sort)
Week 12	top command
Week 13	Arithmetic Operations in Linux
Week 14	Write program in linux
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	OPERATING SYSTEM CONCEPTS, NINTH EDITION ABRAHAM SILBERSCHATZ, Yale University PETER BAER GALVIN, Pluribus Networks GREG GAGNE, Westminster College	Yes
Recommended Texts	Introduction to the Command Line, The Fat-Free Guide to Unix and Linux Commands, Second Edition, Nicholas Marsh, 2010.	
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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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Network and Websites Engineering		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW3205			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	1	Semester of Delivery		6
Administering Department	SW	College	CS	
Module Leader	Iklaas Abd Aljabaar Sultan		e-mail	Iklaas.sultan@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	1/6/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Computer Skills (2)	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives

أهداف المادة الدراسية

- 1- Enhanced Problem-Solving Abilities: Studying data communication systems involves analyzing and troubleshooting network issues. This process helps students develop critical thinking and problem-solving skills, enabling them to identify and resolve complex network problems effectively.
- 2- Increased Digital Literacy: In today's digital world, having knowledge of data communication systems is crucial for digital literacy. Students gain an understanding of how data is transmitted, how networks are structured, and how information flows in the digital realm.
- 3- Collaboration and Communication: Learning about data communication systems helps students comprehend the underlying technologies that facilitate communication and collaboration. They can understand how data is exchanged between devices and how networks enable effective teamwork and information sharing.
- 4- Adaptability to Technological Advancements: Technology is constantly evolving, and staying updated with data communication systems equips students with the knowledge to adapt to new technologies. They can understand emerging trends, such as cloud computing, Internet of Things (IoT), and virtualization, and leverage them for their benefit.
- 5- Improved Efficiency: Knowledge of data communication systems allows students to optimize network performance, troubleshoot connectivity issues, and configure network settings efficiently. This efficiency can translate into improved productivity and effectiveness when using networked resources.
- 6- Career Opportunities: Proficiency in data communication systems opens up a wide range of career opportunities. Many industries, such as IT, telecommunications, cybersecurity, and network administration, require professionals with a strong understanding of data communication systems.
- 7- Get knowledge about the fundamental technologies used in web development, such as HTML, CSS, JavaScript.
- 8- Discover the principles of effective web design, including user interface (UI) and user experience (UX) design, visual design, color theory, typography, and layout.
- 9- Understand the concepts and methods involved in creating responsive websites that adapt to different screen sizes and devices, ensuring a consistent user experience across platforms.
- 10- Gain skills in creating interactive and dynamic user interfaces using JavaScript, CSS, and frontend frameworks, allowing you to enhance user experience through interactivity and responsiveness.
- 11- Understand techniques for optimizing website performance, including optimizing code, minimizing file sizes, caching strategies, and leveraging

	content delivery networks (CDNs) to improve site speed and user experience. 12- Discover the most common web security vulnerabilities, best practices for securing websites, implementing secure authentication and authorization mechanisms, and protecting against attacks like cross-site scripting (XSS) and SQL injection.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understanding of Networking Concepts: Students will gain a solid understanding of networking principles and concepts, including protocols. 2- Technical Skills: Students will acquire technical skills related to data communication systems, such as configuring and managing network devices, troubleshooting network issues They may learn about network protocols like TCP/IP, Ethernet, Wi-Fi, and others. 3- Problem-Solving Abilities: Data communication systems involve complex problem-solving scenarios. Students will develop the ability to analyze network issues, identify the root causes of problems, and implement effective solutions. They will learn how to troubleshoot network connectivity, performance, and security issues. 4- Collaboration and Teamwork: Working with data communication systems often requires collaboration and teamwork. Students may engage in group projects or activities that involve designing, implementing, and testing network solutions. This can enhance their communication, collaboration, and leadership skills. 5- Career Opportunities: Proficiency in data communication systems opens up various career opportunities in the field of networking and IT. Students can pursue careers as network administrators, network engineers, system analysts, or cybersecurity specialists. These roles are in high demand as businesses increasingly rely on technology and interconnected networks. 6- Awareness of Emerging Technologies: Learning about data communication systems exposes students to emerging technologies and trends in the field. They may explore topics such as cloud computing, Internet of Things (IoT), virtualization, software-defined networking (SDN), and network virtualization. This knowledge can prepare them for the future of networking. 7- Proficiency in Web Technologies: Demonstrate a solid understanding of web technologies such as HTML, CSS, JavaScript, and backend programming languages, allowing you to develop and maintain functional websites. 8- Design and User Experience (UX) Skills: Apply principles of effective web design, UI/UX design, and usability to create visually appealing and user-friendly websites that provide an optimal user experience. 9- Responsive Web Development: Design and develop websites that are responsive and adapt to various screen sizes and devices, ensuring accessibility and usability across different platforms. 10- Competence in Frontend Development: Build interactive and dynamic user interfaces using JavaScript, CSS, and frontend frameworks, enabling you to create engaging web applications with seamless user interactions. Backend Development Skills: Develop server-side components and backend

	systems, including database integration, server configuration, and user authentication, allowing you to handle data and business logic effectively.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. There are several key topics and concepts that you should focus on. Here are some indicative contents that can help you gain a comprehensive understanding of this field: -Introduction to Network Communication: Overview of network communication and its importance. Different types of networks (LAN, WAN, MAN, etc.). Network topologies and architectures. - Network Protocols: - TCP/IP protocol suite and its layers (TCP, IP, UDP, etc.). -Network Devices and Components: Network interface cards (NICs) and their functions. Routers, switches, hubs, and their roles in a network. Modems and their role in connecting to the internet. -Network Addressing and Naming: IP addressing (IPv4 and IPv6). Subnetting and supernetting. -Network Protocols and Services: Network Routing and Switching -These indicative contents provide a broad overview of the topics you should cover while learning about network data communication. Remember to delve deeper into each topic to gain a more comprehensive understanding and keep up with the latest advancements and technologies in the field, for web design indicative contents includes: 1. Introduction to Website Engineering a) Overview of website development process b) Understanding the role of website engineers c) Web development methodologies and best practices d) CSS and PHP Fundamentals 2. Mobile-first design concepts a) CSS frameworks for responsive design (e.g., Bootstrap) b) Testing and optimizing responsive websites c) Frontend Development Frameworks 3. Mobile-first design concepts d) CSS frameworks for responsive design (e.g., Bootstrap) e) Testing and optimizing responsive websites f) Frontend Development Frameworks

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	There are several effective approaches for data networks learning strategies that can be employed. Some strategies that can enhance the learning experience for students are conceptual Understanding, Hands-On Experience, Simulations and Virtual Labs, Case Studies and Projects. each learner has different preferences and learning styles, so it is essential to provide a variety of teaching strategies to accommodate diverse needs. Flexibility, active engagement, and practical applications are key to effectively teaching data networking concepts. website engineering course incorporates a range of strategies to promote learning and engagement among students. This includes hands-on projects, group work, practical exercises, case studies, continuous feedback, guest lectures, and access to comprehensive resources. Emphasizing continuous learning and industry updates, providing opportunities for industry projects or internships, and encouraging reflective practice and self-assessment further enhance the learning experience. By employing these strategies, students can develop the necessary skills, knowledge, and critical thinking abilities to excel in website engineering and adapt to the evolving field of web development.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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	An introduction on data communication system, data communication system definition, data communication system component, Network Models & Network Criteria, - LAN and WAN - performance, Reliability, Security
Week 2	Local Area Network & Wide Area Network, Introduction of each type and simple comparison Physical Structures & Data communication, Point to point multipoint
Week 3	Components- and topology, Message- sender-receiver- transmission medium Wired : bus- ring- star- hybrid Wireless net, Physical media , Network devices
Week 4	Data Flow, Simplex, Half-duplex, Full-duplex, Data delivery , Direct Ver. Indirect delivery, Forwarding
Week 5	Internet Protocol, What is IP? IP type OSI & TCP IP model, Introduce OSI
Week 6	Network Addressing class full and class less
Week 7	• SDN, Review some related concepts • SDN overview OpenFlow
Week 8	SDN challenges SDN accessible to a typical user Programming abstraction support
Week 9	SDN Scalability Controller scalability
Week 10	Introduction to web engineering
Week 11	Requirements engineering for web applications and HTML
Week 12	Modeling web application and attributes
Week 13	Web application architecture
Week 14	Technology aware web application design
Week 15	Usability of Web Applications
Week 16	Technologies for web application and process

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to network area
Week 2	Lab 2: types of network devices and cables
Week 3	Lab 3: Cable inspection
Week 4	Lab 4: network construction
Week 5	Lab 5: classfull addressing

Week 6	Lab 6: routing table
Week 7	Lab 7: subletting
Week 8	Lab 8: Building a network of 4 computers with a router
Week 9	Lab 1 for web design : Introduction to Web Technologies Overview of web development process Introduction to HTML, CSS, and JavaScript
Week 10	Lab 2: Frontend Development Students selecting their projects
Week 11	Lab 3: HTML5 and semantic markup and CSS layout techniques and frameworks
Week 12	Lab 4: Introduction to frameworks
Week 13	Lab 5: Backend Development Introduction to server-side programming languages
Week 14	Lab 6: Database integration and management (SQL/NoSQL)
Week 15	Lab 7: Server-side scripting and form processing
Week 16	final project sessions

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	- Data Communications and Networking B. Forouzan chapters(1-6) - Sommerville, Ian. Software Engineering. India: Pearson India Education Services, 2017.	Yes
Recommended Texts	- Computer, Internet and Network Systems, N.Cowichan Duncan - Web Engineering: A Practitioner's Approach by Roger Pressman and David Lowe, McGraw-Hill, 2009.	No
Websites	https://www.w3schools.com	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria

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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Information Security		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW4101			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	36	Semester of Delivery		7
Administering Department	SW	College	CS	
Module Leader	Shahd abdulrhman hasso		e-mail	Shahd_hasso@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	M.Sc
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	Object Oriented Programming (2)	Semester	4
Co-requisites module	Computer Network Security	Semester	8

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Giving an introduction to the attacks and their types that can occur during the transmission process between two parties and methods of data protection, either by traditional encryption methods, block encryption, encryption using the public key, how to choose the appropriate protection method, describing the attacks, and studying protection mechanisms, as required
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Definitions of computer security and internet security. 2. Attacks types. 3. process is designed to detect, prevent, or recover from a security attack. 4. Definitions of security services and characteristics of each service. 5. Transposition cipher with key possibilities, Casear cipher. 6. Affine cipher, Polyalphabetic cipher. 7. Hill cipher, playfair cipher. 8. Introduction to block cipher and Feistel structure figures. 9. Encrypt in DES algorithm with its figures. 10. How find GCD, inverse 11. Euler for numbers How find 12. Characteristics of public key 13. Explain methods to provide authentication as well as secrecy 14. Encrypt and decrypt using RSA 15. Authentication in RSA.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] <u>Part B - Analogue Electronics</u> Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent

	circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] 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]
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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	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to data security
Week 2	Security attack
Week 3	Security mechanism
Week 4	Authentication, integrity, and non-repudiation
Week 5	Classical transposition method for cryptography
Week 6	Classical substitution method for cryptography
Week 7	Classical substitution method for cryptography
Week 8	Feistel structure
Week 9	Data Encryption Standard (DES)
Week 10	Number theory
Week 11	Euler function
Week 12	Public key cryptography
Week 13	Secrecy and authentication
Week 14	RSA algorithm secrecy
Week 15	Authentication using RSA algorithm
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to matlab language
Week 2	Introduction to matlab language
Week 3	Encrypt and decrypt using Casear cipher
Week 4	Prepare function for encrypt using column transposition cipher
Week 5	Prepare function for encrypt using column transposition cipher

Week 6	Encrypt using column transposition cipher
Week 7	decrypt using column transposition cipher
Week 8	Encrypt using polyalphabetic cipher
Week 9	decrypt using polyalphabetic cipher
Week 10	Prepare to construct matrix for playfair cipher
Week 11	Construct matrix for playfair cipher
Week 12	Encrypt using playfair cipher
Week 13	Encrypt in RSA
Week 14	Decrypt in RSA

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	William Stallings , CRYPTOGRAPHY AND NETWORK SECURITY PRINCIPLES AND PRACTICE , Prentice Hall	No
Recommended Texts		
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Software Development Techniques		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	UOMCSSW4102			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	37	Semester of Delivery		7
Administering Department	SW	College	CS	
Module Leader	Atica Mohammed Abdulla		e-mail	Atica_altaie@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Master	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	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	Software Engineering (2)	Semester	4
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. to teach the student about old and modern software development techniques available 2. To understand and choose the appropriate technology from existing software development technologies for developing specific software depending on the size and nature of the project and its development team, and the rapid response to changes in the project. 3. Compare between models from several aspects. 4. To understand the benefits and disadvantages of each of these technologies.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Knowing development strategies available. 2. Understand waterfall model in details. 3. Understand incremental model in details. 4. Understand Prototyping model in details. 5. Understand spiral model in details. 6. Understand XP programming model in details. 7. Understand scrum model in details. 8. Understand Feature Driven Development model in details. 9. Understand and choose the appropriate technology from existing software development technologies.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>SDT Principles</u> Software Development Techniques I – Introduction, Definitions, and characteristics of good software and how attributes can make conflicting demands on the software product. Software Quality Assurance II – Explain each model of traditional in details and describe advantages and disadvantages of each model. Software Quality Assurance III – Explain each model of agile techniques in details and describe advantages and disadvantages of each model. Software Quality Assurance IV – Compare between models available from different aspects and how choose the appropriate model.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy in 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.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
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	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)

المناهج الاسبوعي النظري

	Material Covered
Week 1	Introduction on software product and why we need techniques to develop a product with characteristics of good software.
Week 2	SDT advantages and dis advantages:
Week 3	waterfall model phases, advantages and dis advantages
Week 4	Incremental model phases, advantages and dis advantages
Week 5	Prototyping phases, advantages and dis advantages
Week 6	Spiral model phases, advantages and dis advantages
Week 7	Exam
Week 8	Introduction to Agile models
Week 9	Agility Principles and characteristics
Week 10	Agile models: Extreme programming model Activities
Week 11	Extreme programming model advantages and dis advantages
Week 12	Scrum model Activities, advantages and dis advantages
Week 13	Exam
Week 14	Feature Driven Development model Activities, advantages and dis advantages
Week 15	Difference between traditional and agile models
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Software engineering , Pressman, 6th and 8th edition	Yes
Recommended Texts	Software engineering, Ian Sommerville, 9th edition Rod Stephens, (2015), Beginning software engineering , John Wiley & Sons, Inc .	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	Image and signal processing(1)		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW4103			
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	38	Semester of Delivery		7
Administering Department	SW	College	CS	
Module Leader	Shahbaa I. Khaleel		e-mail	shahbaaibrkh@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	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	Mathematics	Semester	2
Co-requisites module	Image and signal processing(2)	Semester	8

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of image and signal processing through the application of techniques. 2. To understand converting images from one field to another, improving methods of transformations for images and signals. 3. This course deals with the basic concept of image and signal processing. 4. This is the basic subject for all applications on image or signals. 5. To understand and studying the properties of transformations used in the study. 6. To identifying methods for detecting edges, and also, ways to improve and configure data for image and signal.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Introducing the basic concepts of Image and signal processing. 2. List the various terms associated with images and signals. 3. Discuss the concept of image and signal processing, and its importance, and how to convert analogous signals to digital. 4. Explain image and signal applications and their uses. 5. List Images Types, and digital image representation. 6. Discuss types of transformation processes with explaining the properties of each type. 7. Illustrate Enhancement methods. 8. Learn algorithms of image smoothing . 9. Explain Sharpening method.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – image and signals transformation concept</u> Define the concept of the transformation methods. Define the image and signal process and its sources with different types of the stored data, and the various formats for data representation to be stored as a file, and the main steps that used to transform the data from a spatial domain to frequency domain [15 hrs] Explain sampling and quantization operations and the types of images, explain how the data is stored on different storage, and the formatting of files [15 hrs] Explain the properties of transformation methods. [10 hrs] Describe the properties of DFT and explain each property, and take numerical examples to understand each steps of the property . [15 hrs]

	Revision problem classes [6 hrs] <u>Part B – Enhancement techniques</u> Fundamentals Discusses the enhancement operation of image, including histogram equalization, smoothing process, and sharpening process. [15 hrs] Discuss the filters in frequency domain. [7 hrs] Explain the low pass filter in frequency domain to smooth the images. Explain high pass filters in all types to sharpen the images [15 hrs]
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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 and in the applying the algorithms and techniques of image and signal, 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	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	122	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction of Image & signal processing: Digital Image Processing, image processing application, computer imaging systems, digital image representation, Sampling and Quantization,
Week 2	Images Types: Binary images, gray Scale images, color images, multispectral, image file formats, sound file formats.
Week 3	The Continuous Fourier Transform: Equations of Continuous Fourier Transform and examples of them.
Week 4	The Discrete Fourier Transform: Equations of Discrete Fourier Transform and examples of applying these equations
Week 5	properties of the two-dimensional Fourier transform: Separability, Translation, Periodicity,
Week 6	properties of the two-dimensional Fourier transform: Rotation, Distributive Property, Scaling, Average Value
Week 7	Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit
Week 8	Convolution of Continuous functions : Convolution: graphically , Convolution : mathematically
Week 9	Convolution of Discrete functions : Discrete convolution: graphically Discrete convolution: mathematically
Week 10	Correlation of Continuous and Discrete functions : Correlation graphically and mathematically
Week 11	The Fast Fourier transform: FFT and inverse of FFT
Week 12	Enhancement methods: Histogram Equalization
Week 13	Smoothing method: Neighborhood Averaging (spatial domain)
Week 14	Smoothing method: Lowpass Filtering: LPF in frequency domain Ideal Filter, Butterworth Filter, Exponential Filter, Trapezoidal Filter
Week 15	Sharpening method: A sharpening by differentiation, High pass filtering in frequency domain: Ideal Filter, Butterworth Filter, Exponential Filter, Trapezoidal Filter
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to matlab language
Week 2	Lab 2: Apply matlab to write program to read data, and image also display data and imshow in figure
Week 3	Lab 3: Write matlab program to create images and operate some process on it
Week 4	Lab 4: Apply Discrete Fourier Transform and write matlab program for it
Week 5	Lab 5: Apply Separability, Translation, Periodicity, in matlab
Week 6	Lab 6: Apply Rotation, Distributive Property, Scaling, Average Value in matlab
Week 7	Lab 7: Apply Convolution mathematically by equation
Week 8	Lab 8: Apply convolution: mathematically by matrix
Week 9	Lab 9: Apply Correlation mathematically by equation
Week 10	Lab 10: Apply FFT and inverse of FFT
Week 11	Lab 11: Apply Histogram Equalization
Week 12	Lab 12: Apply Neighborhood Averaging (spatial domain)
Week 13	Lab 13: Apply Lowpass Filtering: LPF in frequency domain, Ideal Filter, Butterworth Filter, Exponential Filter, Trapezoidal Filter
Week 14	Lab 14: Apply A sharpening by differentiation, High pass filtering in frequency domain: Ideal Filter, Butterworth Filter, Exponential Filter, Trapezoidal Filter
Week 15	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Digital image processing , introduction to digital image, computer vision, introduction to signal processing.	Yes
Recommended Texts	Researches, letters and theses related to image processing and reference available in the Internet	No
Websites	https://www.coursera.org/browse/computer-science	

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	Design of Real-Time Systems		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW4104			
ECTS Credits	8			
SWL (hr/sem)	200			
Module Level	39	Semester of Delivery		7
Administering Department	SW	College	CS	
Module Leader	Asma Salim Yahya		e-mail	Asma_alkhairi@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M Sc.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	Name		e-mail	E-mail
Scientific Committee Approval Date	10/06/2023	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Operating Systems	Semester	6
Co-requisites module	Internet of Things	Semester	8

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. The main objectives are to introduce the basic concepts of real-time computing .systems 2. Identify several concepts in the core of the subject such as deadline, critical deadline, predictability. and hard, soft, firm deadline 3. Identify several differences between the regular operating systems and real time systems. 4. Handle multiple processes at one time, ensuring that these processes respond to events within a predictable time limit. 5. Illustrate the most significant schedule algorithms in the field. 6. Provide the basic methodologies for designing predictable computing systems useful in supporting critical control applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Define and recognize most types of real time systems in our surroundings. 2. Discuss the limits of current real-time systems as multitasking, priority-based scheduling, ability to quickly respond to external interrupts, basic mechanisms for process communication and synchronization. 3. Broach to the limits of current real-time systems as small kernel and fast context switch and absence of a real-time clock as an internal time reference. 4. Discuss the absence of a real-time clock as an internal time reference that must have to support critical applications such as timeliness, predictability. 5. Describe the most desirable features of real-time systems as efficiency, robustness, fault tolerance and maintainability. 6. Define and discuss periodic tasks, aperiodic and sporadic tasks, critical and non-critical tasks, absolute deadline and relative deadline, lateness and laxity and tardiness. 7. Describe the precedence constraints as a directed acyclic graph. 8. Broach to classical uniprocessor scheduling algorithms hypotheses and assumptions. 9. Summarize the work of rate-monotonic scheduling algorithm. 10. Discuss the earliest deadline first scheduling algorithm. 11. Discuss the awaiting service and deferred server algorithms that handling hybrid task sets. 12. Identify the basic concepts of the priority inversion phenomenon. 13. Discuss the priority inheritance and priority ceiling scheduling algorithms. 14. Broach to the limits of scheduling with precedence constraints. 15. Describe algorithms that work on a many CPUs, then we must account for communication costs between every pair of tasks.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Desirable features of real-time systems</u> There are some very important basic properties that real-time systems must have to support critical applications. They include the following: 1. Timeliness 2. Predictability 3. Efficiency 4. Robustness 5. Fault tolerance 6. Maintainability. [10 hrs] <u>Part B - Task classes</u> Tasks can be classified in two ways: 1. By the predictability of their arrival Periodic, aperiodic and sporadic 2. By the consequences of their not being executed on time. (Critical and non-critical tasks). [10 hrs] Precedence constraints In certain applications, computational activities cannot be executed in arbitrary order but have to respect some precedence relations defined at the design stage. Such precedence relations are usually described through a directed acyclic graph G, where tasks are represented by nodes and precedence relations by arrows. A precedence graph G induces a partial order on the task set. <u>Part C - Classical uniprocessor scheduling algorithms</u> In order to simplify the schedulability analysis, the following hypotheses are assumed on the tasks: - A1. The instances of a periodic task τ_i are regularly activated at a constant rate. The interval T_i between two consecutive activations is the period of the task. - A2. All instances of a periodic task τ_i have the same worst-case execution time C_i. - A3. All instances of a periodic task τ_i have the same relative deadline D_i, which is equal to the period T_i. ($D_i = \text{period of } T_i$) [10 hrs] Revision problem classes [6 hrs] <u>Part D - Rate-monotonic scheduling algorithm</u> It is a uniprocessor static-priority preemptive scheme. The following assumptions are made in addition to the above: - A4. All tasks are periodic. - A5. The relative deadline of a task is. [10 hrs] Fixed priority server scheduling algorithm. Its present a number of scheduling algorithms for handling hybrid task sets consisting of a subset of hard periodic tasks and a subset of soft aperiodic tasks. 1. Periodic tasks are scheduled based on a fixed-priority assignment; namely, the rate-Monotonic (RM) algorithm. 2. All periodic tasks start simultaneously at time $t = 0$ and their relative deadlines are equal to their periods. 3. Arrival times of aperiodic requests are unknown. A periodic task, awaiting service and deferred server algorithms [14 hrs]
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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 algorithms exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive laboratories and by considering types of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	122	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	8
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Real time systems concepts
Week 2	Limits of current real-time systems and desirable features of real-time systems
Week 3	Task classes, precedence constraints, classical uniprocessor scheduling algorithms
Week 4	Fixed priority server algorithms: periodic task, awaiting service and deferred server
Week 5	Resource access protocols
Week 6	Priority Inheritance nested critical section, Transitive priority inheritance
Week 7	Priority ceiling protocol
Week 8	Earliest deadline first scheduling algorithm
Week 9	Scheduling with precedence constraints
Week 10	Assignment with precedence condition using earliest and latest deadline first scheduling algorithm
Week 11	Next – fit assignment algorithm for rate monotonic algorithm
Week 12	Bin – packing assignment algorithm for earliest deadline first scheduling
Week 13	Myopic offline scheduling
Week 14	Assignment with precedence condition
Week 15	Focused addressing and bidding algorithm
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to LabVIEW
Week 2	Sensors & indicators (control & indicator types)
Week 3	Function in LabVIEW (numeric , Boolean), make the student design and tied the numeric , Boolean control , indicator with all the numeric function and Boolean function
Week 4	For loop structure. Auto indexing with for loop
Week 5	Timings measuring, execution time & waiting functions , Dialogs
Week 6	While loop structure. Auto indexing with while loop
Week 7	Local and Global variables
Week 8	Case structure, make the student solve many questions by using case structure

Week 9	Formula node, make the student solve many questions by using the formula node
Week 10	Graphics in LabVIEW (explain all the functions in the graphics)
Week 11	Array one dimension and two dimensions (explain all the functions in it)
Week 12	String in Labview (explain all the functions in it)
Week 13	SubVIS
Week 14	Cluster (explain all the function in it)
Week 15	Synchronization and Semaphore

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Krishna C.M. and Shin, Kang G. ; Real time systems, McGraw-hill 2007.	Yes
Recommended Texts	Giorgio C. Buttazzo; Hard Real time computing system Predictability Scheduling algorithms and applications, 3rd Edition, Springer, 2011.	Yes
Websites	https://staff.emu.edu.tr/alexanderchfranov/Documents/CMSE443/CMSE443%20Spring2020/Laplane2012%20Real-Time%20Systems%20Design%20and%20Analysis.pdf	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Software support		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW3202			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	32	Semester of Delivery		6
Administering Department	SW	College	CS	
Module Leader	Marrwa Abd-AlKareem Alabajee		e-mail	marrwazedan@uomosul.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Master	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	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		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. This is the basic subject in software engineering. 2. have learned about different types of software maintenance and the factors that affect maintenance costs. 3. understand how legacy systems can be assessed to decide whether they should be scrapped, maintained, reengineered, or replaced. 4. The course aims to teach the student that the program development process continues all the time even after the program is delivered to the customer, as a result of errors appearing in it and being corrected, or to adapt the program to work in a new environment, or as a result of the customer's request for new functions and features of the program.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. This course learn the students what is maintenance, re-engineering and reverse engineering. 2. Recognize the types of maintenance. 3. Used a software maintenance tools in software maintenance phase. 4. Identify all Activities of Software Reengineering.
Indicative Contents المحتويات الإرشادية	An application has served the business needs of a company for 10 or 15 years. During that time it has been corrected, adapted, and enhanced many times. People approached this work with the best intentions, but good software engineering practices were always shunted to the side (the press of other matters). Now the application is unstable. It still works, but every time a change is attempted, unexpected and serious side effects occur. Yet the application must continue to evolve. What to do? Unmaintainable software is not a new problem. In fact, the broadening emphasis on software reengineering has been spawned by a software maintenance "iceberg" that has been building for more than three decades.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Various strategies are applied in delivering this module, first is communication skills, Verbal communication (such as: listening, speaking, reading and writing) and non-verbal communication such as Pointing: by body movements, facial expressions, eyes, voice colouring, silence, and other senses. Pausing several times during the lecture, allowing learners to reinforce what they are learning, such as asking what The main ideas we've learned so far? The learners are assigned to work in the form of a project that includes a number of aspects of the activity. Learner uses web and the search for information are a means towards achieving the goals of the project and its completion.

Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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	What is software support?, Software support services
Week 2	Definition, Nature of Maintenance, Need for Maintenance, Majority of Maintenance Costs, Evolution of Software, Categories of Maintenance.
Week 3	Technical issues, Management issues.
Week 4	Cost estimation, Measurement.
Week 5	Maintenance Processes
Week 6	Maintenance Activities
Week 7	Program Comprehension, Reengineering, Reverse Engineering, Migration, Retirement
Week 8	Static analyzers, Dynamic analyzers,...etc
Week 9	Business Processes, Principles of Business Process Reengineering,
Week 10	Exam
Week 11	A Software Reengineering Process Model

Week 12	Software Reengineering Activities
Week 13	Reverse Engineering to Understand Data, Reverse Engineering to Understand Processing, Reverse Engineering User Interfaces.
Week 14	Code Restructuring, Data Restructuring.
Week 15	Forward Engineering for Client-Server Architectures, Forward Engineering for Object-Oriented Architectures.
Week 16	The Economics of Reengineering Legacy system management

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Software Engineering A Practitioner's Approach, Seventh Edition.	
Recommended Texts	SOFTWARE MAINTENANCE, CHAPTER 6	
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	English Language (4)		Module Delivery	
Module Type	Core		☐ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	UOMCSSW4106			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	41	Semester of Delivery		7
Administering Department	SW	College	CS	
Module Leader	Furat Younis Abdulrazaq		e-mail	f.abayaje@uomosul.edu.iq
Module Leader's Acad. Title	Assistant 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	1 / 6 /2023		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	English Language(1), English Language(2), English Language(3)	Semester	2,4,5
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To Develop English skills by listening and writing . 2. Learning English and conversation training 3. Conversations in English in the field of computers (Information Technology). 4. The student receives all the information about the computer and at the same time learns and trains the correct pronunciation in this language. 5. conversations between students about everything related to Information Technology.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Learning English and conversation training. 2. Listening and writing in English language. 3. Basic information about Information Technology (IT). 4. Learns and trains the correct pronunciation in this language. 5. Learn and write common sentences in the English language. 6. Learn to write words that end or start with the same syllable in the English language. 7. Learn about job interviews. 8. Learn personal presentation in English language.
Indicative Contents المحتويات الإرشادية	<u>Unit 5: choice [8hrs]</u> Web hosting: comparing products. IT costs: Discussing IT costs. Product research: researching products. Making recommendations: recommending products. <u>Unit 6: interactions [8hrs]</u> Enterprise social: describing trends. Video conferencing: describing the benefits of video conferencing. E-commerce: giving meanings of e-commerce concepts. Training users: processing requests for training. <u>Unit 7: Developments [8hrs]</u> Requirements analysis: describing software requirements. Website design and architecture: talking about website architecture. Software development: describing programming steps. Project management: discussing future plans and schedules. <u>Unit 8: IT solutions [8hrs]</u> Investigations: talking about what you have done to identify a problem. Diagnosis: speculating about the cause of a fault. Solutions: proposing solutions. Your future IT: talking about your career in IT.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in the delivery of this units are to encourage students to participate in writing and reading exercises, while improving their listening skills. This will be achieved through student interaction in class and completion of daily assignments (homework).
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	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	Web hosting: comparing products + listening, writing, language and vocabulary.
Week 2	IT costs / Discussing IT costs + listening, writing, language and vocabulary.
Week 3	Product research: researching products + listening, writing, language and vocabulary.
Week 4	Making recommendations: recommending products + listening, language, speaking and vocabulary.
Week 5	Enterprise social: describing trends + listening, writing, language, speaking, vocabulary.
Week 6	Video conferencing: describing the benefits of video conferencing + listening, speaking , vocabulary.
Week 7	E-commerce: giving meanings of e-commerce concepts + listening, speaking and vocabulary.
Week 8	Training users: processing requests for training + listening, writing, language, speaking, vocabulary.
Week 9	Requirements analysis: describing software requirements +listening, writing and language.
Week 10	Website design and architecture: talking about website architecture +listening, writing, language.
Week 11	Software development: describing programming steps +listening, writing and language.
Week 12	Project management: discussing future plans and schedules +listening, writing and language.
Week 13	Investigations: talking about what you have done to identify a problem + listening, language.
Week 14	Diagnosis: speculating about the cause of a fault + listening, writing, language, speaking.
Week 15	Your future IT: talking about your career in IT.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر : لا يوجد عملي نظري فقط

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	English for information technology , 2 vocational English, course book, David Hill, series editor David Bonamy.	Yes
Recommended Texts		
Websites	https://www.youtube.com/watch?v=K3wdqgK_TR4	Book 2 Audio CD

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 Network Security		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW4201			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	42	Semester of Delivery		8
Administering Department	SW	College	CS	
Module Leader	Shahd abdulrhman hasso		e-mail	Shahd_hasso@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor		Module Leader's Qualification	M.Sc
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	Information Security	Semester	7
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Teaching students to protect data with different concealment methods or how to choose the appropriate concealment method, giving a description of intruders, studying protection mechanisms from intrusion, methods for choosing passwords, and how to achieve reliability and integrity of data when sending, in addition to giving computer viruses their types and methods of protection from them
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Differences between steganography and another methods 2. Cover types. 3. Hide data in image and image types. 4. Embed and extract LSB method. 5. Embed and extract pseudo random permutation method 6. Embed and extract image downgrading method. 7. Embed and extract parity bit method. 8. Embed and extract DCT method. 9. Intruder techniques and detection. 10. Statistical anomaly detection and rule based detection. 11. Protection and selection strategies. 12. Protect message from modification. 13. Uses and characteristics of hash function. 14. Activation of viruses, causes, types. 15. Detection and protection of viruses.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs]

	<u>Part B - Analogue Electronics</u> Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs] 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]
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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 للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية
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		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	Steganography techniques
Week 2	Steganography communication
Week 3	Image steganography
Week 4	Least Significant bit (LSB)
Week 5	Pseudo random permutation
Week 6	Image downgrading
Week 7	Cover regions
Week 8	Steganography in DCT domain
Week 9	Intruders-part1
Week 10	Intruders-part2
Week 11	Password management
Week 12	Message authentication
Week 13	Hash function
Week 14	Computer Viruses
Week 15	Virus detection
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	How read images
Week 2	Attack on images
Week 3	Differences between images
Week 4	How open files in MATLAB
Week 5	Steganography in LSB method
Week 6	Extract in LSB method
Week 7	Steganography in image downgrading
Week 8	Extract in image downgrading
Week 9	Split the image to block
Week 10	Split the image to block
Week 11	Steganography in cover region
Week 12	Extract in cover region
Week 13	Steganography in DCT method
Week 14	Extract in DCT method

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		
Recommended Texts		
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Software Quality Assurance		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	UOMCSSW4202			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	43	Semester of Delivery		8
Administering Department	SW	College	CS	
Module Leader	Atica Mohammed Abdulla		e-mail	Atica_altaie@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Master	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	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	Software Engineering (2)	Semester	4
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Teaching the student how to test software to find and correct errors in the developed software. 2. To understand and choose from existing software testing methods and strategies. 3. To achieve well-developed software quality assurance for software. 4. To manage the software quality assurance process and periodic reviews.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Know test strategies and distinguish between them. 2. Discuss the steps of deriving Test Cases. 3. Generate test cases for the program under test. 4. Write Driver/Stub for a module. 5. Do integration testing based on software architecture. 6. Discuss the difference between verification and validation 7. Define system and acceptance testing. 8. Identify Software reviews types. 9. List the various metrics associated with reviews types. 10.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>SQA Principles</u> Software Quality Assurance I – Introduction, Definitions, and the Relationship between Software Quality Assurance and Software Engineering, objectives. Software Quality Assurance II - Basic path testing to deriving Test Cases, Generate Test Cases form a unit. Software Quality Assurance III – Testing techniques, White box testing, black box testing, Fault avoidance, Verification and Validation Testing, Software testing Strategies, Unit testing, Integration testing, System, acceptance testing. Software Quality Assurance IV – SOFTWARE REVIEWS, Formal and Informal Technical Reviews, Software reviews metrics, Defect Amplification and Removal model.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy in 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.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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	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)

المناهج الاسبوعي النظري

	Material Covered
Week 1	Introduction - Software, Software Quality and The Relationship between Software Quality Assurance and Software Engineering
Week 2	Define software quality assurance and objectives of software quality assurance activities
Week 3	White box testing, black box testing
Week 4	Basic path testing to deriving Test Cases
Week 5	Generate Test Cases form a unit
Week 6	Fault avoidance, Verification and Validation Testing
Week 7	Exam
Week 8	Software testing Strategies, Unit testing
Week 9	Integration testing
Week 10	System, acceptance testing
Week 11	Other testing types
Week 12	Defect Amplification and Removal model
Week 13	Exam
Week 14	SOFTWARE REVIEWS, Formal and Informal Technical Reviews
Week 15	Software reviews metrics
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Software engineering , Pressman 6th and 8th edition	Yes
Recommended Texts	Software engineering, Ian Sommerville 9th edition	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	Image and signal processing(2)		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW4203			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	44	Semester of Delivery		8
Administering Department	SW	College	CS	
Module Leader	Shahbaa I. Khaleel		e-mail	shahbaaibrkh@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	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	Image and signal processing(1)	Semester	7
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of image and signal processing through the applications of techniques on them. 2. To understand Enhancement based on an image model, by applying homomorphic filtering process. 3. This course deals with the basic concept of image and signal compression, and coloring. 4. This is the basic subject for image or signals. 5. To understand and studying the Fidelity criteria. 6. To identifying methods for detecting the system is linear or not.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Introducing the basic concepts of Image model. 2. List the various terms associated with coloring and compression. 3. Discuss the concept of encoding process, and its importance, and how to encode and decode any data. 4. Explain coloring transformation. 5. List Types of coloring process, and how to representation of it. 6. Discuss types of encoding processes with explaining each type by numerical examples. 7. Illustrate Fidelity criteria. 8. Learn clustering methods. 9. Explain Structure of Special Digital Signal Processors. 10. Learn Signals and Systems
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – coloring transformation concept Define the concept of the coloring transformation methods. Define the coloring process and its sources with different types of them that applied on data, and the main steps that used to transform the data from gray level to coloring [15 hrs] Explain Density Slicing and the Gray level to Color transformation by the three channel [15 hrs] Explain the Enhancement based on an image model, and homomorphic filtering process. [10 hrs] Describe the DCT algorithm and also explain the Fidelity criteria, of Subjective and Objective criteria. [15 hrs]

	Revision problem classes [6 hrs] Part B – Clustering techniques, and signal and system Fundamentals Discusses the clustering operation of data, that applied on image or signal. K-means clustering Algorithm, Minimum Distance Algorithm.[15 hrs] Discuss the signal and system. [7 hrs] Explain Structure of special digital signal processors, including Signal input-single filter, Single input-multiple filters, Multiple input-single filter configuration, Multiple input-multiple filter configuration Requirements for Linearity , Linear system[15 hrs]
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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 and in the applying the algorithms and techniques of image and signal, 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.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب 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	Enhancement based on an image model: homomorphic filtering process
Week 2	color transformation: Density Slicing
Week 3	color transformation: Gray level to Color transformation
Week 4	Introduction of Compression process: General compression system, the benefit of compression
Week 5	Lossless Compression: The encoding process, Huffman coding algorithm, advantages of huffman encoding, disadvantages of huffman encoding, real-life applications of huffman encoding
Week 6	Lossless Compression: Arithmetic Coding and decoding
Week 7	Mid-term Exam + Unit-Step Forcing, Forced Response, the RLC Circuit
Week 8	Lossless Compression: LZW Coding
Week 9	Lossy Compression: Discrete Cosine Transform
Week 10	Fidelity criteria: Subjective and Objective criteria
Week 11	Clustering Method: K-means clustering Algorithm
Week 12	Clustering Method: Minimum Distance Algorithm
Week 13	Structure of special digital signal processors: Signal input-single filter, Single input-multiple filters
Week 14	Structure of special digital signal processors: Multiple input-single filter configuration, Multiple input-multiple filter configuration
Week 15	Signals and Systems: Requirements for Linearity , Linear system
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Apply homomorphic filtering process
Week 2	Lab 2: Apply Density Slicing
Week 3	Lab 3: Apply Gray level to Color transformation
Week 4	Lab 4: Apply Huffman coding algorithm in numerical example
Week 5	Lab 5: Apply Huffman coding algorithm in image files
Week 6	Lab 6: Apply Arithmetic Coding in numerical example
Week 7	Lab 7: Apply Arithmetic Coding in imaging file
Week 8	Lab 8: Apply LZW algorithm in numerical example and image
Week 9	Lab 9: Apply LZW algorithm in alphabetic example and text file
Week 10	Lab 10: Apply Discrete Cosine Transform in numerical example
Week 11	Lab 11: Apply Discrete Cosine Transform in image file
Week 12	Lab 12: Apply Fidelity criteria, MSE, PSNR,BITR
Week 13	Lab 13: Apply K-means clustering Algorithm
Week 14	Lab 14: Apply Minimum Distance Algorithm
Week 15	Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Digital image processing , introduction to digital image, computer vision, introduction to signal processing.	Yes
Recommended Texts	Researches, letters and theses related to image processing and reference available in the Internet	No
Websites	https://www.coursera.org/browse/computer-science	

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	Open Source Software		Module Delivery	
Module Type	Elective		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW4204			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	45	Semester of Delivery		8
Administering Department	SW	College	CS	
Module Leader	Taghreed Riyadh		e-mail	Taghreed_reyad@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Master	
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	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	Object Oriented Programming (2)	Semester	4
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To understanding some concept like open source , close source, freeware, shareware, advantages and dis advantages of each oneetc. 2. To understand copyright, copyleft and whats is the difference between them. 3. This course deals with the basic concept of some Licenses like GPL, MIT. 4. To understand software development, packaging, Release and installation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Define some concept with understand what is the open source, its goals, its advantages and how did get start. 2. List the various of Version control system and define each one. 3. Summarize difference between CSS and OSS. 4. Discuss the meaning of freeware, shareware, and list the advantages and disadvantages , types of each one . 5. Describe copyright and copyleft 6. State the categories of License: copyleft and permissive 7. Define Community, Software Building , Testing and Types of software Testing. 8. Discuss Software Packaging, Release , installation and Define validation and verification.
Indicative Contents المحتويات الإرشادية	The topics studied in open source software are concerned with different subjects. The term open source software is referring to software which publically distributed with its source code. Open Source Software has very important because it allows anybody to access, evaluate and alter the source code; it is useful for studying and it encourages greater transparency and security. This increases the software's overall security and stability by allowing developers, community and security professionals to find and repair bugs and security vulnerabilities more rapidly.

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

Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	67	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	A brief history about open source development
Week 2	The evolution of the open source movement
Week 3	FLOSS - Free, libre, open source software
Week 4	<i>The Open Source Definition</i>
Week 5	Open source vs. proprietary software
Week 6	Open source business models
Week 7	Freeware and shareware.
Week 8	Intellectual property, copyright and licensing.
Week 9	History of open source licensing

Week 10	Copyright and copyleft
Week 11	Choosing the right license
Week 12	Community and Community driven development.
Week 13	Developers' group and Builders' group
Week 14	Testers' group, Packaging And Release management group
Week 15	Installation , verification and validation
Week 16	Exam

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Free Software, Free Society, Selected Essays of Richard M. Stallman Third Edition	Yes
Recommended Texts	THE OPEN SOURCE MOVEMENT: A REVOLUTION IN SOFTWARE DEVELOPMENT, Kevin Carillo, Chitu Okoli	yes
Websites	Free and Open Source Software , ppt	

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	Internet of Things		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UOMCSSW4205			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	46	Semester of Delivery		8
Administering Department	SW	College	CS	
Module Leader	Dr. Ibrahim Ahmed Saleh		e-mail	i.hadedi@uomosul.edu.iq
Module Leader's Acad. Title	Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name	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	Design of Real-Time Systems		Semester	7
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To provide an overview of IoT concepts, principles, and applications. 2. To understand the layered architecture of IoT, including sensors and actuators, connectivity, cloud platforms, and applications. 3. Learn different types of sensors used in IoT devices. 4. To learn how explore the different connectivity options for IoT devices. 5. To gain knowledge of data management techniques for IoT. 6. To learn about real-time analytics, data visualization, and extracting insights from IoT-generated data. 7. To understand the security challenges and vulnerabilities associated with IoT systems. 8. To Study real-world examples and case studies of IoT applications across various industries 9. Learn to develop and program IoT devices using platforms . 10. To explore the integration of IoT devices with cloud platforms.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Understand the fundamental concepts and principles of IoT. 2. Describe the different types of sensors and actuators used in IoT devices and their working principles. 3. Explain the various connectivity options for IoT devices 4. Demonstrate knowledge of data management techniques for IoT. 5. Identify and evaluate security challenges. 6. Analyze real-world IoT case studies and applications. 7. Develop and program IoT devices using prototyping platforms. 8. Integrate IoT devices with cloud platforms. 9. Demonstrate an understanding of the benefits and capabilities of cloud computing in IoT.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Introduction to IoT:</u> Definition, history, and evolution of IoT, Key concepts and components of IoT systems, IoT applications and use cases across different industries , architecture models (e.g., cloud-centric, edge-centric),Communication protocols and standards for IoT (e.g., MQTT, CoAP),Sensor networks, wireless connectivity options (e.g., Wi-Fi, Bluetooth, Zigbee),IoT data management and storage Embedded Systems and Hardware: [15 hrs] <u>Part B – Basics of embedded systems:</u> Selection and integration of sensors, actuators, and other IoT hardware components, Interfacing sensors and actuators with microcontrollers, Power management and energy efficiency considerations,Networking and Communication, Network topologies and protocols for IoT , Wireless sensor networks (WSN) and mesh networking , IoT gateway devices and their role in data aggregation, Cloud computing and IoT data processing , IoT Security and Privacy: [10 hrs] <u>Part C – Network topologies</u>

	Network topologies and protocols for IoT, Wireless sensor networks (WSN) and mesh networking, IoT gateway devices and their role in data aggregation. Cloud computing and IoT data processes [7 hrs]. IoT Security and Privacy: Security challenges and threats in IoT, Authentication and access control mechanisms, Encryption and data protection techniques, Privacy considerations and regulations in IoT [7 hrs] Data Analytics and Visualization: IoT data collection, aggregation, and analysis, Data preprocessing and feature extraction, Machine learning and data mining techniques for IoT, Visualization and interpretation of IoT data [7 hrs]. Software development frameworks for IoT: Programming languages for IoT applications (e.g., Python, C/C++). Cloud platforms and APIs for IoT application development. Mobile applications and IoT integration, IoT [7 hrs]
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategies of the Internet of Things (IoT), there are several key areas to consider. The IoT is a vast and rapidly evolving field, but here are some common strategies that can help you understand and navigate this domain..

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Digital transformation : Digital transformation involves redesigning, business practices to incorporate digital technology within all facets of the business
Week 2	IoT Architecture : IoT system components , IoT network topologies ,Cloud computing and IoT
Week 3	IoT Communication Protocols : MQTT , CoAP ,HTTP(S) , AMQP
Week 4	IoT Networking Technologies : Wireless sensor networks, RFID and NFC , Bluetooth and Zigbee , Cellular networks (3G, 4G, and 5G)
Week 5	IoT Data Management : Data acquisition and sensors , Data storage and processing , Big data and analytics in IoT
Week 6	IoT Platforms and Tools : Arduino and Raspberry Pi و IoT development platforms (AWS IoT, Google Cloud IoT, etc.) Development frameworks (Node-RED, IoTivity, etc.)
Week 7	IoT Security and Privacy :Threats and vulnerabilities in IoT, Authentication and access control, Privacy concerns and data protection
Week 8	IoT Applications :Smart homes and home automation, Industrial IoT (IIoT) , Healthcare and wearable devices , Smart cities and infrastructure
Week 9	IoT and AI Integration :Machine learning and AI in IoT, Edge computing and AI ,Predictive maintenance in IoT
Week 10	Ethical and Social Implications of IoT : Privacy concerns and data ethics ,Social impact and job implications , Legal and regulatory considerations
Week 11	IoT Challenges and Future Trends : Scalability and interoperability challenges
Week 12	Energy efficiency in IoT devices : Edge computing and fog computing , Blockchain and IoT
Week 13	Evaluate the ethical and social implications of IoT. : Identify emerging trends and future directions in IoT.
Week 14	Emerging IoT Technologies and Research Directions : Edge AI and edge analytics 6G networks and beyond , Quantum computing and IoT
Week 15	Smart cities and urban IoT : Industrial IoT and Industry 4.0 , Healthcare applications of IoT , IoT in agriculture and environmental monitoring
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Python programming language : Variables, data types, and operators , Control flow statements (if-else, loops)
Week 2	Functions and modules , File handling in Python
Week 3	Basic Programming to support Devices :Python, Java, C++

Week 4	Programming with Python : How to use python in IoT
Week 5	Prototyping the Idea :Built a prototyping for the project
Week 6	Introduction to Arduino :Learn how to use the Arduino kit and apply it for IoT
Week 7	Data Storage : How and where to store the data of the IoT
Week 8	Data Storage :Data filtering for project
Week 10	Working with Sensors and Actuators: Overview of different types of sensors (temperature, humidity, motion, etc.)
Week 11	Networking fundamentals (IP addressing, TCP/IP, UDP) , HTTP and RESTful APIs for IoT communication MQTT protocol for lightweight IoT messaging , Integration of communication protocols with Python
Week 12	Challenges in the Digital World: What and how to solve problems
Week 13	Professional Opportunities : How to get a benefit by using IoT : How to get a benefit by using IoT
Week 14	Packet Tracker ; Apply the project using Packet Tracker
Week 15	Designing and implementing end-to-end IoT applications :Integrating IoT devices, sensors, and actuators, Developing a user interface for IoT applications, Deployment and monitoring of IoT applications

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	"Internet of Things: A Hands-On Approach" by Arshdeep Bahga and Vijay Madisetti	Yes
Recommended Texts	"Building the Internet of Things" by Maciej Kranz	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.				