

University of Mosul / College of Engineering

Bachelor's Degree in Computer Engineering Department (Third Cycle) 2025-2026

Level UGI (Semester One & Semester Two)

		جمهورية العراق - وزارة التعليم العالي والبحث العلمي جامعة الموصل بكالوريوس في هندسة الحاسوب (الدورة الثانية) Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمية - كل وحدة ائتمية = ٢٥ ساعة المناهج الدراسية للعام 2026-2025																		
Level	Semester	No.	Module Code	Module Name in English	اسم المادة العربية	Language	CL (hr/w)	Lect (hr/w)	ab (hr/w)	SSWL (hr/w)	Pr (hr/w)	Tur (hr/w)	Sem (hr/w)	Exam (hr/w)	SSWL hr/sem	USSVL hr/sem	SVL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
One		1	UCM021	English Language 1	اللغة الانجليزية 1	English	2		0	0				3	33	17	50	2.00	B	
		2	UCM040	Democracy and Human Rights	ديمقراطية وحقوق انسان	Arabic	2		0	0				3	33	17	50	2.00	B	
		3	CD03	Mathematics I	الرياضيات I	English	4		0	0			1	3	78	37	175	7.00	C	
		4	CD04	Engineering Drawing by Computer	الرسم الهندسي بواسطة الحاسوب	English	0		3	3	0			3	48	52	100	4.00	S	
		5	CD05	Electrical Circuits Analysis I	تحليل الدوائر الكهربائية I	English	3		3	3	0		1	3	108	67	175	7.00	C	
		6	CD06	Physics I	فيزياء I	English	3		0	0	0		1	3	63	62	125	5.00	C	
		7	UCM031	Computer I	حاسوب I	English	2		2	0	0		0	3	63	12	75	3.00	B	
				Total		16		0	8	0		3	0	21	426	324	750	30		
UGI					اسم المادة العربية	Language <th>CL (hr/w)</th> <th>Lect (hr/w)</th> <th>ab (hr/w)</th> <th>SSWL (hr/w)</th> <th>Pr (hr/w)</th> <th>Tur (hr/w)</th> <th>Sem (hr/w)</th> <th>Exam (hr/w)</th> <th>SSWL hr/sem</th> <th>USSVL hr/sem</th> <th>SVL hr/sem</th> <th>ECTS</th> <th>Module Type</th> <th>Prerequisite Module(s) Code</th>	CL (hr/w)	Lect (hr/w)	ab (hr/w)	SSWL (hr/w)	Pr (hr/w)	Tur (hr/w)	Sem (hr/w)	Exam (hr/w)	SSWL hr/sem	USSVL hr/sem	SVL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
		1	CD08	Programming using C++ Language	البرمجة باستخدام لغة C++	English	3		3	3				3	33	32	175	7.00	C	
		2	UCM071	Arabic Language 1	اللغة العربية 1	Arabic	2		0	0				3	33	17	50	2.00	B	
		3	CD10	Mathematics II	الرياضيات II	English	4		0	0			1	3	78	37	175	7.00	C	CD03
		4	CD11	Electrical Circuits Analysis 2	تحليل الدوائر الكهربائية 2	English	3		3	3	0		1	3	108	67	175	7.00	C	CD05
		5	CD12	Digital System Fundamentals	مبادئ النظم الرقمية	English	2		2	0	0		1	3	33	32	175	7.00	C	
						Total		14		0	9	0		3	0	15	405	345	750	30.00



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة الموصل
بكالوريوس في هندسة الحاسوب (الثورة الثانية)
أربع سنوات (نوعية لصفوف دراسية) - 140 وحدة ائتمانية - كل وحدة ائتمانية = ٢٥ ساعة
المنهاج الدراسي للعام 2025-2026

Republic of Iraq - Ministry of Higher Education and Scientific Research
University of Mosul
Bachelor's degree in Computer Engineering (Second cycle)
Four years (Eight semesters) - 240 ECTS credits - 1ECTS = 25 hr
Program Curriculum (2025-2026)



MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	English Language1		Module Delivery	
Module Type	Basic learning activities		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☒ Seminar	
Module Code	UOM1021			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	1	Semester of Delivery		1
Administering Department	Computer Eng.	College	College of Eng.	
Module Leader	Dr. Mustafa Siham		e-mail	Mustafa.qassab@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor			e-mail	
Peer Reviewer Name	Dr. Mazin H. Aziz	e-mail	mazin.haziz@uomosul.edu.iq	
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 Aims أهداف المادة الدراسية	This course develops further knowledge of the grammar and of essential vocabulary in order to lead the students to an advanced level of proficiency. Emphasis is placed on developing listening, speaking, reading and writing skills through an integrated approach. It focuses on grammar and fundamental writing skills. By the end of the course, students are expected to: 1. Understand the main ideas of a variety of written and spoken texts 2. Participate effectively in a short conversation using appropriate language 3. Produce a range of text types in the form of a logical and cohesive paragraph 4. Select appropriate vocabulary to talk about feelings, opinions and experiences. 5. Recognize, understand and use a number of phrasal verbs and collocations. 6. Use effective organizational strategies that include introductions, paragraphs, transitions, and conclusion
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO 1: An ability to acquire and apply new knowledge and using appropriate learning strategies. CLO 2: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. CLO 3: Comprehend and analyze various written and spoken texts: Demonstrate the ability to understand the main ideas, key details, and nuances of different types of texts, including articles, essays, speeches, and dialogues. CLO 4: Communicate effectively in spoken interactions: Engage in short conversations using appropriate language and effective communication strategies. Express ideas, opinions, and experiences clearly and coherently. Demonstrate active listening skills and respond appropriately to others. CLO 5: Produce well-structured written texts: Generate logically organized and cohesive paragraphs in written assignments. Apply appropriate grammar, vocabulary, and sentence structures to enhance clarity and coherence. Use effective writing strategies such as introductions, topic sentences, transitions, and conclusions. CLO 6: Employ appropriate vocabulary and expressions: Select and use a wide range of vocabulary to accurately express feelings, opinions, and personal experiences. Recognize, understand, and utilize phrasal verbs and collocations to enhance language fluency and natural expression. CLO 7: Apply effective language organization and coherence: Demonstrate the ability to structure and organize written and spoken

	communication effectively. Use appropriate discourse markers and transitional words to establish coherence and facilitate smooth flow of ideas. These course learning outcomes aim to develop the students' overall English language proficiency and skills in listening, speaking, reading, and writing. By the end of the course, students should be able to understand and analyze various texts, participate actively in conversations, produce well-structured written texts, employ appropriate vocabulary and expressions, and demonstrate effective language organization and coherence.
Indicative Contents المحتويات الإرشادية	Grammar Vocabulary Everyday English

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

Student Workload (SWL) الحمل الدراسي للطالب 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	3	12% (12)	4, 7, 10	LO #1, 3, 5, 6
	Assignments	3	9% (9)	2,4,6	LO #1, 5, 6
	Reports	1	9% (9)	9	LO #4, 5, 7
	Online Assessment	4	10% (10)	10, 11, 12, 13	LO #1, 2, 4, 5, 7
Summative assessment	Midterm Exam	2 hr	10% (10)	15	LO # 1-6
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	UNIT 1 A world of difference: part 1
Week 2	UNIT 1 A world of difference: part 2
Week 3	UNIT 1 A world of difference: part 3
Week 4	UNIT 2 The working week: part 1
Week 5	UNIT 2 The working week: part 2
Week 6	UNIT 2 The working week: part 3
Week 7	UNIT 3 Good times, bad times: part 1
Week 8	UNIT 3 Good times, bad times: part 2
Week 9	UNIT 3 Good times, bad times: part 3
Week 10	Online assessment Group1
Week 11	Online assessment Group2
Week 12	Online assessment Group3
Week 13	Online assessment Group4
Week 14	Reviewing the Units 1-3 and open discussion
Week 15	Midterm exam
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	SOARS, J. & SOARS, L. 2014. New Headway: Intermediate Fourth Edition: Student's Book and iTutor Pack, OUP Oxford.	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	Democracy and Human Rights		Module Delivery	
Module Type	Basic learning activities		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	UOM1040			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	1	Semester of Delivery		1
Administering Department	Computer Eng.	College	College of Eng.ENG4	
Module Leader	Nehal Abdl Wahab Hamid		e-mail	nehal.hamid@uomosul.edu.iq
Module Leader's Acad. Title	Professor Doctor	Module Leader's Qualification	PhD	
Module Tutor			e-mail	
Peer Reviewer Name	Dr. Mazin H. Aziz	e-mail	mazin.haziz@uomosul.edu.iq	
Scientific Committee Approval Date	26/10/2025	Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Introducing the student to the concept of human rights 2. Introducing the student to the historical development of human rights 3. Introducing the student to the sources of human rights 4. Introducing the student to the religious sources of human rights 5. Introducing the student to the rights and freedoms stipulated in the Iraqi constitution
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CL01: Knowledge and understanding CL02: Understanding the roots of human rights CL03: Knowing the international sources (global and regional) CL04: Familiarity with declarations and agreements regulating human rights CL05: Developing students' research and learning skills related to the subject of the course CL06: Enhancing students' analytical abilities by training them on how to utilize the knowledge they have acquired in their studies
Indicative Contents المحتويات الإرشادية	Democracy and Human Rights Section One: Definition of Human Rights, Their Importance, and Types Section Two: Definition of the International Bill of Human Rights and Its Elements Section Three: Group and Private Rights Women's, Children's, and Youth's Rights Section Four: National Mechanisms and Procedures for Implementing Private and Group Rights Section Five: Serious Violations of Human Rights Section Six: Historical Concepts of the Emergence of Democracy and Its Foundations Section Six: Types of Democracy and Their Development in Contemporary Contexts Section Seven: Institutions and Mechanisms of Democracy Section Eight: Democracy in Practice

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Expanding students' understanding of the subject of democracy and human rights, and familiarizing them with the basic rights that individuals should enjoy, as well as developing the ability to distinguish between rights and duties through lectures, in addition to daily and semester exams.

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	7% (14)	5, and 12	CLO4, CLO6
	Assignments	1	6% (6)	9	CLO5
	Projects / Lab.	1	10% (10)	13	CLO6
	Report	1	10% (10)	6	CLO2, CLO3, and CLO4
Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Definition of Human Rights and National and Procedural Mechanisms for Their Implementation
Week 2	Types of Human Rights in Islamic Law Types of Human Rights in the 2005 Constitution of the Republic of Iraq
Week 3	Historical Development of Human Rights

Week 4	Human Rights in the Renaissance and Modern Eras Human Rights in Islam
Week 5	National and Procedural Mechanisms for Human Rights
Week 6	The Concept of the International Bill of Human Rights
Week 7	Midterm Exam
Week 8	The Two International Covenants on Human Rights of 1966
Week 9	The Rights of Women, Children, Minorities, and Persons with Disabilities in International Conventions
Week 10	The Rights of Persons with Disabilities and Minorities
Week 11	The International Convention on the Elimination of All Forms of Racial Discrimination of 1965
Week 12	National Mechanisms and Procedures for Implementing Specific and Group Rights
Week 13	Historical Concepts of the Emergence and Foundations of Democracy
Week 14	The Development of Democracy in the Modern Era and Its Consequences Democracy in the 20th Century: Between Totalitarianism and Global Expansion
Week 15	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	A curriculum approved by the Ministry of Education	
Recommended Texts	A curriculum for first-year students in Iraqi universities	
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	Mathematics I		Module Delivery
Module Type	Core learning activity		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	CO103		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	
Administering Department	Computer Eng.	College	College of Engineering
Module Leader	Dr. Samar Ammar Yasir	e-mail	samarammar@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Ola Marwan Assim	e-mail	ola.marwan@uomosul.edu.iq
Peer Reviewer Name	Dr. Mazin H. Aziz	e-mail	mazin.haziz@uomosul.edu.iq
Scientific Committee Approval Date	21/10/2025	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The objective of this course is to introduce students to four main topics of mathematics Prerequisites for calculus, Limits, and Continuity, Differentiation methods and Analytic Geometry in Space, Matrices, and Solution of system of equations by matrix.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Course Learning Outcomes (CLOs) for the course "Mathematics 1": 1-CLO1: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2-CLO2: An ability to acquire and apply new knowledge and using appropriate learning strategies. 3-CLO3: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4-CLO4: Apply and understand the fundamental of properties and operations of functions and trigonometric functions in engineering and scientific contexts, including domain, range and their graphs. 5-CLO5: Explain the concept of limits and continuity and their implications in mathematical analysis. 6-CLO6: Demonstrate and compute derivatives of functions using various techniques. 7-CLO7: Understand and apply the derivative applications and linear approximations in engineering and science. 8-CLO8: Identify and demonstrate matrix terminology to solve systems of linear equations using matrix methods, such as Gaussian elimination and matrix inverses. By the end of the "Mathematics 1" course, students should have achieved these learning outcomes, gaining a strong foundation in singlevariable mathematics and the ability to apply mathematical concepts to real-world engineering and scientific applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Prerequisites for calculus: - Coordinates and Graphs in the Plane - Slope, and Equations for Lines - Functions and Their Graphs - Shifts, Circles and Parabolas - A Review of Trigonometric Functions - Limits and Continuity : Limits of Functions - The Sandwich Theorem - Limits Involving Infinity - Continuous Functions

	3. Derivatives: 3.1. Slope, Tangent Lines, and Derivatives 3.2. Differentiation Rules 3.3. Derivatives of Trigonometric Functions 3.4. The Chain Rule and Implicit Differentiation and Fractional Powers 3.5. Velocity, Speed and Other Rate of Change 3.6. Linear Approximations and Differentials 4. Matrices: 5.1. Types and properties of Matrices 5.2. Operations of matrices: addition, subtraction, scalar multiplication and matrix multiplication. 5.3. Operations of matrices : transposition, determinant, adjoint and inverse matrix. 5.4. Solution of Linear Equations using Cramer's Rule. 5.5. Gaussian Elimination Method.
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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 type 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	97	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	20% (20)	4, 6, 9,11,13	LO #1,2,4-8
	Onsite Assignments	4	8% (8)	3, 5, 8, 12	LO # 4,5,6,8
	Online Assignments	4	8% (8)	3, 6, 10, 12	LO # 1,2,4,7,8
	Report	1	4% (4)	Continuous	LO # 3, 4-8
Summative assessment	Midterm Exam	2 hr	10% (10)	14	LO # 1,2,4-8
	Final Exam	3hr	50% (50)	15	LO # 1,2,4-8
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Prerequisites for calculus: Coordinates and Graphs in the Plane Slope, and Equations for Lines
Week 2	Functions and Their Graphs Circles and Parabolas
Week 3	Shifting and Scaling Graphs
Week 4	Trigonometric Functions Shifting and Scaling Trigonometric Graphs
Week 5	Quiz 1 Limits and Continuity : Limits of Functions
Week 6	The Sandwich Theorem Limits Involving Infinity Continuous Functions
Week 7	Quiz 2 Derivatives: Slope, Tangent Lines, and Derivatives Differentiation Rules
Week 8	Derivatives of Trigonometric Functions The Chain Rule and Implicit Differentiation and Fractional Powers
Week 9	Quiz 3 Velocity, Speed and Other Rate of Change
Week 10	Linear Approximations and Differentials
Week 11	Quiz 4

	Matrices: Types and properties of Matrices Operations of matrices: addition, subtraction, scalar multiplication and matrix multiplication.
Week 12	Operations of matrices: transposition, determinant, adjoint and inverse matrix. Solution of Linear Equations using Cramer's Rule.
Week 13	Quiz 5 Gaussian Elimination Method.
Week 14	Mid-term Exam + Preparatory week before the final exam
Week 15	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Calculus by Thomas and Finny.	Yes
Recommended Texts	Thomas' Calculus: Early Transcendentals 13th Edition by George B. Thomas, 2014	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
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Drawing by Computer		Module Delivery
Module Type	Support learning activity		Theory Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO104		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level		1	
Administering Department		Computer Eng.	College
Module Leader		Roua Suhail Zidan	e-mail
Module Leader's Acad. Title		Lecturer	Module Leader's Qualification
Module Tutor		Dr. Samar Ammar Yasir	e-mail
Peer Reviewer Name		Dr. Mazin H. Aziz	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 Aims أهداف المادة الدراسية	The aims of the module are: (1) to develop a knowledge of both manual and computer-generated engineering drawing. (2) to create, edit and print a variety of technical drawings using a CAD system. (3) to communicate design ideas and technical information to engineers and other professionals throughout the design process (4) An engineering drawing represents a complex three-dimensional object on a two-dimensional piece of paper or computer screen by a process called projection
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO1: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. CLO2: An ability to acquire and apply new knowledge and using appropriate learning strategies. CLO3: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. CLO 4: Proficiency in AutoCAD: Gain a comprehensive understanding of AutoCAD software, its basic commands, and tools necessary for professional 2D drawing, design, and drafting. CLO 5: Application of Drawing Commands: Acquire the ability to utilize various drawing commands in AutoCAD, including lines, circles, arcs, ellipses, polygons, and other geometric shapes, to create accurate and precise 2D drawings. CLO 6: Modification and Editing Techniques: Develop skills in modifying and editing drawings by employing commands such as erase, trim, extend, mirror, lengthen, offset, chamfer, fillet, and other relevant tools to refine and adjust the design as required. CLO 7: Dimensioning and Annotation: Understand the principles of dimensioning and annotation in engineering drawings. Learn to apply dimensioning commands, create text, use different font types, and utilize

	dimension styles to accurately convey measurements and annotations. CLO 8: Advanced Features and Techniques: Explore advanced features and techniques in AutoCAD, including working with layers, using design templates, inserting and managing blocks, working with 3D models, applying shading and better visibility commands, and utilizing design center and other relevant tools. By the end of the course, students will have developed the necessary skills and knowledge to effectively use AutoCAD for 2D drawing and design tasks, enabling them to create professional engineering drawings in a computer-aided environment.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. • Navigating through the User Interface • Creating Basic Drawings • Manipulating Objects • Implementing Drawing Organization and Inquiry Commands • Altering Objects • Annotate a Drawing • Dimension Drawings • Hatching Objects • Creating Additional Drawing Objects and work on Projects • Plotting the Drawing Output • AutoCAD 2023 3D Basics • Creating Solids • Creating Meshes • Creating Surfaces • Creating Complex Solids & Surfaces • Solid Editing Commands • 3D Modifying Commands • Converting and Sectioning • Printing in 3D and Creating 3D DWF Files • Cameras and Lights • Materials, Rendering, Visual Styles and Animation

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.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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	4	20% (10)	5, 8, 11, 13	LO #1, 4, 5
	Assignments	2	10% (10)	2, 12	LO # 2, 3, 7
	Projects / Lab.	1	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2 hr	10% (10)	9	LO # 1,4, 6,8
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Getting started: 1- Start a new drawing. 2- User Interface. 3- Drafting settingsI (Snap, Rectangular & Isometric grid). 4- Limits. 5- Units. 6- Absolute & Relative coordinate system. 7- Ortho
Week 2	Lab 2: Drawing I1- Point (DDPTYPE = POINT STYLE). 2- Line, Arc, Circle, Ellipse, Polygon, Rectangle
Week 3	Lab 3: Drawing II, View. 1- Zoom, Pan, Steering wheel. 2- Drafting settingsII.(Osnap, Polar snap). 3- Pline, Pedit. 4- Erase. 5- Selecting objects. 6- Ltype, Ltscale
Week 4	Lab 4: ModifyI, Drawing III: 1-Copy, Rotate, Move, Scale, Stretch. 2- Undo, U, Redo. 3- Divide, Measure
Week 5	Lab 5: Layers, Modify II: 1- Working with Layers. 2- Properties (Mo, Ch)... 3- Working with Grips. 4- Align
Week 6	Lab 6: Modify III. 1- Array, Offset, Fillet, Chamfer, Trim, Extend, Lengthen, Mirror, Break, Join, Explode.
Week 7	Lab 7: Annotation I, Modify IV, Inquiry: 1-Style, Text, Mtext, Ddedit, 2- ID, Dist, Area, Massprop
Week 8	Lab 8: quiz 1
Week 9	Lab 9: Mid Term Exam I
Week 10	Lab 10: Hatch, Hatchedit.. 2- tool palette 2
Week 11	Lab 11: Block I: 1- Block, Insert. 2- Wblock. 3- Attributes, Block Editor. 4- Image, Draworder
Week 12	Lab 12: Block II: Parametric constraints. 2- Dynamic Block. 3- Tool palette. 4- Jpgout, Bmpout.
Week 13	Quiz II
Week 14	Plot Drawings: 1- Mspace, Pspace. 2- Mviewport. 3- Layouts. 4- Plot.
Week 15	Final Exam.

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Engineering Drawing and Graphic Technology, By: French & Vierk , 12th edition, 1978 AutoCAD, 2021	Yes
Recommended Texts	Engineering Drawing, ©2005 by Wuttet Taffesse, Laikemariam Kassa	No
Websites	https://www.cartercenter.org/resources/pdfs/health/ephti/library/lecture_notes/en_v_health_science_students/engineeringdrawing.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	Electrical Circuits Analysis 1		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	CO105		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	1
Administering Department	Computer Engineering Dept.	College	Engineering
Module Leader	Ahmed Mamoon	e-mail	ahmedalkababji72@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Ban Aziz Asi	e-mail	ban.alzaydi@uomosul.edu.iq
Peer Reviewer Name	Dr. Mazin H. Aziz	e-mail	mazin.haziz@uomosul.edu.iq
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 Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-CLO1: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2-CLO2: An ability to acquire and apply new knowledge and using appropriate learning strategies. 3-CLO3: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4-CLO4: Demonstrate a thorough understanding of the fundamental theory and mathematical principles underlying Direct Current (DC) and Alternating Current (AC) electrical circuits. 5-CLO5: Apply Ohm's law and analyze series and parallel resistor circuits, including the ability to perform Y Δ transformations and analyze circuits with dependent and independent sources. 6-CLO6: Apply Kirchhoff's laws to analyze and solve complex electrical circuits, both in DC and AC settings. 7-CLO7: Understand the characteristics of AC signals, including concepts related to frequency, amplitude, phase, and waveform. 8-CLO8: Analyze AC circuits with capacitance and inductance, employing appropriate mathematical tools and techniques to calculate voltage, current, and impedance. These CLOs emphasize the mastery of foundational concepts, principles, and analytical techniques required for the analysis of electrical circuits, particularly in the context of DC and AC circuits. Through the achievement of these learning outcomes, students will develop a solid understanding of circuit analysis and be prepared to apply their knowledge in more advanced electrical engineering courses and practical engineering scenarios

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] Revision problem classes [6 hrs] <u>Part B - Analogue Electronics</u> Fundamentals Resistive networks, voltage and current sources, current and voltage division. [15 hrs] Components and active devices – Components vs elements and circuit modeling, real and ideal elements. [7 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 type of simple experiments involving some sampling activities that are interesting to the students.

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

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	8	16% (16)	2,4,6,7,9,10,12,14	LO # 1,2,4-8
	Assignments	2	10% (10)	4, 10	LO # 6,8
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	4% (4)	10	LO # 8
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1,2,4-8
	Final Exam	3hr	50% (50)	15	LO # 1,2,4-8
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction : electrical materials, basic quantities[ch1]
Week 2	Introduction : electrical materials, basic quantities[ch1]+quiz
Week 3	Basic relation: Ohm's law depended and indented sources, series resistor circuits, Y Δ transformation[ch2]
Week 4	Basic relation: Ohm's law depended and indented sources, parallel resistor circuits, Y Δ transformation[ch2]+quiz
Week 5	Kirchhoff's law.[ch2]
Week 6	Kirchhoff's law.[ch2] +quiz
Week 7	AC signals.[ch8] +quiz
Week 8	Mid exam
Week 9	AC circuits: capacitance [ch6,ch8] +quiz
Week 10	AC circuits: inductance [ch6,ch8] +quiz
Week 11	Phases.[ch8]
Week 12	Phases.[ch8] +quiz
Week 13	AC circuits analysis [ch8,ch9]
Week 14	AC circuits analysis [ch8,ch9] +quiz
Week 15	Final exam

Delivery Plan (Weekly Lab. Syllabus)

المناهج الاسبوعي للمختبر

	Material Covered
	Semester 1
Week 1	Lab 1: Background information +quiz
Week 2	Lab 2: Ohm's law : series resistor circuits +quiz
Week 3	Lab 3: Ohm's law : parallel resistor circuits
Week 4	Lab 4:quiz
Week 5	Lab 5: AC circuits: capacitance
Week 6	Lab 6: AC circuits: inductance +quiz
Week 7	Lab 7 : review the experiment
Week 8	Lab 8 : mid exam
Week 9	Lab 9: Phase difference angle measurement :series circuits +quiz
Week 10	Lab 10: Phase difference angle measurement :parallel circuits
Week 11	Lab 11 : quiz
Week 12	Lab 12: Kirchhoff's law +quiz
Week 13	Lab 13: review the experiment
Week 14	Lab 14:quiz
Week 15	Lab 15:final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	BASIC ENGINEERING CIRCUIT ANALYSIS 10th Ed by J. Irwin	Yes
Recommended Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A – Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C – Good	جيد	70 - 79	Sound work with notable errors
	D – Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E – Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (فيد 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	Physics I		Module Delivery
Module Type	Core learning activities		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO106		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	1
Administering Department	Computer Engineering Dept.	College	Engineering
Module Leader	Nada Ismaial	e-mail	nada.ismail@uomosul.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Msc
Module Tutor	Muhanad Faris	e-mail	muhanad.faris@uomosul.edu.iq
Peer Reviewer Name	Dr. Mazin H. Aziz	e-mail	mazin.haziz@uomosul.edu.iq
Scientific Committee Approval Date	01/09/2024	Version Number	2.0

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-The student learns an idea about the atomic structure, energy levels, and conductivity of minerals. Concepts of Modern Physics, Semiconductor Materials, 2- The student will be introduced to semiconductors and diodes, their types and applications in the field of communication science, and an understanding of electronic circuits and the most important electronic elements included in the designs of these circuits. PN-junction diode ‘Potential barrier’ drift current ‘ Depletion layer and capacitor, forward and reverse bias ‘Temperature effect on diode characteristics ‘Types of diodes ‘Diodes applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- CLO1: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2- CLO2: An ability to acquire and apply new knowledge and using appropriate learning strategies. 3- CLO3: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4- CLO4: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 5- CLO5: An ability to acquire and apply new knowledge and using appropriate learning strategies. 6- CLO6: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 7- CLO7: Gives an overview of Failure of Classical physics & Concepts of Modern Physics Understand the details of the scientific phenomena that could not be explainable by classical mechanics (failure of Classical Mechanics) 8- CLO8: Understand the fundamental principles of semiconductor devices and their manufacturing process. Describe the structure and operation of PN-junction. Explain the concept of potential barrier and drift current in semiconductor materials. 9- CLO9: Analyze the behavior of diodes under different biasing conditions and temperature effects. Explain the operation of diodes in forward and reverse bias modes. Evaluate the impact of temperature on diode characteristics. 10- CLO10: Identify different types of diodes and their applications.

	Classify various types of diodes based on their characteristics and properties. Explore the applications of diodes in electronic circuits and systems. These Course Learning Outcomes (CLOs) for "Electronics Physics" focus on providing students with a comprehensive understanding of semiconductor devices, including diodes and transistors. By achieving these learning outcomes, students will develop the necessary knowledge and skills to analyze and apply these electronic components in various electronic systems and applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Concepts of Modern Physics , Semiconductor Materials, PN-junction diode , Potential barrier, drift current , Depletion layer and capacitor, forward and reverse bias , Temperature effect on diode characteristics , Types of diodes 1 , Types of diodes 2 , Diodes applications 1 , Diodes applications 2.

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

Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ أسبوعا			
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	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
Total SWL (h/sem)	125		

الحمل الدراسي الكلي للطالب خلال الفصل					
Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	20% (10)	3,5,8,10,12	LO #4,5,7,8,9
	Assignments	4	10% (10)	4,6,9,13	LO # 4,5,7,8,9,10
	Activities during the lecture / no Lab.	1	5% (10)	Continuous	All
	Report	1	5% (10)	13	All
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 4-8
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
	Semester 1
Week 1	Concepts of Modern Physics
Week 2	Semiconductor Materials
Week 3	Doping: PN-junction diode
Week 4	Potential barrier, drift current
Week 5	Depletion layer and capacitor, forward and reverse bias
Week 6	Temperature effect on diode characteristics.
Week 7	Mide exam
Week 8	Types of diodes 1
Week 9	Types of diodes 2
Week 10	Diode Approximations

Week 11	Diodes applications 1
Week 12	Diodes applications 2
Week 13	Zener diodes and its applications
Week 14	Reports seminars
Week 15	Final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. فيزياء الإلكترونيات، وكاع الجبوري 2. الخواص الكهربائية والمغناطيسية للمواد، وكاع الجبوري	Yes
Recommended Texts	Concepts of Modern Physics, Arthur Beiser, Kent A. Peterson Electronic Devices, Floyd Material Science, Kakani	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 1		Module Delivery
Module Type	Basic learning activities		☐ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOM1031		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery	
Administering Department	Computer Eng.	College	College of Engineering
Module Leader	Noor Mowafeq	e-mail	noor.mowafeq@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M. Sc.
Module Tutor	Shaymaa nazar	e-mail	sshaymaa266@uomosul.edu.iq
Peer Reviewer Name	Dr. Mazin H. Aziz	e-mail	mazin.haziz@uomosul.edu.iq
Scientific Committee Approval Date		Version Number	2.0

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	Computing Fundamentals and Office applications will be cover during this course. Computing Fundamentals includes computer hardware and software and how they work together. The course guide students to explore the windows operating system, change settings, and customize the desktop. Students also learn how to manage files and folders. On the other hand, the Key Applications focuses on two of the Microsoft Office applications: Word and Excel.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO1: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. CLO2: An ability to acquire and apply new knowledge and using appropriate learning strategies. CLO3: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. CLO4: learning the relations between the hardware and the software and the differences between them. CLO5: Identifying computer operating system and how it works. CLO6: Exploring Microsoft Office 2013. CLO7: Getting Started with Word Essentials, Editing and Formatting Documents. CLO8: Getting Started with Excel Essentials, Organizing and Enhancing Worksheets, Creating Formulas and Charting Data. CLO9: enabling effectively utilize computing tools for everyday tasks. By the end of the course, students will have developed the necessary skills and knowledge effectively use the computer and the office applications.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Computers and Operating System. • Software and Hardware Interaction. • Windows File Management. • Operating System Customization. • Computer Hardware. • Exploring Microsoft Office 2013. • Getting Started with Word Essentials. • Editing and Formatting Documents. • Getting Started with Excel Essentials. • Organizing and Enhancing Worksheets. • Creating Formulas and Charting Data.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy will be adopt in delivering this module is to encourage students' participation in the Lab activities, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, laboratory and by considering type of external search involving some of computer technology 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	12	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	15%(15)	continue	Lo# 1,2,7,9
	Assignments	2	5%(5)	continue	Lo# 1,2,7,9
	Lab	10	10%(10)	continue	all
	Summery test	2	10%(10)	continue	all
Summative assessment	Midterm Exam	2hr	10%(10)	9	LO# 1,2,3,4
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Computers and Operating System
Week 2	
Week 3	Software and Hardware Interaction
Week 4	
Week 5	Windows File Management
Week 6	Operating System Customization
Week 7	Computer Hardware
Week 8	Computer Hardware
Week 9	Monthly Exam
Week 10	Exploring Microsoft Office
Week 11	Getting Started with Word Essentials
Week 12	Editing and Formatting Documents
Week 13	Getting Started with Excel Essentials
Week 14	Organizing and Enhancing Worksheets
Week 15	Creating Formulas and Charting Data

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Computers and Operating System
Week 2	Computers and Operating System
Week 3	Software and Hardware Interaction
Week 4	Software and Hardware Interaction
Week 5	Windows File Management
Week 6	Operating System Customization
Week 7	Computer Hardware
Week 8	Computer Hardware
Week9	Monthly Lab Exam
Week 10	Exploring Microsoft Office

Week 11	Getting Started with Word Essentials
Week 12	Editing and Formatting Documents
Week 13	Getting Started with Excel Essentials
Week 14	Organizing and Enhancing Worksheets
Week 15	Creating Formulas and Charting Data

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	2015 Computer Literacy BASICS: A Comprehensive Guide to IC3 Connie Morrison, Dolores Wells, Lisa Ruffolo Cengage Learning. ISBN: 128576658X	No
Recommended Texts	1. IC3 GS5 Certification Guide Using Windows 10 & Office 2016, Print ISBN: 978-1-55332-463-8	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	Programing using C++ Language		Module Delivery
Module Type	Core learning activity		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	CO108		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	
Administering Department	Computer Eng.	College	College of Engineering
Module Leader	Sahar Khalid Ahmed	e-mail	sahar.ahmed@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Shaymaa Nazar	e-mail	sshaymaa226@uomosul.edu.iq
Peer Reviewer Name	Dr. Mazin H. Aziz	e-mail	mazin.haziz@uomosul.edu.iq
Scientific Committee Approval Date		Version Number	2.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1.This course introduces students to C++ programming language. 2.Understanding the effort needed to successfully develop engineering-oriented software.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO1: Understand the fundamentals of programming. Demonstrate knowledge of C++ syntax, keywords, and basic program construction principles. Apply the concepts of identifiers, variables, assignment statements, and input/output operations. CLO2: Develop competence in constructing arithmetic and logical expressions in C++. Utilize arithmetic operators, logical operators, and relational operators to manipulate data. Create efficient and accurate arithmetic and logical expressions in engineering-oriented software development. CLO3: Implement control flow structures in C++ programs. Design and implement selection statements (if, if-else, switch/-case) for decision making. Utilize loop statements (for, while, do-while) for repetitive tasks and iteration. CLO4: Apply functions. Design and implement user-defined functions to modularize code and improve code reusability. CLO5: Apply arrays, and vectors in C++ programming. Utilize arrays and vectors for efficient data storage and manipulation. CLO6: Understand and utilize structures in C++ programming. CLO7: An ability to identify, analyze, and solve engineering problems according to principles of engineering, science, and mathematics. CLO8: An ability to acquire and apply new knowledge and using appropriate learning strategies. CLO9: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. By achieving these outcomes, students will develop a solid understanding of These Course Learning Outcomes (CLOs) highlight the key objectives of the "Programming using C++" course, focusing on the fundamental concepts and skills necessary to develop engineering-oriented software using the C++ programming language. By achieving these outcomes, students will gain a solid understanding of C++ programming principles and be able to apply them effectively in practical programming scenarios.

Indicative Contents المحتويات الإرشادية	Introduction, Algorithms and Flowcharts, Basic program construction: Keywords, Identifiers, comments, variables, Assignment statements, Input and output Statements, Arithmetic and logical expression: Arithmetic operators, logical operators, relational operators, Selection statements: if, if-else, switch..case, Loop statements: for, while, do...while, functions, Arrays and Vectors, Structures and Structure type functions.
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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 type 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	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	16%(16)	4,7,9,12	Lo#1-5, Lo#7
	Assignments	2	4%(4)	6,10	Lo# 1-4, Lo#7-8
	Lab	1	15%(15)	continue	All
	Report	1	5%(5)	12	All
Summative assessment	Midterm Exam	2hr	10%(10)	11	Lo# 1-4, Lo#7
	Final Exam	3hr	50% (50)		Lo# 1-7
Total assessment			100% (100 Marks)	15	

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction
Week2	Algorithms and Flowcharts
Week 3	Basic program construction: Keywords, Identifiers, comments, variables, Assignment statements, Input and output Statements.
Week 4	Arithmetic and logical expression: Arithmetic operators, logical operators, relational operators.
Week 5	Selection statements: if, if-else, switch..case and ? operator.
Week6	
Week 7	Loop statements: for, while, do...while
Week8	
Week 9	functions
Week10	
Week 11	Mid-term Exam
Week 12	Arrays and Vectors
Week 13	
Week 14	Structures and Structure type functions
Week 15	

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	codeblock IDE (download, Installing, use)
Week 2	A simple C++ program using basic program construction (Identifiers, comments, variables, Assignment statements, output statement(cin)).
Week 3	A simple C++ program using input and output statements (cin, cout).
Week 4	Arithmetic and logical expression: Arithmetic operators, logical operators, relational operators.
Week 5	programs using selection statement (if-statement)
Week 6	programs using selection statements (if-statement and switch statement)
Week 7	programs using loop statements (for statement)
Week 8	programs using loop statements (while and do statements)

Week9	Functions (call by value)
Week10	Functions (call by reference)
Week11	One dimensional array
Week12	Two dimensional array
Week13	Examples
Week 14	Structures and Structure type functions
Week 15	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	1-C++ How to Program, 8/E, Paul Deitel & Harvey Deitel, ©2012 2-The Complete Reference in C++ By Herbert Schildt, 4th edition,2003.	No
Recommended Texts	The Complete Reference in C++ By Herbert Schildt, 4th edition,2003.	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	Arabic Language 1		Module Delivery	
Module Type	Basic learning activities		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar	
Module Code	UOM1011			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	1	Semester of Delivery		2
Administering Department	Computer Eng.	College	College of Engineering	
Module Leader	Dr. Muhammad Ali Ibrahim Hussein		e-mail	Mohammad.ali.a@uomosul.edu.iq
Module Leader's Acad. Title	Instructor	Module Leader's Qualification	Lecturer	
Module Tutor		e-mail		
Peer Reviewer Name	Dr. Mazin H. Aziz	e-mail	mazin.haziz@uomosul.edu.iq	
Scientific Committee Approval Date	May 23, 2025	Version Number	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The objective of this course is to enable students to correctly use Classical Arabic in reading and writing, to acquire the ability to speak eloquently and express themselves well, to develop their literary taste, to accustom them to using clear and correct expressions, and to help them avoid common mistakes.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO1: Introduce students to the importance of practicing proper writing conventions and expression in Classical Arabic. CLO2: Introduce students to the levels of the Arabic language system CLO3: Deepen students' connection to Arab and Islamic heritage. CLO4: To promote scientific research in the field of the Arabic language and its sciences for the preparation of studies and research papers. CLO5: Highlighting the beauty of the Arabic language, the breadth of its meanings, and the various ways of expressing meaning within it. CLO6: Enable students to identify and correct linguistic errors and use punctuation correctly. CLO7: Develop students' literary taste to appreciate the aesthetic aspects of style, imagery, and meaning in speech. CLO8: Introduce students to the most prominent figures in Arabic literature, including scholars and poets
Indicative Contents المحتويات الإرشادية	Part One: (6 hours) • Arabic Grammar • Parts of Speech • Primary and Secondary Inflectional Markers • The Difference Between Inflection and Syntax

	Part Two: (6 hours) • Basics of Writing a Research Paper or Text • Punctuation • Semantic differences between words Part Three: (6 hours) • Daily Exam • Subject and Predicate • Incomplete verbs and verb-like particles Part Four: (6 hours) • Common Mistakes • Rules for Writing the Hamza • The Zay and the Dhad Part Five: (8 hours) • Rules of numerals • Midterm Exam • Report Discussion
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary goal of Arabic language classes is to eliminate the difficulty and rigidity that may accompany some of these lessons, as well as to convey the necessary ideas and information to students in an understandable manner, setting aside individual differences among them. Among the key areas emphasized in the lectures are Arabic grammar rules, correct spelling, correction of common errors, literature, and the use of punctuation marks. The course consists of lectures, exams, in-class assignments, discussions, homework, and report writing.

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	1	14% (14)	4, 8, and 10	All
	H.W. Assignments Homework	1	6% (6)	6, 7	CLO4, CLO5, and CLO6
	Seminars/Reports Seminars and Reports	1	10% (10)	12	All
	On-site Assignment In-class assignments	1	10% (10)	6, 10	CLO4, CLO5, and CLO6
Summative assessment	Midterm Exam	2 hr	10% (10)	7	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic Arabic Grammar / Parts of Speech and Their Specific Markers
Week 2	Primary and Secondary Inflectional Markers
Week 3	Introducing Students to the Levels of the Arabic Language System / Grammar, Spelling, Error Correction, Preparing Literary and Scientific Texts and Reports
Week 4	Subject and Predicate
Week 5	Incomplete verbs
Week 6	Verbal Adverbs
Week 7	Punctuation Marks and Their Most Common Uses in Speech
Week 8	Basics of Writing a Research Paper or Text
Week 9	Rules for Writing the Hamza
Week 10	Common Speech Errors
Week 11	The letters "z" and "d" and how scholars distinguish between what is written with them

Week 12	Semantic Differences Between Similar Words
Week 13	Rules of Number
Week 14	The Relationship Between Number and Counted Objects: Masculine and Feminine
Week 15	Rules for distinguishing the count (the counted)
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	None
Week 2	None
Week 3	None
Week 4	None
Week 5	None
Week 6	None
Week 7	None

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Arabic for Non-Majors / Collection of Arabic Lessons / Ministerial Curriculum	Yes
Recommended Texts	Curriculum in Grammar and Syntax	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

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	Mathematics II		Module Delivery
Module Type	Core learning activity		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	CO110		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	
Administering Department	Computer Eng.	College	College of Engineering
Module Leader	Dr. Samar Ammar Yasir	e-mail	samarammar@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Ola Marwan Assim	e-mail	ola.marwan@uomosul.edu.iq
Peer Reviewer Name	Dr. Mazin H. Aziz	e-mail	mazin.haziz@uomosul.edu.iq
Scientific Committee Approval Date	21/10/2025	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This subject provides students with the basic skills of Mathematics, which is the core of many mathematical disciplines such as optimization, financial mathematics, statistics, simulation, etc. This subject introduces students to the fundamental concepts and skills of Mathematics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Course Learning Outcomes (CLOs) for the course "Mathematics 2": 1. An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2. An ability to acquire and apply new knowledge and using appropriate learning strategies. 3. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4. Apply the fundamental concepts of integration, including definite and indefinite integrals, to solve mathematical problems and calculate areas, volumes, surface areas, and lengths of curves. 5. Utilize techniques of integration, such as integration by parts, trigonometric integrals, and partial fractions, to simplify and solve complex mathematical expressions. 6. Understand and analyze the properties of transcendental functions, including the derivatives and integrals of exponential, logarithmic. 7. Analyze and evaluate the behavior and properties inverse trigonometric functions, to support mathematical modeling and problem-solving. These Course Learning Outcomes (CLOs) aim to equip students with the necessary skills and understanding of mathematics, specifically in integration, transcendental functions and applications of integration. By achieving these outcomes, students will have a strong foundation in mathematical concepts and techniques applicable to various disciplines within computer engineering, including optimization, financial mathematics, and simulation.
Indicative Contents	1. Integration 1.1. Mathematics and Area.

المحتويات الإرشادية	1.2. Formulas for Finite sums. 1.3. Definite Integrals. 1.4. The Fundamental Theorems of Integral Mathematics. 1.5. Indefinite Integrals. 1.6. Mathematics and Area. Integration by Substitution –Running the Chain Rule Backward 2. Applications of Definite Integrals 2.1. Areas between Curves- Mathematics and Area. 2.2. Volumes of Solids of Revolution-Disks and Washers 2.3. Cylindrical Shells-An Alternative to Washers. 2.4. Lengths of Curves in the Plane 2.5. Areas of Surfaces of Revolution. 3. The Mathematics of Transcendental Function 3.1. Inverse Function and Their Derivatives. 3.2. $\ln(x)$, $\exp$, and Logarithmic Differentiation and Integration. 3.3. Other Exponential and Logarithmic Function. 3.4. The Inverse Trigonometric Function. 3.5. Derivatives and Integration of Inverse Trigonometric Functions. 4. Techniques of Integration 4.1. Basic Integration Formulas. 4.2. Integration by Parts. 4.3. Tabular Integration. 4.4. Trigonometric Integrals. 4.5. Trigonometric Substitutions. 4.6. Rational Functions and Partial Fractions.
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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 type 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	97	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	6	20% (20)	3, 6, 9, 10,12	LO # 1,2,4-7
	Onsite Assignments	4	8% (4)	2, 5, 8, 12	LO # 4, 5,6,7
	Online Assignments	3	24% (12)	2, 5, 9, 13	LO # 1,2,4-7
	Reports	1	8% (4)	Continuous	LO # 3, 4-7
Summative assessment	Midterm Exam	2 hr	10% (10)	14	LO # 1,2,4-7
	Final Exam	3hr	50% (50)	15	LO # 1,2,4-7
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Integration: Mathematics and Area. Formulas for Finite sums.
Week 2	Definite and Indefinite Integrals. The Fundamental Theorems of Integral Mathematics. Mathematics and Area.
Week 3	Integration by Substitution –Running the Chain Rule Backward Quiz 1 + Applications of Definite Integrals: Areas between Curves- Mathematics and Area.
Week 4	Volumes of Solids of Revolution using Disk method Volumes of Solids of Revolution using Washer method
Week 5	Cylindrical Shells-An Alternative to Washers.
Week 6	Quiz 2 + Lengths of Curves in the Plane. Areas of Surfaces of Revolution.
Week 7	The Mathematics of Transcendental Function: Inverse Function and Their Derivatives.
Week 8	$\ln(x)$, $\exp$, and Logarithmic Differentiation and Integration. Other Exponential and Logarithmic Function.
Week 9	Quiz 3 + The Inverse Trigonometric Function. Derivatives and Integration of Inverse Trigonometric Functions.
Week 10	Quiz 4 + Techniques of Integration: Basic Integration Formulas.
Week 11	Integration by Parts. Tabular Integration.
Week 12	Quiz 4 + Trigonometric Integrals.
Week 13	Rational Functions and Partial Fractions.
Week 14	Mid Term Exam Preparatory week before the final Exam
Week 15	Final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Calculus by Thomas and Finny.	Yes
Recommended Texts	Thomas' Calculus: Early Transcendentals 13th Edition by George B. Thomas, 2014	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	Electrical Circuits Analysis 2		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	CO111		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	1	Semester of Delivery	2
Administering Department	Computer Engineering Dept.	College	Engineering
Module Leader	Ahmed Mamoon	e-mail	ahmedalkababji72@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Ban Aziz Asi	e-mail	ban.alzaydi@uomosul.edu.iq
Peer Reviewer Name	Dr. Mazin H. Aziz	e-mail	mazin.haziz@uomosul.edu.iq
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electrical Circuits Analysis 1	Semester	1
Co-requisites module	None	Semester	-

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

Module Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of circuit analysis theorems through the application of (superposition, source transformation, mesh analysis, Nodal analysis) 2. To Determine the conditions for maximum power transfer to any circuit element 3. To understand the importance of transients in RL, RC & RLC. 4. To understand the principals of Resonant circuits 5. To understand the principals of Three-phase circuits
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-CLO1: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2-CLO2: An ability to acquire and apply new knowledge and using appropriate learning strategies. 3-CLO3: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4-CLO4: Demonstrate a thorough understanding of circuit analysis theorems underlying Direct Current (DC) and Alternating Current (AC) electrical circuits. 5-CLO5: Apply circuit analysis theorems (superposition, source transformation, mesh analysis, Nodal analysis) 6-CLO6: Apply Thevenin's & Norton's theorem, maximum power transfer, both in DC and AC. 7-CLO7: Analyse transient responses of RL, RC and RLC for various circuit configurations. 8-CLO8: Get an introduction to Resonant circuits and Three-phase circuits. These CLOs emphasize the mastery of foundational concepts, principles, and analytical techniques required for the analysis of electrical circuits, particularly in the context of DC and AC circuits. Through the achievement of these learning outcomes, students will develop a solid understanding of circuit analysis and be prepared to apply their knowledge in more advanced electrical engineering courses and practical engineering scenarios
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Circuit Theory</u> DC circuits – circuit analysis theorems through the application of (superposition, source transformation, mesh analysis, Nodal analysis). [75 hrs]

	AC circuits – circuit analysis theorems through the application of (superposition, source transformation, mesh analysis, Nodal analysis). [75 hrs] Thevenin and Norton equivalent circuits, maximum power transfer, RMS and power dissipation. [15 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Introduction to Resonant circuits and Three-phase circuits. Revision problem classes [6 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 type of simple experiments involving some sampling activities that are interesting to the students.

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

Module Evaluation تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	8	16% (16)	2,4,6,7,9,10,12,14	LO # 1-8
	Assignments	2	10% (10)	4, 10	LO # 5,6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	4% (4)	10	LO # 5,8
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-8
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
	Semester 2
Week 1	Circuit theory: source transformation [ch3,5,8,9]
Week 2	Circuit theory: superposition [ch3,5,8,9] +quiz
Week 3	Circuit theory: Mesh analysis [ch3,5,8,9]
Week 4	Circuit theory: nodal analysis [ch3,5,8,9] +quiz
Week 5	Circuit theory: thevenin [ch3,5,8,9]
Week 6	Circuit theory: Norton's theorem [ch3,5,8,9] +quiz
Week 7	Circuit theory: maximum power transfer[ch3,5,8,9] +quiz
Week 8	Mid exam
Week 9	Steady-State power Analysis [ch10] +quiz
Week 10	Transient circuits: RL circuit's [ch7] +quiz
Week 11	Transient circuits: RC circuit's [ch7]
Week 12	Transient circuits: RLC circuit's [ch7] +quiz
Week 13	Resonant circuits [ch11] +quiz
Week 14	Three –phase circuits [ch11]
Week 15	Final exam

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

	Semester 2
Week 1	Lab 1: Superposition theory +quiz
Week 2	Lab 2: Mesh analysis +quiz
Week 3	Lab 3: Nodal analysis +quiz
Week 4	Lab 4:maximum power transfer
Week 5	Lab 5:maximum power transfer +quiz
Week 6	Lab 6: Theven's theory +quiz
Week 7	Lab 7 review the experiment
Week 8	Lab 8:Mid exam
Week 8	Lab 9: PN junction diode applications +quiz
Week 10	Lab 10: Transient state in RL circuits
Week 11	Lab 11: Transient state in RC circuits
Week 12	Lab 12: Transient state in RLC circuits +quiz
Week 13	Lab 13:review excrement
Week 14	Lab 14: quiz
Week 15	Lab 15: final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	BASIC ENGINEERING CIRCUIT ANALYSIS 10th Ed by J. Irwin	Yes
Recommended Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Digital System Fundamentals		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	CO112				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		1	Semester of Delivery		2
Administering Department		Computer Eng.	College	College of Engineering	
Module Leader	Dr. Shawkat Sabah Khairullah		e-mail	Shawkat.sabah@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Professor	Module Leader's Qualification		Ph.D.
Module Tutor	Farah Nazar Ibraheem		e-mail	farah_nazar80@uomosul.edu.iq	
Peer Reviewer Name		Dr. Mazin H. Aziz	e-mail	mazin.haziz@uomosul.edu.iq	
Scientific Committee Approval Date		10/08/2024	Version Number		1.0

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

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

Module Aims أهداف المادة الدراسية	The basic objective of this course is to give an introduction to digital logic design with an emphasis on practical design techniques and hardware circuit implementation. Topics include number representation in digital computers, Boolean algebra theorems, theory of Boolean logic functions, mapping techniques and logic function minimization, design of combinational and interactive digital circuits such as magnitude comparators, binary decoder and encoder, adder and subtractor logic circuits. An introduction on designing digital circuits using schematic capture and logic simulation is included.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Here are Seven Course Learning Outcomes (CLOs) for the course "Digital System Fundamentals": CLO 1: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. CLO 2: An ability to acquire and apply new knowledge and using appropriate learning strategies. CLO 3: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. CLO 4: Understand the fundamentals of number representation in digital computers, including binary arithmetic, binary representation of numbers, and conversions between the different number representations such as binary, octal, hexadecimal, and decimal. CLO 5: Apply properties of Boolean algebra theorems and truth table principles to simplify and analyze the Boolean logic functions of digital logic circuits. CLO 6: Utilize Karnaugh maps as a graphical tool for minimizing and optimizing Boolean logical expressions and truth tables. CLO 7: Design and analyze combinational, and interactive digital circuits such as magnitude comparators, binary adders and subtractors, binary decoder and encoder circuits and understand their applications. CLO 8: Demonstrate proficiency in the basic skills to design and fabricate digital logic circuits using discrete logic design and various logic gates and components. These course learning outcomes aim to ensure that students achieve a thorough understanding of the core concepts and techniques covered in the "Digital Logic Fundamentals" course. By the end of the course, students should be able to apply their knowledge and skills in the laboratory to solve problems, design and fabricate digital logic circuits, and comprehend the practical applications of these fundamental concepts in computer engineering.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following.
	Describing the basic logic operations, logic gates, truth table, basic logic function, logic symbol, and logic waveform [ch1,ch3]. Boolean algebra laws, logic simplification, sum of product (SOP) and product of sum (POS) logic expressions [ch4]. Proof theorems by applying properties of Boolean algebra laws and truth tables [ch4]. Number systems representation in digital computers, decimal numbers, binary numbers, octal numbers, hexadecimal numbers, binary coded decimal (BCD) [ch2]. Conversions of number systems in digital computers [ch2]. Unsigned and signed numbers representation in digital computers [ch2]. Minimization by Karnaugh maps [ch4]. Five, six variable Karnaugh map and multiple function minimization [ch4]. Variable-entered Karnaugh map, Implementing Boolean Logic Functions using Multiplexer-based logic [ch4, ch6]. Digital magnitude comparator circuits [ch6]. Binary adder and subtractor circuit, half-adder, full-adder, and ripple carry adder [ch6]. Digital binary decoder and encoder circuits [ch6]. Implementing Boolean logic functions using multiplexer-based logic [ch6].

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	16% (16)	3, 5, 9, 13	LO # 1, 2, 3, 4, 5, and 6
	Assignments	4	8% (8)	3, 5, 8, 10	LO # 1, 2, 3, 4, 5, 6 and 7
	Projects/Lab	1	6% (6)	Continuous	All
	Reports	1	10% (10)	2, 4, 6, 8, 10, 12, 14	All
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1, 2, 3, 4, 5, and 6
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الاسبوعي النظري

	Material Covered
Week 1	Introduction - Digital Logic Fundamentals
Week 2	The Operation of Basic Logic Gates, Truth Table, Logic Function, and Logic Waveform
Week 3	Boolean Algebra Laws, Sum of Product (SOP) and Product of Sum (POS) Logic Expressions
Week 4	Proof Theorems by Applying Properties of Boolean Algebra Laws and Truth Tables
Week 5	Number Systems Representation in Digital Computers
Week 6	Conversions of Number Systems in Digital Computers
Week 7	Minimization by Karnaugh Maps
Week 8	Mid-term Exam + Five, Six Variable Karnaugh Map and Multiple Function Minimization
Week 9	Implementing Boolean Logic Functions using Multiplexer-based logic
Week 10	Digital Magnitude Comparator Circuits
Week 11	Digital Binary Decoder and Encoder Circuits
Week 12	Binary Adder and Subtractor Circuit, Half-Adder, Full-Adder, and Ripple Carry Adder
Week 13	Variable-entered Karnaugh Map and Multiplexer Tree Implementation
Week 14	Unsigned and Signed Numbers representation in Digital Computers
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المناهج الاسبوعي للمختبر

	Material Covered
Week 1,2	Experiment (1): Understanding the Operation of Basic Logic Gates
Week 3,4	Experiment (2): Boolean Algebra Laws
Week 5,6	Experiment (3): Boolean Expression Simplification
Week 7,8	Experiment (4): Functional Minimization using Karnaugh Map
Week 9,10	Experiment (5): Design of Digital Multiplexer and Comparator Circuits
Week 11,12	Experiment (6): Implementation of Digital Decoder and Encoder Circuits
Week 13,14	Experiment (7): Implementation of Adder and Subtractor Circuits using Half-Adder and Full-Adder/Ripple Carry Adder Circuits
Week 15	Final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Modern digital design by Richard S. Sandige (McGraw-Hill)	YES
	Digital Fundamentals, 9 th Edition, Thomas L. Floyd, Pearson Prentice Hall, 2006.	NO
Recommended Texts	Introduction to Logic Design, 3rd edition, Alan Marcovitz, McGraw-Hill, 2010.	NO
	Digital Design, 5 th edition, Morris Mano, Pearson Prentice Hall, 2013.	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.				

جامعة الموصل / كلية الهندسة
قسم هندسة الحاسوب الدورة الثانية (2025-2026)
المستوى الثاني الفصل الدراسي الأول والفصل الدراسي الثاني

جمهورية العراق - وزارة التعليم العالي والبحث العلمي																				
جامعة الموصل																				
مكاويوس في هندسة الحاسوب (الدورة الثانية)																				
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمية - كل وحدة ائتمية = ٢٥ ساعة																				
المناهج الدراسية للعام 2025-2026																				
Republic of Iraq - Ministry of Higher Education and Scientific Research																				
University of Mosul																				
Bachelor's degree in Computer Engineering (Second cycle)																				
Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr																				
Program Curriculum (2025-2026)																				
Level	Semester	No.	Module Code	Module Name in English	اسم الوحدة الدراسية	Language	CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	SSWL (hr/w)	Tut (hr/w)	Semr (hr/w)	Exam (hr/sem)	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
Three		1	CO201	Mathematics III	رياضيات III	English	4		0	0				3	63	62	125	5.00	C	CO110
		2	CO202	Analog Electronics	الإلكترونيات تماثلية	English	3		3	3				3	93	57	150	6.00	C	CO111
		3	CO203	Microprocessors 1	معالجات دقيقة 1	English	2		3	3				3	79	72	150	6.00	C	
		4	UOM2022	English Language 2	اللغة الانكليزية 2	English	2		0					3	33	17	50	2.00	B	
		5	CO205	Object Oriented Programming	البرمجة بالاكائنات الموجهة	English	2		3	3				3	78	47	125	5.00	C	CO108
		6	CO206	Programmable Logic Design	تصميم منطق قابل للبرمجة	English	2		3					3	78	72	150	6.00	C	CO112
				Total			15	0	12	0	0	0	0	18	423	327	750	30.00		
UGII																				
Semester	No.	Module Code	Module Name in English	اسم الوحدة الدراسية	Language	CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	SSWL (hr/w)	Tut (hr/w)	Semr (hr/w)	Exam (hr/sem)	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code	
Four	1	CO207	Numerical Analysis	تحليلات عددية	English	2		0	0		1		3	48	27	75	3.00	C		
	2	CO208	Mathematics IV	رياضيات IV	English	4		0	0				3	63	62	125	5.00	C	CO201	
	3	CO209	Statistics	إحصاء	English	2		0					3	33	17	50	2.00	C		
	4	CO210	Digital Electronics	الإلكترونيات رقمية	English	2					1		3	48	52	100	4.00	C		
	5	CO211	Microprocessors 2	معالجات دقيقة 2	English	2		3					3	78	72	150	6.00	C	CO203	
	6	CO212	Data Structures	هياكل البيانات	English	2		3			1		3	93	57	150	6.00	C		
	7	UOM2050	Baath Regime Crimes in Iraq	جرائم نظام البعث في العراق	Arabic	2							3	33	17	50	2.00	B		
	8	UOM2012	Arabic Language 2	اللغة العربية 2	Arabic	2							3	33	17	50	2.00	B		
				Total			18	0	6	0	0	3	0	24	429	321	750	30.00		

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

2026-2025

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics III		Module Delivery
Module Type	Core		☐ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO201		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	Computer Eng.	College	College of Engineering
Module Leader	Dr.Sura Nawfal abdulrazzaq	e-mail	Sura.nawfal@uomosul.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Warqa'a Younis	e-mail	Warqaa.Younis@uomosul.edu.iq
Peer Reviewer Name	Dr. Rabee M. Hagem	e-mail	rabeehagem@uomosul.edu.iq
Scientific Committee Approval Date	10/08/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics II	Semester	CO110
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course gives the students some more advanced subjects in engineering mathematics as partial derivative, differential equations, Multiple Integrals, and vectors, this is to prepare the student for the next course and the other subjects like the numerical and engineering analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO1: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics CLO2: An ability to acquire and apply new knowledge and using appropriate learning strategies CLO3: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams, CLO4: Knowledge and Understanding: Students will acquire a solid understanding of fundamental mathematical concepts, principles, and techniques relevant to engineering. This includes topics such as calculus, algebra, trigonometry, and vectors. CLO5: Problem Solving: Students will develop problem-solving skills and be able to apply mathematical methods to analyze and solve engineering problems. They will learn how to model real-world situations mathematically and use appropriate mathematical techniques to arrive at solutions. CLO6: Mathematical Techniques: Students will learn a range of mathematical techniques and tools, such as differentiation, integration, solving equations, matrix operations, and complex numbers. They will be able to apply these techniques to solve engineering problems and interpret the results in the context of the problem. CLO7: Mathematical Modeling: Students will learn how to translate real-world engineering problems into mathematical models. They will understand the process of abstraction, simplification, and idealization necessary to represent complex engineering systems mathematically. CLO8: Comparative Mathematical Methods for Problem Solving: Students will work to select and apply at least two different mathematical methods to solve the same engineering problem. Each student will apply one method, and the others will compare and evaluate the results. They will learn to assess the reasonableness of solutions and interpret the mathematical results in the context of engineering applications.
Indicative Contents المحتويات الإرشادية	Limits and continuity , Partial derivatives (definitions, functions of more than two variables) Domain and Range (multi-variable functions) Chain rule for functions of two or three variables , Maxima and minima and saddle point Polar Coordinates, Areas and Lengths in Polar Coordinates. Double integral (properties, Cartesian integrals form) Double integral (Polar form, Changing Cartesian integrals into polar form) Triple integrals (Properties, Triple integrals in Cartesian coordinates)

	Triple integrals (Triple integrals in cylindrical coordinates) Triple integrals (Applications) Dot and cross product (applications: area of parallelogram ,angle between two vectors, vector projection) Vector functions: lines parametric equations, planes, spheres. Arc length in space , Curvature and Normal Vectors of a Curve Tangential and Normal Components of Acceleration
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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 type 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	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	6	24% (24)	4 ,6,10,11,14,15	LO #1,2,4-6
	Assignments	4	4% (4)	5, 7, 9, 13	LO # 4,5
	Class-works	2	6% (6)	5,11	LO # 4,5,6
	seminars	2	6% (6)	Continuous	LO # 2,3,4,8
Summative assessment	Midterm Exam	2 hr	10% (10)	11	LO # 1,2,4-7
	Final Exam	3hr	50% (50)	16	LO # 1,2,4-7
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري	
	Material Covered
Week 1	Limits and continuity (multi-variable functions)
Week 2	Domain and Range (multi-variable functions)
Week 3	Partial derivatives (definitions, functions of more than two variables), Chain rule for functions of two or three variables
Week 4	Critical Points in 3D space (Maxima and minima, and saddle points)
Week 5	Double integral (properties, Cartesian integrals form)
Week 6	Polar Coordinates, Areas and Lengths in Polar Coordinates.
Week 7	Double integral (Polar form, Changing Cartesian integrals into polar form)
Week 8	Triple integrals (Properties, Triple integrals in Cartesian coordinates)
Week 9	Triple integrals (Triple integrals in cylindrical coordinates)
Week 10	Triple integrals (Application)
Week 11	Introduction to Vectors: (definition, notation, properties, Vector algebra: addition, subtraction, multiplication)
Week 12	Dot and cross product (applications: area of parallelogram ,angle between two vectors, vector projection)
Week 13	Vector functions: lines parametric equations, planes, spheres.
Week 14	Arc length in space , Curvature and Normal Vectors of a Curve
Week 15	Tangential and Normal Components of Acceleration
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	[1] G. B. Thomas, E. Transcendentals, M. D. Weir, J. Hass, and C. Heil, <i>Calculus</i> , 13 th edition. 2014.	No
Recommended Texts	[2] E. Kreyszig, <i>Advance Engineering Mathematics</i> , 10 th edition. 2011. [3] Bird, John. <i>Understanding engineering mathematics</i> . Routledge, 2014	Yes
Websites		

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

Module Information					
معلومات المادة الدراسية					
Module Title	Analog Electronics		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	CO202				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		2	Semester of Delivery		3
Administering Department		Computer Eng.	College	College of Engineering	
Module Leader	Dr.Rabee M. Hagm		e-mail	rabeehagem@uomosul.edu.iq	
Module Leader’s Acad. Title		Assistant Professor	Module Leader’s Qualification		Ph.D.
Module Tutor	Nada Ismail		e-mail	nada.ismail@uomosul.edu.iq	
Peer Reviewer Name		Dr.Rabee M. Hagm	e-mail	rabeehagem@uomosul.edu.iq	
Scientific Committee Approval Date		11/08/2024	Version Number		1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electrical Circuits Analysis II	Semester	2
Co-requisites module	None	Semester	

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

Module Aims أهداف المادة الدراسية	This course covers the operating principles, analysis, design and applications of some semiconductor devices underpinning electronic systems. It builds on the foundational of the electrical concepts developed at level I and provides an in-depth exploration of important non-linear devices: diodes, bipolar junction transistors and field-effect transistors. Equivalent circuit models for these devices are developed and applied to the analysis and design of practical systems, such as voltage rectifiers and amplifiers. Important system concepts are introduced along the way, including calculating gains and frequency responses. Operational amplifier op-amp circuits and its applications in different practical circuits such as positive and negative feedback are presented in this course. The course includes a practical laboratory to apply the concepts and understand the main theoretical ideas..
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2. An ability to acquire and apply new knowledge and using appropriate learning strategies. 3. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams 4. Students will study different types of amplifiers, including common-emitter, common-base, and common-collector configurations for bipolar junction transistors (BJTs), as well as common-source, common-gate, and common-drain configurations for field-effect transistors (FETs). They will learn to analyze amplifier circuits, calculate gain and frequency response, and understand amplifier characteristics such as biasing, stability, and distortion. 5. Feedback Systems: Students will gain an understanding of feedback concepts and their applications in analog electronics. They will study the effects of negative feedback on amplifier performance, stability, and distortion reduction. Students will also learn to design and analyze feedback systems to achieve desired performance characteristics. 6. Operational Amplifiers: Students will learn about operational amplifiers (Op-amps), their characteristics, and their applications in analog circuits. They will study Op-amp circuits such as amplifiers, filters, comparators, and oscillators. Students will be able to design and analyze Op-amp circuits to meet specific requirements. 7. Frequency Response: Students will explore the frequency response of analog electronic circuits and devices. They will learn about concepts such as gain, bandwidth, resonance, and filters. Students will be able to design and analyze filters for specific frequency response requirements. 8. Laboratory Skills: Students will have hands-on experience in the laboratory with analog electronic circuits. They will learn to use test and measurement equipment, build and troubleshoot analog circuits, and validate theoretical concepts through practical experiments.
Indicative Contents	Semiconductor Materials and introduction to PN junction diode

المحتويات الإرشادية	pn junction diodes circuits and diode applications Zener diodes and its applications. - Bipolar junction transistors (BJT) - BJT configurations - DC response - Transistor biasing - Transistor biasing examples - AC response - Multistage Transistor and frequency response Midterm exam Review the exam questions - Introduction to FET and MOSFET - FET and MOSFET biasing - AC circuits for FET and MOSFET - Introduction to Operational Amplifier - OP applications I - OP applications II - Positive and Negative feedback circuits and examples
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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 type 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	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (10)	3 ,6,9,12	LO #1, 2,5,6,7
	Assignments	2	10% (10)	5, 10	LO # 3, 4,6
	Lab Exam	1	10% (10)	1-15	All
Summative assessment	Midterm Exam	2 hr	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	Semiconductor Materials and introduction to PN junction diode

Week 2	pn junction diodes circuits and diode applications
Week 3	Bipolar junction transistors (BJT) and BJT configurations
Week 4	DC response, Transistor biasing and Transistor biasing examples
Week 5	AC response, Multistage Transistor and frequency response
Week 6	Triple integrals (Properties, Triple integrals in Cartesian coordinates)
Week 7	Mid-term exam
Week 8	Introduction to FET and MOSFET
Week 9	FET and MOSFET biasing
Week 10	AC circuits for FET and MOSFET
Week 11	Introduction to Operational Amplifier
Week 12	OP applications I
Week 13	OP applications II
Week 14	Positive and Negative feedback circuits and examples I
Week 15	Positive and Negative feedback circuits and examples II
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي العملي	
Week	Material Covered
Weeks 1,2	Introduction to Diode and how to use the Mutism program
Week 3	Diode applications (clipping and clamping)
Week 4	Diode applications (Rectifying circuits)
Week 5	Common Emitter amplifier
Week 6	Common Base amplifier

Week 7	Amplifier frequency response
Week 8	Midterm practical exam
Week 9	FET and MOSFET characteristics
Week 10	FET and MOSFET amplifiers
Week 11	Operational Amplifier characteristics
Week 12	Operational Amplifier applications I,II
Weeks 13-15	Mini projects seminars
Week 16	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Electronic Devices, Thomas L. Floyd, 7th edition, 2017	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 Information			
معلومات المادة الدراسية			
Module Title	Microprocessor 1		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO203		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	Semester of Delivery	3
Administering Department	Computer Eng. Dept	College	College of Engineering
Module Leader	Dr. Mazin Hashim Aziz	e-mail	mazin.haziz@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	PhD
Module Tutor	Hamid Abdulaziz Mahmood	e-mail	hamedeng@uomosul.edu.iq
Peer Reviewer Name	Dr. Rabee M. Hagem	e-mail	rabeehagem@uomosul.edu.iq
Scientific Committee Approval Date	01/08/2024	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The aim of the Microprocessor 1 course is to provide students with a solid understanding of the 8086 architecture, instruction set, machine code, assembly coding, debugging techniques, and the use of INT services.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this course students will be able to: (1) An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. (2) An ability to acquire and apply new knowledge and using appropriate learning strategies. (3) An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. (4) Knowledge: understanding of the fundamental principles of the 8086 architecture, explain the instruction set and machine code representation of the 8086 Microprocessor, and Identify and describe the various debugging techniques used in assembly language programming. (5) Comprehension: Interpret and explain the internal architecture and organization of the 8086 Microprocessor, summarize and compare different addressing modes and instruction formats of it, and explain the purpose and functionality of different registers and flags within the 8086 Microprocessor. (6) Application: Apply the knowledge of the 8086 architecture to write assembly code for various operations and applications, utilize debugging techniques to identify and fix errors in assembly code, and apply the appropriate addressing modes and instruction formats to achieve desired outcomes in assembly programming. (7) Analysis: Analyze and evaluate assembly code to identify potential errors or optimizations, compare different debugging techniques and choose the most appropriate one for specific scenarios, and examine the effects of different addressing modes on program execution and memory usage. (8) Evaluation: Assess the effectiveness and efficiency of assembly code in achieving desired outcomes, analyze and evaluate the impact of different addressing modes on program performance and memory utilization, and make informed judgments and recommendations based on the evaluation of assembly code, debugging techniques, and addressing modes. (9) Creation: Design and develop complex assembly programs to solve specific problems or implement specific functionalities and create optimized and efficient assembly code by utilizing appropriate instructions and addressing modes.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Microprocessors: ➤ Overview of microprocessors and their significance in computing. ➤ Introduction to the 8086 Microprocessor and its historical context. 2. 8086 Architecture:

	➤ Understanding the internal architecture and organization of the 8086 Microprocessor. ➤ Representation of instructions in machine code. ➤ Instruction formats and addressing modes. 3. Assembly Coding: ➤ Introduction to assembly language programming. ➤ Writing assembly code for various operations and applications. ➤ Exploring data movement, arithmetic, logical, and control flow instructions. 4. Debugging Techniques: ➤ Overview of debugging tools and techniques for assembly language programming. ➤ Understanding common errors and how to identify and fix them. ➤ Step-by-step execution, breakpoints, and memory examination. 5. INT Services and Applications: ➤ Introduction to BIOS and DOS INT services and their role in interrupt-driven programming. ➤ Using INT services for input/output operations, timer handling, and other applications. ➤ Integration of INT services in assembly programs.
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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 type 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)		Structured SWL (h/w)	
الحمل الدراسي المنتظم للطالب خلال الفصل	78	الحمل الدراسي المنتظم للطالب أسبوعيا	5

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
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	5	10% (10)	5,8,10,12,13	LO #1, 2, 4, 5 and 9
	Assignments	2	8% (8)	6, 10	LO #1, 2, 4, 5 and 9
	Presentation	2	2% (2)	7,11	LO #1, 2, 4, 5 and 9
	Lab Report	4	10% (10)	5,7,11,13	LO # 3, 5-9
Summative assessment	Midterm Exam (theory)	2hr	10% (10)	14	LO #3, 5-9
	Midterm Exam (lab)	1hr	10% (10)	14	LO #4, 5 and 9
	Final Exam (theory)	3hr	40% (40)	15	All
	Final Exam (lab)	1hr	10% (10)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Microprocessors

Week 2	The Architecture and Buses of the 8086 Microprocessor
Week 3	The 8086 Microprocessor's Addressing modes
Week 4	The 8086 Microprocessor Instruction set, Debug, and MASM software
Week 5	The Data-transfer instructions' group
Week 6	The Logical and Shift & Rotate instructions' group
Week 7	The Loop and Branching instructions' group
Week 8	The Arithmetic instructions' group
Week 9	Evaluation Exam.
Week 10	The String instructions' group
Week 11	The Control instructions' group
Week 12	The BIOS and DOS Interrupts
Week 13	Machine language coding
Weeks 14	Course Summary Test
Week 15	Final Exam

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي العملي

	Material Covered
Weeks 1,2	Introduction to Debugging tools, Installation, and Debug Commands, and applications .
Week 3	Syntax debugger, Text editor, MASM and LINK usage.
Week 4	Data-transfer instructions' group experiment.
Week 5	Logical and Shift & Rotate instructions' group experiment.
Week 6	Loop and Branching instructions' group experiment.
Week 7	Arithmetic instructions' group experiment.
Week 8	The String instructions' group experiment.
Week 9	The Control instructions' group experiment.
Week 10	Writing and executing programs in assembly language experiment.
Week 11	Playing with VRAM.
Week 12	Evaluation Exam.
Weeks 13-14	Applications using BIOS and DOS Interrupts.
Week 15	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
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Required Texts	Walter Triebel and Avtar Singh, The 8088 and 8086 Microprocessors: programming, Interfacing, software, Hardware, Applications, 4th edition, prentice-Hall, 2002.	No
Recommended Texts	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 extensions: architecture, programming, and interfacing by: Barry B. Brey—8th ed.	No
Websites	https://www.eng.auburn.edu/~sylee/ee2220/8086_instruction_set.html	

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

Module Information			
معلومات المادة الدراسية			
Module Title	English Language-2		Module Delivery
Module Type	Basic learning activities		Theory ☒ Lecture Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOM2022		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	
Administering Department	Computer Eng.	College	College of Eng.
Module Leader	Basman Mahmood	e-mail	bm.alhafidh@uomosul.edu.iq
Module Leader's Acad. Title	Instructor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Mustafa Siham	e-mail	Mustafa.qassab@uomosul.edu.iq
Peer Reviewer Name	Dr. Rabee M. Hagem	e-mail	rabeehagem@uomosul.edu.iq
Scientific Committee Approval Date	30/10/2024	Version Number	2.0

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

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

Module Aims أهداف المادة الدراسية	1. Study grammar, (verb tenses, structure sentence, question words, adverbs and adjectives, quantity, articles, verb pattern, prepositions, comparative and superlative). 2. Learn Vocabulary, focus on all academic words specifically in environmental engineering field. 3. Study comprehensive reading in variety subjects. 4. Focus on listening and speaking using videos and conversation between students in class. 5. Study how to write an academic paragraph.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An ability to acquire and apply new knowledge and using appropriate learning strategies. 2. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 3. Comprehend and analyze various written and spoken texts: 4. Demonstrate the ability to understand the main ideas, key details, and nuances of different types of texts, including articles, essays, speeches, and dialogues. 5. Learn grammar specifically that help student to write and speak. 6. Learn new vocabulary and focus on academic word that related in environmental engineering field. 7. Learn the comprehensive reading. 8. Practice more on listening and speaking. 9. Learn how to write an academic paragraph.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. – <u>English Language</u> • Grammar/ Verb tenses and examples, structure sentence, question words, adverb and adjectives, articles, quantity, phrasal verbs, and comparative & superlatives, and certainty. [18 hrs.] • Practice on comprehensive reading. [4 hrs.] • Practice on Listening and Speaking. [4 hrs.] • Writing an academic paragraph and paraphrasing. [6hrs.]

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

Student Workload (SWL)			
الحمل الدراسي للطالب 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/N umber	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	8.11	LO #1, 3, 5, 7 and 9
	Assignments	2	10% (10)	2, 5, 8, 12	All
	OnsitAssignments	1	10%		All
	حلقات دراسية	1	10		All
Summative assessment	Midterm Exam	2 hr	10% (10)	9	LO # 1-6
	Final Exam	3hr	50% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Grammar / Verb tenses and examples (present, past, future) / Vocabulary / Reading, listening, speaking
Week 2	Grammar/ Verb tenses and examples (present) / Vocabulary / Reading, listening, speaking
Week 3	Grammar/ Verb tenses and examples (past) / Vocabulary / Reading, listening, speaking
Week 4	Grammar/ Quantity/ Vocabulary / Reading, listening, speaking
Week 5	Grammar/ Verb tenses and examples (future) / Vocabulary / Reading, listening, speaking
Week 6	Grammar/ Comparative & Superlatives / Vocabulary / Reading, listening, speaking
Week 7	Grammar/ Verb tenses and examples (present perfect) / Vocabulary / Reading, listening, speaking
Week 8	Grammar/ have to, should / Vocabulary / Reading, listening, speaking
Week 9	Midterm Exam
Week 10	Grammar/ Verb tenses and examples (past perfect) / Vocabulary / Reading, listening, speaking
Week 11	Grammar/ Verb tenses and examples (passive) / Vocabulary / Reading, listening, speaking
Week 12	Grammar/ Verb tenses and examples (present perfect continuous) / Vocabulary / Reading, listening, speaking
Week 13	Writing an academic paragraph / Reading, listening, speaking
Week 14	Grammar/ if condition / Vocabulary / Reading, listening, speaking
Week 15	Writing / Paraphrasing / Reading, listening, speaking

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Headway Pre-Intermediate Student's Book-Fourth Edition	Yes (text book)
	Headway Pre-Intermediate Student's Book-Fourth Edition	Yes
Websites	https://meet.google.com/yof-ngkn-ssc	

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

Module Information					
معلومات المادة الدراسية					
Module Title	Object Oriented Programming		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	CO205				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		2	Semester of Delivery		3
Administering Department		Computer Eng. Dept	College	College of Engineering	
Module Leader	Turkan Ahmed Khaleel		e-mail	turkan@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Professor	Module Leader's Qualification		Ph.D.
Module Tutor	1- Sahar Khalid Ahmed 2- Hiba Dhiya Ali		e-mail	sahar.ahmed@uomosul.edu.iq Hiba.dhiya@uomosul.edu.iq	
Peer Reviewer Name		Dr. Rabee M. Hagem	e-mail	rabeehagem@uomosul.edu.iq	
Scientific Committee Approval Date		10/08/2024	Version Number		1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CO108	Semester	2
Co-requisites module	None	Semester	

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

Module Aims أهداف المادة الدراسية	This module aims to provide an introduction to the fundamentals of object-oriented programming using C++.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this module, the student will be able to: CLO 1: An ability to identify, analyze, and solve complex programming problems using object-oriented principles, applying concepts from computer science, mathematics, and engineering. CLO 2: An ability to acquire and apply new knowledge in object-oriented programming, utilizing appropriate learning strategies to adapt to emerging technologies. CLO 3: An ability to participate and work professionally and ethically in various software development projects, functioning effectively within multidisciplinary teams. CLO 4: An ability to design and implement software applications using object-oriented programming principles, with a focus on reusability, efficiency, and scalability. CLO 5: An ability to evaluate and optimize object-oriented software designs, ensuring maintainability, extensibility, and performance in real-world applications. CLO 6: Apply object-oriented principles, such as encapsulation and inheritance, to design modular and maintainable software systems. CLO 7: Understand the characteristics of design patterns in object-oriented programming, including their applicability, structure, and impact on software architecture. CLO 8: Analyze and optimize object-oriented code, using appropriate tools and techniques to improve performance, reduce complexity, and ensure code quality.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. The course " Object Oriented Programming" provides students with the following: Objects and Classes, Encapsulation, Abstraction, Binding. Methods and Behaviour, Inheritance, and Multiple Inheritance.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	There are many teaching and learning activities including lectures, laboratories, and group projects. The assessment requires students to design OOP classes and hierarchies related to a specific problem, to implement a solution in the C++ language.

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Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 11	LO #1, 2 and 3
	Assignments	2	10% (10)	2, 12	LO # 1, 2, 3, and 4
	Lab	1	15% (15)	2,4,6,8,12	LO # 1, 2, 3, and 4
	Project	1	5% (5)	13	LO # 5, 6, and 8
Summative assessment	Midterm Exam	2hr	10% (10)	10	LO #1, 2, 3, and 4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

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	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري
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	Material Covered
Week 1	Introduction and review.
Week 2	Objects.
Week 3	Data Abstraction.
Week 4	Information Hiding & Encapsulation.
Week 5	Constructors, destructors, and object creation.
Week 6	Class Methods.
Week 7	Methods Overloading
Week 8	Inheritance
Week 9	Polymorphism.
Week 10	Abstract Classes
Week 11	Abstract Methods
Week 12	Exception Handling
Week 13	Presentation on coursework if it is necessary Students support
Week 14	Study week and preparations for assignment submission and Exams Students support.
Week 15	Final Exam

Delivery Plan (Weekly Syllabus)		
المنهاج الاسبوعي العملي		
Week	Practical Activity	Task
Week 1	Introduction to the Integrated Development Environment (IDE) like Codebook or Visual Studio.	Create a simple project and write a "Hello World" program.
Week 2	Understanding objects and creating simple classes.	Program a "Student" class with student data as variables.

Week 3	Applying the concept of Abstraction.	Program an interface with basic operations for "Student" such as "addStudent" and "removeStudent".
Week 4	Information hiding and Encapsulation.	Enhance the "Student" class with private variables and implement getters and setters.
Week 5	Implementing Constructors and Destructors.	Create a custom constructor and destructor in the "Student" class.
Week 6	Defining class methods.	Add methods to calculate student grades within the "Student" class.
Week 7	Method Overloading.	Create overloaded methods in the "Student" class with different parameters.
Week 8	Implementing Inheritance.	Create a "GraduateStudent" class that inherits from the "Student" class with additional variables and methods.
Week 9	Applying Polymorphism.	Implement polymorphism by creating varied methods in the parent and derived classes using generic types.
Week 10	Handling Abstract Classes.	Create an abstract "Person" class with "Student" and "Teacher" subclasses inheriting from it.
Week 11	Implementing Abstract Methods.	Add abstract methods to the "Person" class and implement them in the subclasses.
Week 12	Exception Handling.	Add exception handling in the "Student" class to manage errors for invalid data entry.
Week 13	Student support and project presentations (if necessary).	Students present their projects or parts of their programs.
Week 14	Review and student support for assignment submission and exam preparation.	Review projects and provide individual assistance.
Week 15	Final practical exam.	Practical exam covering all concepts learned throughout the course.

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Object-Oriented Programming in C++, Fourth Edition, by , Robert Lafore (Author), Waite Group,Sams Publishing,2002.	No
Recommended Texts	C++ programming an object oriented approach, by Admin , 2022 .	No
Websites		

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

Module Information					
معلومات المادة الدراسية					
Module Title	Programmable Logic Design		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	CO206				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level					Semester of Delivery
Administering Department		Computer Eng.	College	College of Engineering	
Module Leader	Dr. Shawkat Sabah Khairullah		e-mail	Shawkat.sabah@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Professor	Module Leader's Qualification		Ph.D.
Module Tutor	Farah Nazar Ibraheem		e-mail	farah_nazar80@uomosul.edu.iq	
Peer Reviewer Name		Dr. Rabee M. Hagem	e-mail	rabeehagem@uomosul.edu.iq	
Scientific Committee Approval Date		10/08/2024	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Digital System Fundamentals	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The basic objective of this course is to instruct the students the basic principles of modern digital systems and programmable logic design. Topics covered include design and analysis of clocked sequential digital circuits such as flip-flops, shift registers, counters, and pattern detectors; the architectural concepts of different programmable logic devices (PLDs); Hazards in combinational

	logic circuits and eliminating techniques; field programmable gate array (FPGA) design techniques using very high-speed circuit hardware description language (VHDL) and introduction to modeling, simulation, synthesis (with Xilinx, Altera, or Intel FPGAs). This course will present the syntax, structure, and data types used in HDLs and gain proficiency in writing basic HDL code.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Here are five Course Learning Outcomes (CLOs) for the course "Digital System Fundamentals": CLO 1: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. CLO 2: An ability to acquire and apply new knowledge and using appropriate learning strategies. CLO 3: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. CLO 4: Students will design and analyze clocked sequential and interactive digital circuits such as flip-flops, shift registers, counters, pattern detectors and understand their applications. CLO 5: Students will learn how to model basic combinational logic circuits such as logic gates, multiplexers, decoders, and other combinational circuits using hardware description languages (HDLs), such as VHDL. They will also be able to use VHDL for coding the basic sequential logic circuits, including latches, flip-flops, state machines, registers, and counters. CLO 6: Students will develop a solid understanding of the architectural concepts and programmable technologies for different types of programmable logic devices (PLDs) such as programmable read only memory (PROM), programmable array logic (PAL), programmable logic array (PLA), generic array logic (GAL), complex programmable logic design (CPLD), and field programmable gate array (FPGA). CLO 7: Students will understand the hazard in combinational logic circuits that caused by a deficiency in the digital system or external influences. There are basically two types of hazards: static and dynamic that can be eliminated using different mitigation methods. CLO 8: Students will gain skills in simulating and verifying HDL designs. They will learn to use simulation tools to test and validate their designs before implementation. They will gain an understanding of design abstraction techniques in HDL using structural modeling. They will learn how to divide a complex design into hierarchical modules and describe the interconnections between modules. CLO 9: Students will explore the process of hardware synthesis, which converts HDL descriptions into gate-level representations suitable for implementation on programmable logic devices. They will learn synthesis techniques and optimization strategies to achieve desired design performance and resource utilization. CLO 10: Students will learn how to realize combinational logic functions and implement synchronous sequential logic systems on PLD digital devices that typically use logic arrays as hardware platform, logic storage and programmable input output (I/O) capability.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Sequential Logic Design: Synchronous and Asynchronous Circuit Models, Latch and Flip-Flop [ch8]. Synchronous Sequential Logic Circuits: D Flip-Flop, J-K Flip-Flop, and T Flip-Flop [ch8]. Synchronous Register Design: serial-in/serial-out, serial-in/parallel-out, parallel-in/serial-out, parallel-in/parallel-out; Non-Binary Counters based on Shift Registers as ring counter, twisted ring counter, maximum length shift counter [ch9]. Analysis Tools: State Diagram (SD), Algorithmic State Machine (ASM) Chart, Transition Map, Race Condition, and Timing Diagram [ch8]. Clocked Synchronous Sequential Logic Circuits: Mealy, Moore, and Mixed Type State Machine Models [ch9]. Asynchronous and Synchronous Counter Design [ch9]. Introduction to VHDL: Language-based Design, VHDL Description and Simulation [ch1]. VHDL Code Structure: Entity and Architecture Declaration, Structural VHDL Model Components [ch2]. Sequential and Concurrent VHDL Statements [ch4, ch5]. VHDL State machines, implementation, and simulation results, VHDL Data types: predefined and user-defined, operators [ch3, ch4, ch8]. Introduction to Programmable Logic Devices: Taxonomy, Implementation Technology Trade-offs [ch7]. Implementing Logic Functions using PLDs, PROM, FPGA Structure Design [ch7]. Basic Principles of Programmable Logic Devices: PAL, PLA, GAL/CPLD [ch7]. Hazards in Combinational Logic Circuits and Eliminating Techniques; function hazards; logic hazards [ch7].
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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 type 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 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	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
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	4	16% (16)	3, 5, 7, 11	LO # 1, 2, 3, 4, 5, and 6
	Assignments	4	8% (8)	2, 4, 7, 10	LO # 1, 2, 3, 4, 5, 6, and 7
	Projects/Lab.	1	6% (6)	Continuous	All
	Reports	1	10% (10)	2, 4, 6, 8, 10, 12, 14	LO # 1, 2, 3, 4, 5, 8, and 9
Summative assessment	Midterm Exam	2 hr	10% (10)	9	LO # 1, 2, 3, 4, 5, and 6
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Sequential Logic Design: Synchronous and Asynchronous Circuit Models, Latch and Flip-Flop
Week 2	Synchronous Sequential Logic Circuits: D Flip-Flop, J-K Flip-Flop, and T Flip-Flop
Week 3	Synchronous Register Design: serial-in/serial-out, serial-in/parallel-out, parallel-in/serial-out, parallel-in/parallel-out, and Non-Binary Counters based on Shift Registers
Week 4	Analysis Tools: State Diagram (SD), Algorithmic State Machine (ASM) Chart, Transition Map, Race Condition, and Timing Diagram
Week 5	Clocked Synchronous Sequential Logic Circuits: Mealy and Moore State Machine Models
Week 6	Introduction to VHDL: Language-based Design, VHDL Description and Simulation
Week 7	VHDL Code Structure: Entity and Architecture Declaration, Structural VHDL Model Components
Week 8	Mid-term Exam + Sequential and Concurrent VHDL Statements
Week 9	VHDL State machines, implementation, and simulation results, VHDL Data types: predefined and user-defined, operators
Week 10	Introduction to Programmable Logic Devices: Taxonomy, Implementation Technology Trade-offs

Week 11	Implementing Logic Functions using PLDs, PROM, FPGA Structure Design
Week 12	Basic Principles of Programmable Logic Devices: PAL, PLA, GAL/CPLD
Week 13	Hazards in Combinational Logic Circuits and Eliminating Techniques
Week 14	Asynchronous and Synchronous Counter Design
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1, 2	Experiment (1): Synthesis and Understanding the Operation of Latch, D Flip-Flop, J-K Flip-Flop, and T Flip-Flop
Week 3, 4	Experiment (2): Design and Understanding the Operation of Shift Registers and Synchronous Counter Logic Circuits
Week 5, 6	Experiment (3): Using (Xilinx, Altera, or Intel FPGAs) Simulator as a Modeling Design, Synthesis, and Analysis Tool for Modeling Basic Combinational Components: Logic Gates, Multiplexers in VHDL
Week 7, 8	Experiment (4): Modeling Basic Combinational Components: Decoders and Encoders in VHDL
Week 9, 10	Experiment (5): Structural VHDL
Week 11, 12	Experiment (6): Modeling Basic Sequential Components: Latches, Flip-Flops, Shift Registers, Counters in VHDL
Week 13, 14	Experiment (7): VHDL State Machine
Week 15	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Modern digital design by Richard S. Sandige (McGraw-Hill)	YES
	Voinci A. pedroni, "Circuit design with VHDL", MIT press, Cambridge, London 2004.	NO
	Thom A.S. "digital with CPLA application and VHDL.	NO
Recommended Texts	Introduction to Logic Design, 3rd edition, Alan Marcovitz, McGraw-Hill, 2010.	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 Information					
معلومات المادة الدراسية					
Module Title	Numerical Analysis		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	CE207				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		2			Semester of Delivery
Administering Department		Computer Eng. Dept	College	College of Engineering	
Module Leader	Dr. Ina’am Fathi Khudher		e-mail	inam.fathi@uomosul.edu.iq	
Module Leader’s Acad. Title		Assistant Professor	Module Leader’s Qualification		PhD.
Module Tutor			e-mail		
Peer Reviewer Name		Dr. Rabee M. Hagem	e-mail	rabeehagem@uomosul.edu.iq	
Scientific Committee Approval Date		17/04/2024	Version Number		1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The course "Computational Methods for Data Analysis" is designed to provide students in the Bachelor of Science in Computer Engineering program with a

	solid foundation in numerical analysis. Help the student to develop and investigate of numerical methods, which provide the transition from the mathematical model of a problem (the equations or functions obtained in calculus or algebra., etc. to an algorithm which we can be solved numerically and programmed to get fast solution.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. List theories and concepts used in Numerical Analysis. 2. Classifying the numerical techniques to compute approximate solutions of linear and nonlinear equations and differential equations. 3. Apply numerical techniques for interpolation, differentiation quadrature problems. 4. Analyze errors arising in numerical computation of solutions to mathematical and applied problems and execute some problems. 5. Compare results for numerical root finding methods.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Numerical Methods for Data and error Analysis. Numerical Methods for linear Data Analysis. Numerical Methods for non- linear Data Analysis. Interpolation and extrapolation. Numerical integration. Numerical differentiation. Regression analysis.

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem)	31	Structured SWL (h/w)	2

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	44	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	24% (24)	5, 10	LO #2, 3, 8 and 9
	Assignments	2	10% (10)	2, 12	LO # 2, 4, 5 and 9
	Report	1	6% (6)	13	LO # 5, 8 , 9 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Numerical Methods
Week 2	Introduction to Data and error Analysis
Week 3	Concepts and role for the numerical method in engineering, approximations, and errors, the definition of Round-off error and truncation error, absolute and relative true/approximation error

Week 4	Numerical Methods for non- linear Data Analysis
Week 5	Numerical Solution of Nonlinear Algebraic Equations (Roots of Equations): Bracketing Methods (Graphical, Bisection, and False-Position method).
Week 6	Numerical Methods for linear Data Analysis
Week 7	Numerical Solution of linear algebraic equations (system): the difference between the direct and indirect methods, Singular and ill/well-conditioned system, Partial and complete Pivoting, Convergence Criteria, Jacobi iterative method.
Week 8	Open Methods (Simple fixed-point iteration and Newton-Raphson and secant methods).
Week 9	The gauss-Seidel iterative method, Gauss-Seidel iterative with the relaxation factor method. Tri-diagonal systems and its solution.
Week 10	Interpolation and extrapolation
Week 11	The cubic version of Lagrangian Interpolation, cubic spline Interpolation (Cheney and Kincaid Formula). Tri-diagonal systems and its solution
Week 12	Numerical integration
Week 13	Numerical differentiation
Week 14	Regression
Week 15	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Numerical Analysis Using Matlab and Excel, Steven T. Karris, Applied Numerical Methods with MATLAB® for Engineers and Scientists, Steven C. Chapra, Fourth Edition, 2017.	No
Recommended Texts	1-Leader, Jeffery J. Numerical analysis and scientific computation. CRC Press, 2022. 2-Numerical Analysis Using Matlab and Excel, Steven T. Karris, Third Edition, 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 Information			
معلومات المادة الدراسية			
Module Title	Mathematics IV		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO208		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	4
Administering Department	Computer Eng.	College	College of Engineering
Module Leader	Warqaa Younis Ibrahim	e-mail	warqaa.younis@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Noor Mowafq	e-mail	noor.mowafeq@uomosul.edu.iq
Peer Reviewer Name	Dr. Rabee Hagem	e-mail	rabeehagem@uomosul.edu.iq
Scientific Committee Approval Date	21/04/2025	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	• This course gives the students the ability to solve and investigate differential equations using different methods, two types of differential equations will be covered (1st order and second order, linear and non-linear), in doing so, the students will gain an advantage for the next courses in that some signal processing and control system problems that will be easier to solve. Also, the Laplace transform can be analyzed and more information about this transform can be gained and investigated • To develop mathematical skills so that students are able to apply mathematical methods & principles in solving problems from Engineering fields. • To make aware students of the importance and symbiosis between Mathematics and Engineering
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2. Ability to solve Laplace transform problems with knowledge of their properties. 3. Solve the linear and non-linear differential equations 1st order and higher order equations, and choose appropriate procedures to solve them. 4. An ability to acquire and apply new knowledge and using appropriate learning strategies. 5. Evaluate and solve real-world problems, like electrical circuits, harmonic oscillators, and mechanical systems. 6. Compare and examine the results when using different methods to solve the problems like separable, exact, linear, and homogeneous. 7. The ability to solve problems in a team and cooperate to solve thorny issues. 8. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Laplace transform, Laplace transform properties and application, Laplace Inverse Transform, Laplace transform of unit step function. 1st Shifting theorem (Translation in S- domain), 2nd Shifting theorem (Translation in Time), Convolution Theorem. Solution of Differential Equations by Laplace Transformation. Applications of Laplace Transform. Definition and Classification of differential equation DE (ordinary and partial, order, degree, Linear and non-linear). Solutions of differential equations (general and particular solutions). 1st order ordinary DEs (Linear, Separable Homogeneous, Exact, Non-Homogeneous) 2nd order ordinary DEs (Linear 2nd order DEs with constant coefficients, Undetermined coefficients method, Variable of parameter method, 2nd order DEs with variable coefficients). Application of second order ordinary differential equations.

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Learning and Teaching Strategies	
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 activities that are interesting to the students

Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ أسبوعا			
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	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	3,6, 10,13	LO # 1 -6
	Home works	3	8% (8)	2,7,11	LO # 2-6
	Class work	2	8% (8)	5,12	LO # 2-6
	Report	1	4% (4)	14	LO # 7,8

Summative assessment	Midterm Exam	2hr	10%(10)	11	LO # 1 -6
	Final Exam	3hr	50% (50)	16	LO #1 -8
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Laplace transform properties and state application
Week 2	Laplace transform table
Week 3	1 st Shifting theorem (Translation in S- domain) 2 nd Shifting theorem (Translation in Time) Convolution Theorem
Week 4	Unit step function, Initial and final value theorems.
Week 5	Inverse Laplace Transform.
Week 6	Solution of Differential Equations by Laplace Transformation
Week 7	Applications of LT.
Week 8	Definition and Classification of differential equation DE (ordinary and partial, order, degree, Linear and non-linear).
Week 9	Solutions of differential equations (general and particular solutions)
Week 10	1 st order ordinary DEs (Linear, separable homogeneous)
Week 11	1 st order ordinary DEs (Exact, not Exact, and Nonhomogeneous)
Week 12	Initial value problems, Boundary values problems of 2 nd ODEs.,
Week 13	2 nd order ordinary DEs(Linear 2 nd order DEs with constant coefficients,
Week 14	Undetermined Coefficients method,
Week 15	2 nd order DEs with Variable of parameter method, variable coefficients
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	[1] G. B. Thomas, E. Transcendentals, M. D. Weir, J. Hass, and C. Heil, "Calculus", 13th edition. 2014. [2] E. Kreyszig, Advance Engineering Mathematics, 10th edition. 2011.	No
Recommended Texts	Dennis G. Zill, "Advanced Engineering Mathematics", 6 th edition 2017. John Bird, "Understanding Engineering Mathematics", 1 st edition 2014.	No
Websites		

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

Module Information			
معلومات المادة الدراسية			
Module Title	Statistics		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO209		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	
Administering Department	Computer Eng. Dept	College	College of Engineering
Module Leader	Dr. amar Idrees daood	e-mail	amar.daood@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Professor	Module Leader's Qualification	Ph.D
Module Tutor	Akram Abdul Mawjood Dawood	e-mail	akram.dawood@uomosul.edu.iq
Peer Reviewer Name	Dr. Rabee M. Hagem	e-mail	rabeehagem@uomosul.edu.iq
Scientific Committee Approval Date	6/9/2024	Version Number	1.0

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

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

Module Aims أهداف المادة الدراسية	The course "Statistics" is designed to provide students in the Bachelor of Science in Computer Engineering program with a solid foundation in statistics. This course combines key concepts and techniques from both disciplines to equip students with the necessary tools to analyze and interpret data in various engineering and computational contexts.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	6. An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 7. An ability to acquire and apply new knowledge and using appropriate learning strategies. 8. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams 9. Learn all basic mathematical of statistics and probability. 10. Understand and analyze dataset. 11. Compute statistics measurements to conclude the distribution of the collected data 12. Perform conducting predication analysis which can be applied into data mining. 13. Use the techniques and skills to design and analysis system using the engineering tools to provide better description of real-world data.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. The course "Statistics" provides students with a comprehensive understanding of statistics, focusing on their application in computer engineering. Students will develop a strong foundation in data analysis techniques, enabling them to effectively analyze and interpret data in real-world engineering scenarios. The course will provide the following topics: Introduction to Data Analysis. Descriptive Statistics, Measures of central tendency (mean, median, mode), Measures of dispersion (variance, standard deviation, range). Data visualization techniques (histograms, box plots, scatter plots). Probability Theory, Fundamentals of probability. Conditional probability, Bayes rules for Data Mining and Machine Learning. Discrete and continuous probability distributions (binomial, normal, exponential). Probability density and cumulative distribution functions.

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.
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Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ أسبوعا			
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	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	25% (25)	3,5,7, 10,12	LO # 3, 4, 5, 6 ,7, and 8
	Homework Assignments	2	6% (5)	2, 12	LO # 1, 2,
	Onsite Assignments	2	4% (5)	2,13	LO # 3, 4
	Report	1	5% (5)	13	LO # 5-8
	Midterm Exam	2 hr	10% (10)	9	LO # 1-8

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Data Analysis
Week 2	Descriptive Statistics, Measures of central tendency (mean, median, mode), Measures of dispersion (variance, standard deviation, range)
Week 3	Data visualization techniques (histograms, box plots, scatter plots)
Week 4	Probability Theory, Fundamentals of probability
Week 5	Sets and probabilistic models, axioms of probability, rule of Probability
Week 6	The definition of conditional probability and their properties
Week 7	Multiplication rule, total probability theorem, Bayes' theorem
Week 8	Three events, mutually and non-mutually events
Week 9	Counting, permutation, combination
Week 10	The definition and classification of random variable (Discrete and Continuous), type of discrete distribution.
Week 11	Discrete probability distributions, Binomial and Poisson Distribution.
Week 12	Continuous distribution,
Week 13	Probability density and cumulative distribution functions, normal distribution
Week 14	Test of hypothesis, types of errors in hypothesis testing, hypothesis tests of means.
Week 15	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1-Introduction to Statistics, K. M. AL_Rawi, Second Edition	No
Recommended Texts	1- Introduction to Probability and Statistics for Engineers, Holický, Milan	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

Module Information			
معلومات المادة الدراسية			
Module Title	Digital Electronics		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	CO210		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	2	Semester of Delivery	
Administering Department	Computer Eng. Dept	College	College of Engineering
Module Leader	Modhar Ahmed Hammoudy	e-mail	modharhammoudy@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Nada Ismail Najim	e-mail	nada.ismail@uomosul.edu.iq
Peer Reviewer Name	Dr. Rabee M. Hagem	e-mail	rabeehagem@uomosul.edu.iq
Scientific Committee Approval Date	01/08/2024	Version Number	2.0

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
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أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1.To develop problem solving skills and understanding of digital electronics principles through the application of (Kirchhoff's theorems). 2.To determine the static power consumption of any gate. 3.To understand the importance of noise margins. 4.To understand the principals of figure of merits. 5.To determine the fan out of any gate.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-CLO1: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2-CLO2: An ability to acquire and apply new knowledge and using appropriate learning strategies. 3-CLO3: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4-CLO4: Naming all the Families (Types) of digital electronics circuits and the different between them. 5-CLO5: Using the basic concepts of electrical and electronic analysis to determine the power consumption, number of load circuits and the logic voltage levels for the logic gates. 6-CLO6: Monitoring the figure of merit of the logic gates types, select the suitable logic design after summarizing the different types of logic gates families. 7-CLO7: Ability of deconstruct any digital logic circuit to evaluate the electrical and logical magnitudes. 8-CLO8: Designing a new digital logic circuit to perform a certain duty.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following: This course focuses on meaning of digital electronics, and the use of electronic devices to design the digital gates. Verifying the logic families' types and the noise margins, power dissipations, fan –in and fan – out calculations for all types of digital gates. The course includes activities and exercises that guide students to interface and deal with many problems issues in the designing of digital electronics logic gates so it will be easier to face such of these problems in the future. Introduction to digital electronics and the digital IC characteristics, Resistor diode logic, Resistor transistor logic, Diode transistor logic, TTL logic, Emitter coupled logic. The Field effect transistor, MOSFET logic circuits design and analysis, NMOS and PMOS logic circuits, Complementary Metal Oxide CMOS logic circuits, Sequential MOS logic circuits Regenerative logic circuits, Semiconductor memories.
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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 experiments, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and labs by considering type of simple experiments involving some designing 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	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.5

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100
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Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	6	24% (24)	6,7,8,9,10,11	LO #1-8
	Assignments	1	4% (4)	11	LO # 1-3
	Projects	1	8% (8)	12	LO # 1-3
	Report	1	4% (4)	14	LO # 1-8
Summative assessment	Midterm Exam	2hr	10% (10)	13	LO # 1-8
	Final Exam	3hr	50% (50)	15	LO # 1-8
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to digital electronics and the digital IC characteristics
Week 2	Resistor diode logic RDL
Week 3	Resistor transistor logic RTL
Week 4	Diode transistor logic DTL
Week 5	Transistor transistor logic TTL
Week 6	Emitter coupled logic ECL , I ² L
Week 7	The Field effect transistor FET
Week 8	MOSFET logic circuits design and analysis
Week 9	NMOS and PMOS logic circuits
Week 10	Complementary Metal Oxide CMOS logic circuits
Week 11	Sequential MOS logic circuits
Week 12	Regenerative logic circuits
Week 13	Term exam

Week 14	Semiconductor memories
Week 15	Final exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	"Digital Integrated Circuits Analysis and Design" by: John E. Ayers.2004	No
Recommended Texts	1. "Analysis and Design of Digital Integrated Circuits" by: David A. Hodges. 1988 2.Lab Manual , LTSPICE Design Tool.	No
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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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Information			
معلومات المادة الدراسية			
Module Title	Microprocessor 2		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	CO211		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level		2	
Administering Department		Computer Eng. Dept	College
			College of Engineering
Module Leader	Dr. Mazin Hashim Aziz		e-mail
			mazin.haziz@uomosul.edu.iq
Module Leader's Acad. Title		Assistant Professor	Module Leader's Qualification
			PhD
Module Tutor	Hamid Abdulaziz Mahmood		e-mail
			hamedeng@uomosul.edu.iq
Peer Reviewer Name		Dr. Rabee M. Hagem	e-mail
			rabeehagem@uomosul.edu.iq
Scientific Committee Approval Date		01/08/2024	Version Number
			1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Microprocessor 1		Semester
			3
Co-requisites module	None		Semester

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	The objective of this course is to integrate with the prerequisite course (Microprocessor I) by introducing the signals and functions of the 8086 Microprocessor. It covers the design of interface circuits with memories and basic input/output devices, and provides hands-on experience through simulation tools in the Microprocessor LAB. The course also covers different register types within the 80X86 Microprocessor family, and provides an overview of math coprocessing, real and protected modes. Additionally, it includes an introduction to MMX technology and a brief overview of various architectures utilized in the development of the 80X86 Microprocessor family.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this course students will be able to: (10) An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. (11) An ability to acquire and apply new knowledge and using appropriate learning strategies. (12) An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. (13) Knowledge: Recognize different microprocessor signals, describe the importance of address decoding, identify the importance of the math coprocessor, describe the evolution of the registers for the 80X86 family, and name the MMX technology usage. (14) Comprehension: Explain the differences between real mode and protected mode, summarize the basic architecture development of the 80X86 family, and exemplify floating point data structure. (15) Application: Implement the interface circuits using the Proteus simulation design suite. (16) Analysis: Integrate the 8086 Microprocessor, memories, and simple input/output devices via interfacing circuits. (17) Evaluation: Monitor the digital signals of the Microprocessors and its interface circuits using the virtual devices of the Proteus design suite. (18) Creation: Design the interface circuits between the 8086 Microprocessor and the memories and basic input/output devices.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 6. Introduction to the 8086 Microprocessor: Explanation of signals and functions of the 8086 Microprocessor. 7. Interface Circuit Design: ➤ Designing interface circuits for connecting memories to the 8086 Microprocessor. ➤ Designing interface circuits for basic input/output devices. ➤ Hands-on experience in implementing and testing interface circuits using simulation tools in the Microprocessor LAB. 8. Register Types in the 80X86 Microprocessor Family: ➤ Understanding different types of registers within the 80X86 Microprocessor family. ➤ Register organization and usage in programming with the 80X86 Microprocessor. ➤ Understanding real mode and protected mode in the 80X86 Microprocessor. ➤ Differences between real mode and protected mode and their implications. ➤ Memory segmentation and paging. 9. Math Coprocessing, Real, and Protected Modes:

	➤ Data types and floating-point basics. ➤ Overview of math coprocessing instructions and their usage. ➤ Understanding the internal architecture of the Math Coprocessor.
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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 type 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	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	72	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	5
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	5	10% (10)	5,8,10,12,13	LO #1, 2, 4, 5 and 9
	Assignments	2	8% (8)	6, 10	LO #1, 2, 4, 5 and 9

	Presentation	2	2% (2)	7,11	LO #1, 2, 4, 5 and 9
	Lab Report	4	10% (10)	5,7,11,13	LO # 3, 5-9
Summative assessment	Midterm Exam (theory)	2hr	10% (10)	14	LO #3, 5-9
	Midterm Exam (lab)	1hr	10% (10)	14	LO #4, 5 and 9
	Final Exam (theory)	3hr	40% (40)	15	All
	Final Exam (lab)	1hr	10% (10)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	The 8086 Microprocessor Pins and Signals.
Weeks 2,3	The 8086 Microprocessor's address decoding and memory interface.
Week 4	Memory Expansion.
Weeks 5,6	The Basic Input / Output Interfaces to the 8086 Microprocessor.
Week 7	The 8X86 Registers (16, 32, and 64-bits).
Week 8	Introduction to Protected Mode.
Week 9	Memory segmentation and paging
Week 10	Evaluation Exam.
Week 11	Arithmetic Co-processor: Data Formats.
Week 12	Arithmetic Co-processor: 80x87 Architecture.
Week 13	Arithmetic Co-processor: Instruction Set.
Week 14	Course Summary Test
Week 15	Final Exam

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي العملي	
	Material Covered
Week 1	Introduction to the Design and Simulation Suit (Proteus).

Week 2	Installation and basic operation of the Proteus.
Week 3	Design and simulation of a simple logic circuit.
Week 4	Design and simulation of a stand-alone 8086 Microprocessor to monitor its signals and buses.
Weeks 5,6	Design and simulation of an 8086 Microprocessor bus interfacing.
Weeks 7,8	Design and simulation of an 8086 Microprocessor address decoding.
Weeks 9-11	Design and simulation of an 8086 Microprocessor memory interfacing.
Week 12	Evaluation Exam.
Weeks 13	Design and simulation of an 8086 Microprocessor Basic Input / Output interfacing.
Week 14	Design and simulation of an 8086 Microprocessor Memory and Input / Output interfacing.
Week 15	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Walter Triebel and Avtar Singh, The 8088 and 8086 Microprocessors: programming, Interfacing, software, Hardware, Applications, 4th edition, prentice-Hall, 2002.	No
Recommended Texts	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 extensions: architecture, programming, and interfacing by: Barry B. Brey—8th ed.	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

Module Information					
معلومات المادة الدراسية					
Module Title	Data Structures		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	CO212				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		2	Semester of Delivery		4
Administering Department		Computer Eng. Dept	College	College of Engineering	
Module Leader	Turkan Ahmed Khaleel		e-mail	turkan@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Professor	Module Leader's Qualification		Ph.D.
Module Tutor	Hiba Dhiya Ali		e-mail	hiba.dhiya@uomosul.edu.iq	
Peer Reviewer Name		Dr. Rabee M. Hagem	e-mail	rabeehagem@uomosul.edu.iq	
Scientific Committee Approval Date		10/08/2024	Version Number		1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The module aims to introduce students to a wide variety of data structures and algorithms. It provides students with a coherent knowledge of techniques for implementing data structures and algorithms. It also discusses different data structures

	and algorithms' complexity, advantages, and disadvantages. Finally, it introduces the main algorithms for fundamental tasks such as sorting and searching.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	CLO 1: An ability to identify, analyze, and solve complex problems in data structures and algorithms, applying principles of computer science, mathematics, and engineering. CLO 2: An ability to acquire and apply new knowledge in data structures and algorithms using appropriate learning strategies to adapt to evolving technologies. CLO 3: An ability to participate and work professionally and ethically in various projects, effectively functioning within multidisciplinary teams. CLO 4: An ability to design and implement advanced data structures and algorithms, considering efficiency in memory and time usage. CLO 5: An ability to evaluate the performance of different algorithms and data structures using time and space complexity analysis techniques. CLO 6: Apply data structure concepts, such as arrays, linked lists, stacks, and queues, to solve complex computational problems efficiently. CLO 7: Understand the characteristics of advanced data structures, including trees, graphs, and hash tables, and their applications in various domains. CLO 8: Analyze and implement sorting and searching algorithms, employing appropriate data structures to optimize performance in terms of time and space complexity.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. The course "Data Structures" provides students with the following: 1. Analysis of Algorithms. 2. Basic Data Structures: Array, Structures, linked list, stack, queue, graph, tree, hashing. 3. Search Algorithms: Linear search for unordered/ordered lists, binary search, 4. 4. Sorting Algorithms: Bubble sorts, Insertion sorts, selection sort, merge sort, quicksort.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	

	There are several teaching and learning activities including lectures, laboratories, and group projects. The concepts and principles of complexity analysis in algorithms, data structures, search algorithms, sort algorithms, and object-oriented programming will be covered in lectures.
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Student Workload (SWL) الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4
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	5% (5)	5, 11	LO #1, 2, and 3
	Assignments	2	10% (10)	2, 12	LO # 1, 2, 3, and 4
	Lab	10	15% (15)	2,4,6,8,12	LO # 1, 2, 3, and 4
	Project	1	10% (10)	13	LO # 5, 6, 7 and 8
Summative assessment	Midterm Exam	2hr	10% (10)	10	LO #1, 2, 3, and 4
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المناهج الاسبوعي النظري
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	Material Covered
Week 1	Introduction and review, information hiding, Encapsulation, Design and implementation of list ADTS using arrays and linked lists.
Week 2	Recursion in Programming and Problem-Solving Recursive valued functions: Factorial, Classical problems.
Week 3	Stacks Stack ADT, implementation using arrays.
Week 4	Stacks Stack ADT, linked lists, and list ADTS, Applications: Checking balanced braces, recognizing strings, depth-first searches on graphs.
Week 5	Queues: Queue ADT, implementation using arrays.
Week 6	Queues: Queue ADT, linked lists, and list ADTS, Applications: breadth-first searches, recognizing palindromes.
Week 7	Trees: Introduction, Terminology, Traversals, Applications: Binary Trees, Tree
Week 8	Trees: Applications: Binary Trees, Tree
Week 9	Introduction to Graph Theory.
Week 10	Hashing Techniques
Week 11	Sorting techniques and Searching techniques
Week 12	Complexity Analysis
Week 13	Presentation on coursework if it is necessary Students support
Week 14	Study week and preparations for assignment submission and Exams Students support.
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المناهج الاسبوعي للمختبر	
	Material Covered
Week 1	Execute programs array, function, structure, and class
Week 2	Recursion in Programming and Problem-Solving Recursive valued functions: Factorial, Classical problems.
Week 3	Stacks Stack ADT, implementation using arrays and Structure.
Week 4	Stacks Stack ADT, linked lists Algorithm
Week 5	Queues: Queue ADT, implementation using arrays and Structure.
Week 6	Queues: Queue ADT, linked lists Algorithm.
Week 7	Circular Queues: Queue ADT, implementation using arrays and Structure.
Week 8	Circular Queues: Queue ADT, linked lists Algorithm.
Week9	Trees Traversals, Applications: Binary Trees, Tree
Week10	Mid-term Exam
Week11	Trees: Applications: inorder, postorder, preorder
Week12	Graph Theory.
Week13	Hashing Techniques
Week 14	Sorting techniques and Searching techniques
Week 15	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Data Structures Using C++ (Second Edition) by D.S. Malik – 2012 by D.S. Malik.	No
Recommended Texts	Data Structures and Algorithms in C++ 4th Edition by Mark A. Weiss 2014.	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 is required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

Module Information			
معلومات المادة الدراسية			
Module Title	Baath Regime Crimes in Iraq		Module Delivery
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	UOM2050		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	4
Administering Department	Computer Eng. Dept	College	College of Engineering
Module Leader	Wisam jamal jamal	e-mail	wisam.jamal@uomosul.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	MSc
Module Tutor		e-mail	
Peer Reviewer Name	Dr. Rabee M. Hagem	e-mail	rabeehagem@uomosul.edu.iq
Scientific Committee Approval Date	23/5/2024	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	- Educating students about the crimes committed by the Baath regime in Iraq - Guiding students to familiarize themselves With crimes...
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	
Indicative Contents المحتويات الإرشادية	

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..
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ أسبوعا

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)	17	Unstructured SWL (h/w)	1

الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)		
	Homework Assignments	1	7% (7)		
	Onsite Assignments	1	7% (7)		
	Report	1	6% (6)		
Summative assessment	Midterm Exam	2 hr	10% (10)		
	Final Exam	3hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	The concept of crimes and their Types
Week 2	Types of international crimes
Week 3	Political crime Exam
Week 4	Social Crime
Week 5	The crime of suppressing

Week 6	the Shaaban uprising
Week 7	Psychological crimes of the baath
Week 8	Regime of disrupting Friday
Week 9	Prayers Mass grave crimes
Week 10	Chemical attack on Haiabja
Week 11	Use of internationally
Week 12	Exam
Week 13	Environmental crimes of the baath regime in Iraq
Week 14	Incidents of cemeteries and genocide committed dy the Baathist regime in Iraq
Week 15	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	The textbook on the crimes of the Ba'ath regime in Iraq, issued by the Ministry of Higher Education and Scientific Research	No
Recommended Texts		No
Websites		

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

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

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

Module Information					
Module Title اسم المنهج	Arabic Language 2 Core Course		Module Delivery		
Module Type نوع المنهج	English Language		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☒ Seminar		
Module Code رمز المنهج	UOM2012				
ECTS Credits عدد الوحدات	2				
SWL (hr/sem) الحمل الكلي	50				
Module Level / المستوى		1			Semester of Delivery / سحب المنهج
Administering Department القسم الإداري		Computer Engineering	College	Engineering	
Module Leader اسم التدريسي	M.M. Omar Hazim Hamed		e-mail البريد الالكتروني	omar.hazim.h@uomosul.edu.iq	
Module Leader's Acad. Title		Assistant Lecturer	Module Leader's Qualification		MSc
Module Tutor	-----		e-mail	-----	
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date		<u>23/ 5 /2026</u>	Version Number	<u>2.0</u>	

Relation with other Modules			
Prerequisite module	لا يوجد	Semester	
Co-requisites module	لا يوجد	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives

The aim of this semester is to enable the student to read correctly, and to acquire the ability to use the language properly in communication with others; such as speed, quality of delivery, and good expression. It also trains the student in good listening skills, develops literary taste, and helps the student use clear and correct expressions.

Module Learning Outcomes

CLO1:

To introduce the student to the importance of practicing writing and speaking rules in Standard Arabic.

CLO2:

To introduce the student to the levels of the Arabic language system.

CLO3:

To deepen the student's connection with Arab and Islamic heritage.

CLO4:

To promote scientific research in the field of Arabic language and its sciences in order to prepare studies and research.

CLO5:

To demonstrate the beauty of the Arabic language, its vast meanings, and its expressive styles.

CLO6:

To enable the student to overcome linguistic errors and correct them.

CLO7:

	To develop the student's literary taste in order to perceive the aesthetic aspects of expression, imagery, and meanings in speech. CLO8: To introduce the most prominent poets of the Abbasid era.
Indicative Contents	• Here is the translation into English: • Part One: (6 hours) •Arabic Grammar (Syntax) •The Present Tense Verb (Imperfect Verb) • Dual and Plural (Sound Masculine Plural and Sound Feminine Plural) • Part Two: (6 hour) •Semantic Rhetorical Devices (Figures of Meaning) •Verbal Rhetorical Devices (Figures of Speech) • Part Three: (6 hours) •Numbers and Counted Objects •Accusative Nouns •Prepositional Cases (Nouns governed by prepositions) • Part Four: (4 hours) •Linguistic Errors •Spelling • Part Five: (8 hours) •Literature in the Abbasid Era •The Poet Al-Mutanabbi •The Poet Abu Tammam •The Poet Abu Firas Al-Hamdani • If you want, I can also turn this into a study plan or summary notes for each topic.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The primary objective of Arabic language lessons is to eliminate the difficulty and rigidity that may accompany some of these topics, as well as to convey the required ideas and information to students in clear and understandable ways that take into account individual differences among them.

	Among the main areas focused on in the lectures are Arabic grammar and literature. The course is delivered through lectures, examinations, in-class assignments, discussions, and homework assignments.
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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 التقويم التكويني	Quizzes الكويز	3	15% (15)	4,8 and 10	All
	H.W Assignments الواجبات البيتية	2	10% (10)	6, 7	CLO4, CLO5, and CLO6
	Seminars/Reports السمنار والتقارير	1	5% (5)	12	All
	On-site Assignment	2	10% (10)	6, 10	CLO4, CLO5, and CLO6

	واجبات داخل الصف				
Summative Assessment التقويم التلخيصي	Midterm Exam امتحان نصف الفصل	2 hrs	10% (10)	7	All
	Final Exam الامتحان النهائي	3 hrs	50% (50)	16	All
Total Assessment / التقويم النهائي			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered /
Week 1	Arabic Language Grammar (Syntax)
Week 2	Introducing the student to the importance of practicing writing and speaking rules in Standard Arabic.
Week 3	Deepening the student's connection with Arab and Islamic heritage.
Week 4	Introducing the student to the levels of the Arabic language system.
Week 5	Promoting scientific research in the field of Arabic language and its sciences in order to prepare studies and research.
Week 6	Demonstrating the beauty of the Arabic language, its wide range of meanings, and its expressive styles.
Week 7	Enabling the student to overcome linguistic errors and correct
Week 8	Rules of writing the letter Taa (ت)
Week 9	Rules of writing the Alif (ا)
Week 10	Stages of language development and collection

Week 11	Lexicons of vocabulary and semantics (meaning)
Week 12	Morphology (Sarf)
Week 13	Grammatical appositives (Tawābī') Selected verses from Surah Yusuf (peace be upon him)
Week 14	Ibn al-Farid (the poet Ibn al-Fāriḍ)
Week 15	Badr Shakir al-Sayyab
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)	
	Material Covered / المواضيع المغطاة
Week 1	لا يوجد
Week 2	لا يوجد
Week 3	لا يوجد
Week 4	لا يوجد
Week 5	لا يوجد
Week 6	لا يوجد
Week 7	لا يوجد

Learning and Teaching Resources		
	Text	Available in the Library?
Required Texts المنهج المطلوب	Al-Nahw al-Wafi / Abbas Hasan —	Yes

Recommended Texts المنهج الموصى به	In Abbasid Literature / Muhammad Mahdi al-Basir	Yes
Websites المواقع الالكترونية	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

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
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University of Mosul / College of Engineering
Bachelor's Degree in Computer Engineering Department (Third Cycle) 2025-2026
Level UG III (Semester One & Semester Two)

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)	Exam hr/sem	SSWL	Lab (hr/w)	USSWL	SWL	ECTS Semn (hr/w)	Module Type	Prerequisite Module(s) Code	hr/sem	hr/sem	hr/sem
Five		1	CO301	Data Communications	اتصالات البيانات	English	3		3	3				3	93	57	150	6.00 C
		2	CO302	Mathematics V	رياضيات V	English	4		0	0				3	63	87	150	6.00 C
		3	CO303	Computer Architecture 1	معمارية الحاسوب 1	English	3		0	0				3	48	77	125	5.00 C
		4	CO304	Embedded Systems	الأنظمة المضمنة	English	2		3	3				3	78	47	125	5.00 C
		5	CO305	Operating Systems	نظم تشغيل	English	2		3	3				3	78	47	125	5.00 C
		6	CO306	Artificial Intelligence Fundamentals	أساسيات الذكاء الاصطناعي	English	2		0	0				3	33	42	75	3.00 C
				Total		16	0	9	0	0	0	0	0	18	393	357	750	30.00
UGIII	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)	Exam hr/sem	SSWL	Lab (hr/w)	USSWL	SWL	ECTS Semn (hr/w)	Module Type	Prerequisite Module(s) Code	hr/sem	hr/sem	hr/sem
Six		1	CO307	Computer Networks	شبكات الحاسوب	English	3		3	3				3	93	32	125	5.00 C
		2	CO308	Digital Signal Processing	معالجة الاشارة الرقمية	English	3		0	0				3	48	52	100	4.00 C CO302
		3	CO309	Computer Architecture 2	معمارية الحاسوب 2	English	3		0	0				3	48	77	125	5.00 C CO303
		4	CO310	Mathematics VI	رياضيات VI	English	4		0	0				3	63	112	175	7.00 C
		5	CO311	Physics II	فيزياء II	English	4		0	0				3	63	112	175	7.00 C
		6	CO312	Engineering Project Design and Planning	تصميم وتخطيط المشروع الهندسي	English	2							3	33	17	50	2.00 S
				Total		19	0	3	0	0	0	0	0	18	348	402	750	30.00

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Data Communications		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO301		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGIII	Semester of Delivery	Five
Administering Department	Computer Eng. Dept.	College	College of Engineering
Module Leader	Dr. Salah Abdulghani	e-mail	eng.salah@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Mustafa Qassab	e-mail	mustafa.qassab@uomosul.edu.iq
Peer Reviewer Name	Dr. Dhafir Abdulfattah Abdulqader	e-mail	dhafir.abdulfattah@uomosul.edu.iq
Scientific Committee Approval Date	12/08/2024	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course will cover many topics and concepts of computer networks and data communication. The topics that will be covered during this course will include the first layer (physical layer), and the second (data link layer). The topics of data communication includes: network devices and transmission media, data and signal transmission, digital and analog transmission, analog transmission, bandwidth utilization, multiplexing, error detection and correction. The topic of computer networks includes: switching (circuit-switched and packet networks), data link control, multiple access links and protocols. The objective of this course is to provide fundamentals of computer networks and data communication
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this course students will be able to: 1) An ability to identify, analyzes, and solves complex engineering problems according to principles of engineering, science, and mathematics. 2) An ability to acquire and apply new knowledge and using appropriate learning strategies. 3) An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4) Identify and describe the responsibility of each layer. 5) Identify, describe and demonstrate the principles of OSI model and the TCP/IP protocol suite. 6) Apply mathematical foundations to solve problems involving digital and analog signals. 7) Identify and describe the fundamentals of data communications. 8) Identify and describe analog and digital transmission. 9) Identify and describe the multiple access links and protocols. 10) Identify and describe the data link control protocols.
Indicative Contents المحتويات الإرشادية	1) Introduces data communications and defines their components and the types of data exchanged. It also shows how different types of data are represented and how data is flowed through the network. 2) Introduces networks and defines their criteria and structures. It introduces four different network topologies that are encountered throughout the book. 3) Discusses different types of networks: LANs, WANs, and internetworks (internets). 4) Introduces the concept of protocol layering using OSI model and TCP/IP model. 5) Discuss the physical layer, including the transmission media that is connected to the physical layer. 6) Discusses the data rate limit: how many bits per second we can send with the available channel. The data rates of noiseless and noisy channels are examined and compared. 7) Discusses the performance of data transmission. Several channel measurements are examined including bandwidth, throughput, latency, and jitter.

	8) Discusses digital-to-digital conversion. Line coding is used to convert digital data to a digital signal. 9) Discusses analog-to-digital conversion. Pulse code modulation is described as the main method used to sample an analog signal. 10) Discusses transmission modes, parallel or serial transmission. 11) Discusses the advantages and disadvantages of digital transmission over analog transmission. 12) Discuss digital-to-digital conversion techniques, methods which convert digital data to digital signals. Second, we discuss analog to-digital conversion techniques. 13) Explore these two broad categories of bandwidth utilization: multiplexing and spreading. 14) Discusses the types of switched networks.
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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 type 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	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	20% (20)	2, 4, 6, 8, 10	LO # 1,2,4,5,6,7,8
	Assignments	2	5% (5)	3, 7	LO # 6, 8, 9, 10
	Projects /Lab	1	10% (10)	Continuous	All
	Report	5	5% (5)	Continuous	All
Summative assessment	Midterm Exam	2 hr	10% (10)	11	LO # 1, 2, 3, 4, 5
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Data Communications and Underlying Technologies, Data Communications, Components of a Data Communication System, Data Representation, Data Flow, Networks, Network Criteria, Physical Structures, Types of Connections , Network Types, Local Area Network, Wide Area Network, Building A Network, Requirements, Layering and Protocols, Internet Architecture.
Week 2	The OSI Model and the TCP/IP Protocol Suite, Network Models, Protocol Layering, Describe the functions of each layer in the OSI model. Addresses in TCP/IP. Relationship of layers and addresses in TCP/IP.
Week 3 & 4	Data and Signal Transmission, Bit Rate, Bit Length, Baud Rate , Bit Interval digital signal transmission impairment (attenuation, distortion, and noise), Data Rate Limits , Noiseless Channel: Nyquist Bit Rate, Noisy Channel: Shannon Capacity
Week 5 & 6	Analogue and Digital Transmission, Digital and Analog Transmission, Digital-To-Digital Conversion, Data Rate Versus Signal Rate, Line coding ,Transmission Modes, Block coding, Analog Transmission, Digital-to-analog conversion , Types of digital-to-analog conversion (ASK,FSK,PSK,QAM), Analog-to-Analog Conversion (AM, FM, PM).
Week 7 & 8	Bandwidth Utilization, Multiplexing, Bandwidth Utilization Multiplexing and Spreading, Types of Multiplexing (FDM, WDM, Synchronous TDM, Statistical TDM), Categories of multiplexing (strategies multilevel multiplexing, multiple-slot allocation, and pulse stuffing.)
Week 9 & 10	Switching (Circuit-Switched and Packet networks), Switching (Circuit-Switched and Packet networks),Taxonomy of switched networks (virtual-circuit networks have some common characteristics with circuit-switched and datagram networks),Delay in a datagram network,Delay in Virtual-Circuit Networks.
Week 11 & 12	Data Link Control (DLC) , Flow and Error Control Mechanisms, Simplest Protocol, Stop-and-Wait Protocol,Stop-and-Wait Automatic Repeat Request, Go-Back-N Automatic Repeat Request, Selective Repeat Automatic Repeat Request.

Week 13 & 14	Multiple Access Links and Protocols, Media Access Control (MAC), Taxonomy of multiple-access protocols random access or contention methods, ALOHA, Carrier Sense Multiple Access (CSMA), Carrier Sense Multiple Access with Collision Detection (CSMA/CD), Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA), Collision & broadcast domain controlled access (Reservation, Polling, Token Passing, selecting), Channelization (Frequency-Division Multiple Access (FDMA), Time-Division Multiple Access (TDMA), Code-Division Multiple Access (CDMA).
Week 15	Error Detection and Correction, Types of Errors (single-bit error, burst error), Detection versus Correction, structure of encoder and decoder, block coding, linear block codes, Hamming code C(7, 4).

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	Material Covered
Week 1	Computer Network Devices
Week 2	Network Diagnostic Commands
Week 3	Introduction to Packet Tracer
Week 4	IP Address Classes
Week 5	Hub-Bridge-Switch and their characteristics
Week 6	Router and its characteristics
Week 7	Drawing Signals Using MATLAB
Week 8	Exam 1
Week 9	Channel Capacity
Week 10	Multiplexing and De-multiplexing and Noise Effect
Week 11	Error Detection Techniques
Week 12 & 13	Line Coding
Week 14	Comprehensive review
Week 15	Exam 2

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

Required Texts	1) Behrouz A. Forouzan, "Data communication and Networking", Fifth Edition, Tata McGraw – Hill, 2015. 2) James F. Kurose, Keith W. Ross, "Computer Networking – A Top-Down Approach Featuring the Internet", seventh Edition, Pearson Education, 2016.	No
Recommended Texts	1) Stallings W. , "Data & Computer Communications", 8th Edition , Prentice-Hall Publishing, 2012 . 2) McMillan, T. (2015). Cisco networking essentials. John Wiley & Sons.	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	Mathematics V		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO302		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	UGIII	Semester of Delivery	Five
Administering Department	Computer Eng. Dept.	College	College of Engineering
Module Leader	Zahraa Talal Abed	e-mail	zahraatalal@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PH.D.
Module Tutor	Muhannad Faris	e-mail	muhanad.faris@uomosul.edu.iq
Peer Reviewer Name	Dr. Dhafir Abdulfattah Abdulqader	e-mail	dhafir.abdulfattah@uomosul.edu.iq
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 Aims

أهداف المادة الدراسية

- An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics.
- An ability to acquire and apply new knowledge and using appropriate learning strategies.
- An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams.
- To Analyze the discrete-time signals and systems in the time domain using Frequency response, and converting signals from analogue to digital formula.
- To Applying the fundamental Digital Convolutional theories and De-convolution theories on digital signals.
- To apply real and complex Fourier series .
- To Solve difference equation based on Frequency response of digital function
- To understand and solve the theories 1D-FT theory.
- To understand and solve the theories 1D-DTFT theory.
- To understand and solve the theories inverse 1D-DTFT theory. To apply complex Fourier series.
- To apply Higher Order Linear ODEs ,Homogeneous Linear ODEs, and Homogeneous Linear ODEs with Constant Coefficients

Module Learning Outcomes

مخرجات التعلم للمادة الدراسية

1. An ability to identify, analyze, and solve complex engineering problems according to engineering, science, and mathematics principles.
2. An ability to acquire and apply new knowledge and using appropriate learning strategies.
3. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams.
4. To Perform time-domain analysis of sequences and sampled-data systems depending on digitization and quantization formula, converting the analogue signals to digital signals based on digitalization formula and calculate the Shannon, aliasing theories on continuous signals.
5. To analysis continuous and discrete convolutional methods and de-convolutional formula.

	- To analyze real and complex Fourier series (Arbitrary Period, Even and Odd Functions, Half-Range Expansions Forced Oscillations, Approximation by Trigonometric Polynomials, Orthogonal Functions Orthogonal Series, Generalized Fourier Series). - To solve difference equation based on Frequency response of digital function. - To understand and solve the theories 1D-FT theory. - To understand and solve the theories 1D-DTFT theory. - To understand and solve the theories inverse 1D-DTFT theory. - To understand and solve Higher Order Linear ODEs, Homogeneous Linear ODEs, Homogeneous Linear ODEs with Constant Coefficients.
Indicative Contents المحتويات الإرشادية	1) Introduction: This course introduces the fundamental knowledge needed for the Engineering and sciences theories. 2) Data Representation and conversion: Students learn to apply Fourier series, FFT, DFT-transform and inverse DFT Transform to determine the frequency formula of any digital signals. 3) Find and understand the overs the following themes: functions of a convolutional method in continuous and discrete formula. 4) Solve and understand the Higher Order Linear ODEs, Homogeneous Linear ODEs, Homogeneous Linear ODEs with Constant Coefficients.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Increase the ability of student to distinguish, identify, define, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics (Fourier series, FFT, DFT-transform and inverse DFT Transform to determine the frequency formula of any digital signals).

	ii) Increase the ability of student to produce engineering mathematics that meet desired needs within certain constraints by applying both analysis and synthesis in the design process.
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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	6	18% (18)	3,7,9,8,10,11	LO # 1-6
	Assignments	2	4% (4)	7, 12	LO # 4,5,6
	Summary Test	2	15 % (15)	14,7	All
	Report	1	3%(3)	14	LO# 7, 8
Summative assessment	Midterm Exam	2 hr	10% (10)	15	LO # 5,6,7,8
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Analogue to digital conversion form
Week 2	Shannon formula: Digitalization and quantization theories
Week 3	Continuous and Digital Convolutional theories: (Graphical method, Tabular method , Matrix method) part1
Week 4	Digital Convolutional theories: (Overlap method ,and Analytical method) part2
Week 5	De-convolution theories (Long division method, partial function, polynomial method, and table Method).
Week 6	Real and Complex Fourier series (Arbitrary Period, Even and Odd Functions, Half-Range Expansions Forced Oscillations, Approximation by Trigonometric Polynomials, Orthogonal Functions Orthogonal Series, Generalized Fourier Series) Part1
Week 7	Fourier Integral (Fourier Cosine and Sine Transforms, Fourier Transform, Discrete and Fast Fourier Transforms, Tables of Transforms) Part2
Week 8	Solving difference equation based on Frequency response of digital function and LCCDE and nonlinear first order ordinary equation
Week 9	1D-FT theory
Week 10	1D-DTFT theory
Week 11	Inverse1D-DTFT theory
Week 12	Higher Order Linear ODEs
Week 13	Homogeneous Linear ODEs
Week 14	Homogeneous Linear ODEs with Constant Coefficients
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1-Modern Engineering Mathematics by Glyn James, sixth edition, ISBN: 978-1-292-25349-7 (print) 978-1-292-25353-4 (PDF) 978-1-292-25355-8 (ePub) British Library Cataloguing-in-Publication Data Description: Sixth edition. Harlow, England; Hoboken, NJ : Pearson,2020. 2- A text book of Engineering mathematics-I by H.S.Gangwar, Prabhakar Gupta, second edition. ISBN (13) : 978-81-224-2847-6 PUBLISHING FOR ONE WORLD NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS 4835/24, Ansari Road, Daryaganj, New Delhi - 110002 Visit us at www.newagepublishers.com	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	Computer Architecture I		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO303		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	Five
Administering Department	Computer Eng. Dept.	College	College of Engineering
Module Leader	Dr. Dhafir Abdulfattah Abdulqader	e-mail	dhafir.abdulfattah@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Ms. Ola Marwan Assim	e-mail	ola.marwan@uomosul.edu.iq
Peer Reviewer Name	Dr. Dhafir Abdulfattah Abdulqader	e-mail	dhafir.abdulfattah@uomosul.edu.iq
Scientific Committee Approval Date	11/08/2024	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. This course provides the basic knowledge necessary to understand the hardware operation of digital computer. 2. It presents the various digital components used in the organization and design of digital computer. 3. It shows the necessary steps that designer must go through in order to design an elementary basic computer.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1) An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2) An ability to acquire and apply new knowledge and using appropriate learning strategies. 3) An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4) Understand the fundamental principles of digital logic circuits and digital components used in computer architecture, including their functionality and interconnections. 5) Explain different methods of data representation, such as signed number representation, fixed-point representation, and floating-point representation, and apply them in computer arithmetic operations. 6) Demonstrate knowledge of registers, buses, and memory transfer mechanisms, including understanding their role in data storage, movement, and retrieval within a computer system. 7) Apply arithmetic micro-operations, logic micro-operations, and shift micro-operations to perform various computational tasks and data manipulations within a computer system. 8) Design and analyze the basic hardware components of a computer system, including instruction codes, registers, control units, and memory structures, and understand their interactions and functions in the context of computer architecture.
Indicative Contents المحتويات الإرشادية	1) Introduction: This course Introduces the fundamental knowledge needed for the design of digital systems. It starts with giving a review of digital logic circuits and digital components.

	2) Data Representation: Students learn the data types found in digital computers and how are represented in binary form in computer registers. 3) Register Transfer: This part introduces a register transfer language and how the registers are connected and transferred information with each other and with memory. 4) Micro-operations: This module covers how to express arithmetic, logic, and shift micro-operations in symbolic form. Then use them to build an arithmetic logic shift unit. 5) Basic Computer: This course presents all the necessary steps for organization and design an example of simple complete computer system that is called the Basic Computer.
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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 type 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	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	25% (25)	3, 6, 9, 11, 15	LO # 1, 2, 4-8
	Assignments	3	9% (9)	2, 5, 8, 12	LO # 1, 2, 4-8
	Projects	1	3% (3)	Continuous	LO # 3-8
	Report	1	3% (3)	Continuous	LO # 2
Summative assessment	Midterm Exam	2 hr	10% (10)	13	LO # 4-8
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Digital logic circuits and digital components review
Week 2	Data representation: Signed number representation
Week 3	Data representation: Fixed and floating point representation
Week 4	Registers, bus and memory transfer
Week 5	Arithmetic micro-operations
Week 6	Logic and shift micro-operations
Week 7	Application of logic micro-operations
Week 8	Basic Computer hardware design: Instruction codes and registers

Week 9	Basic Computer hardware design: Computer instructions
Week 10	Basic Computer hardware design: Timing, control and instruction cycle
Week 11	Basic Computer hardware design: Memory reference instructions
Week 12	Basic Computer hardware design: Register reference instructions
Week 13	Basic Computer hardware design: Input-output and interrupt instructions
Week 14	Basic Computer hardware design: Complete design
Week 15	Programming of Basic Computer

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Computer System Architecture. By: M. Morris Mano	No
Recommended Texts	Fundamentals of Computer Organization and Architecture. By: M. Abd-El-Barr and H. El-Rewini	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Embedded Systems		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO304		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	Five
Administering Department	Computer Eng. Dept.	College	College of Engineering
Module Leader	Ina'am Fathi khudher	e-mail	inam.fathi@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Kasim Abdullah Ahmed	e-mail	kasimeng@uomosul.edu.iq
Peer Reviewer Name	Dr. Dhafir Abdulfattah Abdulqader	e-mail	dhafir.abdulfattah@uomosul.edu.iq
Scientific Committee Approval Date	30/9/2025	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. Learn both hardware and software aspect of I/O interfaces into microprocessor-based systems. 2. gain hands- on experience with, common microprocessor peripherals such as PPI, USART, Timers, ADC and DAC, DMA, PIC. 3. Develop a solid understanding of embedded systems, focusing on the architecture and operation ATmega2560. 4. Provide practical experience with the Arduino ATmega2560 platform, enabling students to interface with sensors, actuators, and other peripherals through General Purpose Input/Output (GPIO) pins. 5. Encourage the use of ATmega2560's features, such as timers, counters, and interrupt handling, to solve complex embedded system challenges.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2. An ability to acquire and apply new knowledge and using appropriate learning strategies. 3. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4. Explain the functionality of the 8255 Programmable Peripheral Interface (PPI), 8253\ 8254 timer/counter, 8279 keyboard/ display controller, the Direct Memory Access (DMA) , 8251 USART , 8259 Programmable Interrupt Controller (PIC), 8237 DMA controller , and their role in computer interfacing in various modes and apply it in practical interfacing scenarios. 5. Interface and program A/D and D/A converters with microprocessors for signal processing applications. 6. Understand the configuration and use of GPIO pins on the Arduino ATmega2560. 7. Utilize the ATmega2560 instruction set to write and debug programs that perform data manipulation, control operations, and I/O tasks. 8. Describe the timer/counter, interrupt system, serial communication interfaces (UART, SPI, I2C) modes of the ATmega2560 and their respective uses. Develop embedded system applications using these timer/counter modes for timing, counting, and waveform generation.
Indicative Contents المحتويات الإرشادية	• The 80386 Microprocessor & I/O interfacing (Parallel input/output using 8255 PPI and its applications) • 8255 PPI Mode 1 & 8255 PPI Mode 2

	• 8254 timer / counter and applications • 8279 keyboard/display controller • 8237 DMA chip and its applications • A/D converters & D/A converters • RS-232 bus & Serial I/O vs USART 8251 and applications 8250,16650 UART chips. • Microprocessor interrupts (HW and SW) 8259 PIC chip , master/slave of 8259 and its programming. • Introduction to Micro-controller vs. Microprocessor & ATmega2560 Micro-controller Architecture. • Arduino ATmega 2560 General Purpose Input/ Output Pins description • Addressing modes, instruction set. • ATmega2560 6-Timer/Counter modes . • ATmega2560 Interrupts. • ATmega2560 Serial Communication modes of operation. • Theoretical Midterm Exam • Preparatory week before the final Exam
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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 type 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	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	20% (20)	3, 5,6,7,11	LO #1, 2, 3
	Assignments	2	5% (5)	5, 12	LO # 1,3
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	5% (5)	12	LO # 6,7
Summative assessment	Midterm Exam	2 hr	10% (10)	10	LO # 1,2,3
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	The 80386 Microprocessor & I/O interfacing (Parallel input/output using 8255 PPI and its applications)
Week 2	8255 PPI Mode 1 & 8255 PPI Mode 2
Week 3	8254 timer / counter and applications
Week 4	8279 keyboard/display controller
Week 5	A/D converters and D/A converters
Week 6	RS-232 bus & USART 8251 and applications.
Week 7	Microprocessor interrupts (HW and SW) 8259 PIC chip and its programming.
Week 8	8237 DMA chip and its applications
Week 9	Introduction to Micro-controller vs. Microprocessor & ATmega2560 Micro-controller Architecture
Week 10	Med Term Exam
Week 11	Arduino Mega 2560 General Purpose I/ O Pins description & instruction set and Addressing modes (Part1)
Week 12	instruction set and Addressing modes (Part2)
Week 13	ATmega2560 6-timer/Counter modes and ATmega2560 Interrupts
Week 14	ATmega2560 Serial Communication modes of operation
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to MTS-86C Kit & The 7-Segment Display and 74LS373 (part1)
Week 2	8255 Programmable Peripheral interface Modes of operation
Week 3	8253 Programmable Interval Timer (PIT) Modes of Operation & Sound Generator using 8253PIT
Week 4	8279 The Programmable Keyboard / Display
Week 5	Digital to Analog Convertor DAC 0808 & Analog to Digital Convertor 0809
Week 6	Digital Sound Recorder
Week 7	USART.1 8251 Universal Synchronous Asynchronous Receiver Transmitter USART (Asynchronous Mode and Synchronous Mode)
Week 8	8259 The Programmable Interrupt Controller PIC
Week 9	Introduction To Arduino Microcontroller Chip & Install and configure lab software (Programming Arduino Chip)
Week 10	Basic I/O programming & Traffic light system using Arduino & I/O LEDs and Buzzer
Week 11	Analogue to digital convertor
Week 12	Servo motor and stepper motor
Week 13	Arduino with 7_Segments & Up And Down Counter On The 7-Segment
Week 14	Arduino with Keypad
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- Barry B. Bray, The Intel Microprocessors 8086/8088, 80,86,80286,80386,80486, Pentium , Pentium pro processor, Pentium II, Pentium III, Pentium 4 , and core2 with 64bit Extension:Architecture, programming and interfacing, prentice Hall2008. 2- Walter Triebel and Avtar Singh, The 8088 and 8086 Microprocessors: programming, Interfacing, software, Hardware, Applications, 4th edition, prentice-Hall, 2002. 3- Embedded system Design: Embedded systems Foundations of Cyber-Physical Systems, Peter Marwedel, Spriner Nov. 16, 2010.	yes
Recommended Texts	1- Data Sheets (8255, 8253,8254,DAC808-ADC809,8251,1650,8237,8259, 8279) by Intel. 2- Intel 80x86 and other chips hardware reference manuals, Intel. 3- The ATmega640/1280/2560/V Microcontroller Data sheet.	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	Operating Systems		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO305		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	Five
Administering Department	Computer Eng. Dept.	College	College of Engineering
Module Leader	Dr.Sura Ramzi Shareef	e-mail	Sura.ramzishareef@uomosul.edu.iq
Module Leader's Acad. Title	Lecture	Module Leader's Qualification	Ph.D.
Module Tutor	Hiba Dhiya	e-mail	hiba.dhiya@uomosul.edu.iq
Peer Reviewer Name	Dr. Dhafir Abdulfattah Abdulqader	e-mail	dhafir.abdulfattah@uomosul.edu.iq
Scientific Committee Approval Date	19-10-2025	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course aims to • Exploring the importance of operating systems, their goals and functions. • The operating system provides an established, convenient, and efficient interface between user programs and the hardware of computer on which they run. • Introduction to designing and implementing operating systems. • Covers the various techniques used by the operating system to manage resources. • Introducing the student to the concepts and structure of various operating systems, how they work internally, and their most important main parts. • Teaching the student the concept of the program, methods of scheduling it on the central processing unit, and how to implement it using many different algorithms. How to manage the clustering of processes (processes, threads, CPU scheduling, synchronization, and learning about the concept of deadlock) and ways to solve the problem of system stagnation and try to prevent or avoid it. • In this course we will explore the core principles of operating systems design implementation, including file systems and storage; memory management techniques; virtualization and distributed systems. Provides the basic knowledge necessary to understand the principle of operating systems. • Gives the understanding principles of operating systems design and implementation, including file systems and storage; memory management techniques; virtualization and distributed systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2. An ability to acquire and apply new knowledge and using appropriate learning strategies. 3. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4. Understand the fundamental concepts and principles of operating systems, including their role in managing hardware and software resources in computer systems. 5. Describe the different structures and components of operating systems, including kernel, file system, device drivers, and memory management, and understand their functions and interactions. 6. Explain the concepts and mechanisms of process management, including processes, threads, and CPU scheduling, and analyze their impact on system performance and resource utilization.

	7. Apply synchronization tools and techniques to manage concurrent access to shared resources, including understanding different synchronization primitives like locks, semaphores, and monitors. 8. Gain knowledge of different memory management techniques, such as main memory management and virtual memory, including concepts like paging, segmentation, and demand paging, to optimize memory utilization and support multitasking in operating systems. 9. Explore the structure and functionality of mass storage systems, including disk organization, file systems, and I/O systems, to ensure efficient and reliable storage and retrieval of data in operating systems. 10. Comprehend the file system interface, implementation, and internals, including file organization, directory structures, and access methods, for effective management and manipulation of files and directories in operating systems.
Indicative Contents المحتويات الإرشادية	1) This course introduces the concepts of the operating system. It includes: introduction to the design and implementation of operating systems. The students will be introduced to different operating systems and their structures to moreover to cover process management (processes, threads, CPU scheduling, synchronization, and deadlock). 2) Explain the concepts and mechanisms of process management, including processes, threads, and CPU scheduling, and analyze their impact on system performance and resource utilization. 3) It demonstrates students will be introduced to different operating systems and their structures to cover process management (processes, threads, CPU scheduling, synchronization, and deadlock). 4) This course introduces the concepts of the operating system. It includes: different memory management techniques, such as main memory management and virtual memory, paging, segmentation, and demand paging, to optimize memory utilization including concepts like and support multitasking in operating systems and file systems and storage; virtualization and distributed systems. 5) It demonstrates the structure and functionality of mass storage systems, including disk organization, file systems, and I/O systems.
Learning and Teaching Strategies استراتيجيات التعلم والتعليم-	
Strategies	The main strategy in this course is to: Encouraging students' participation in exercises, as well as improving and expanding their critical thinking skills. Through familiarity with the workings of the system, the purpose of its use, and cases of complete system downtime and dealing with them if they occur. This will be achieved through classrooms, interactive educational programs,

	and by considering the type of simple experiments that include some sampling activities that are of interest to students. ✓ Gain knowledge of different memory management techniques, such as main memory management and virtual memory, including concepts like paging, segmentation, demand paging, to optimize memory utilization and support multitasking in operating systems. ✓ Explore the structure and functionality of mass storage systems, including disk organization, file systems, and I/O systems, to ensure efficient and reliable storage and retrieval of data in operating systems. ✓ This course introduces: different memory management techniques, such as main memory management and virtual memory, paging, segmentation, and demand paging to optimize memory utilization including concepts like and support multitasking in operating systems and file systems and storage; virtualization and distributed systems. It demonstrates the structure and functionality of mass storage systems, including disk organization, file systems, and I/O systems.
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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	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Operating Systems.
Week 2	Operating-System Structures
Week 3	Operating-System Structures
Week 4	Processes
Week 5	Threads
Week 6	Synchronization Tools
Week 7	Synchronization Examples
Week 8	CPU Scheduling
Week 9	Deadlocks
Week 10	Main Memory
Week 11	Virtual Memory
Week 12	Mass-Storage Structure
Week 13	I/O Systems
Week 14	File-System Interface
Week 15	File-System Implementation

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. Operating Systems Concepts, 10th Edition Silberschatz, Abraham, Galvin, PeterB., and Gagne, Greg JohnWiley&Sons.,Inc. ISBN: 9781119320913.	No
Recommended Texts	2. An Introduction to GCC: For the GNU Compilers GCC and G++, Brian J. Gough, Richard M. Stallman, Network Theory Ltd, ISBN : 978-0954161798	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	Artificial Intelligence Fundamentals		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CO306			
ECTS Credits	3			
SWL (hr/sem)	75			
Module Level	3	Semester of Delivery		5
Administering Department	Computer Eng. Dept.		College	College of Engineering
Module Leader	Dr. Ali Mukhlif Ahmed Al-Saegh		e-mail	ali.alsaegh@uomosul.edu.iq
Module Leader's Acad. Title	Asst. Prof.		Module Leader's Qualification	Ph.D.
Module Tutor	Asst. Prof. Akram Abdulmawjood		e-mail	akram.dawood@uomosul.edu.iq
Peer Reviewer Name	Dr. Dhafir Abdulfattah Abdulqader		e-mail	dhafir.abdulfattah@uomosul.edu.iq
Scientific Committee Approval Date	01/06/2023		Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. This course let the students be familiar with some new algorithms and methods in artificial intelligence and machine learning. 2. The algorithms are based on the natural behavior of the different organisms. 3. Also, to give the ability to apply these methods in designing and understanding real-world systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. CLO1: An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2. CLO2: An ability to acquire and apply new knowledge and using appropriate learning strategies. 3. CLO3: An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4. CLO4: Understanding the main strategies of artificial intelligence and the main types of machine learning. 5. CLO5: Knowing the principles of Artificial Neural Networks (ANN) and its use for the classification of objects. 6. CLO6: Understanding the Genetic Algorithm and its use for solving real-world problems such as the scheduling problem. 7. CLO7: Understanding the fuzzy logic and its use for controlling actuators. 8. CLO8: Experimenting some artificial intelligence strategies.
Indicative Contents المحتويات الإرشادية	1. Introduction to AI: This course provides a brief overview of artificial intelligence, including its history, key concepts, and applications in various fields. 2. Machine Learning Basics: Students learn foundational concepts of machine learning, such as supervised and unsupervised learning, feature engineering, model evaluation, and basic algorithms like linear regression and decision trees. 3. Neural Networks: This section focuses on artificial neural networks and deep learning. Students explore the architecture of neural networks, backpropagation, activation functions, and popular deep learning models like convolutional neural networks (CNNs) and recurrent neural networks (RNNs). 4. Natural Language Processing Fundamentals: This module covers the basics of natural language processing, including text preprocessing, sentiment analysis, and text classification techniques like bag-of-words and word embeddings. 5. AI Ethics and Responsible AI: Students delve into the ethical implications of AI, examining issues related to bias, privacy, fairness, and transparency. They explore ethical frameworks and discuss strategies for ensuring responsible AI development and deployment.

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 the type of simple experiments involving some interesting sampling activities for 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	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	20% (20)	3, 5, 7, 9	LO # 4,5,6,7
	Assignments	2	8% (8)	6, 8	LO # 1, 2, 3, 4
	Projects	1	6% (6)	14	LO # 8
	Report	1	6% (6)	13	All

Summative assessment	Midterm Exam	2 hr	10% (10)	15	LO # 1-7
	Final Exam	3hr	50% (50)	16	LO # 1-7
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to artificial intelligence
Week 2	Classification, regression, clustering, and association
Week 3	Confusion matrix and evaluation matrices
Week 4	Supervised and Unsupervised training
Week 5	Introduction to artificial neural networks
Week 6	Training a perceptron
Week 7	Training neural networks
Week 8	Introduction to Fuzzy logic
Week 9	Fuzzy sets and fuzzy operations
Week 10	Fuzzification and defuzzification
Week 11	Designing a fuzzy control system
Week 12	Introduction to evolutionary algorithms and genetic algorithm
Week 13	Operations of genetic algorithm
Week 14	Case study of genetic algorithm
Week 15	Mid Term Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Pattern Recognition And Machine Learning by Christopher M. Bishop	No
Recommended Texts	Soft Computing and its Applications by Kumar S. Ray	Yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer Networks		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO307		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	Six
Administering Department	Computer Eng. Dept.	College	College of Engineering
Module Leader	Dr. Salah Abdulghani	e-mail	eng.salah@uomosul.edu.iq
Module Leader's Acad. Title	Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Mustafa Qassab	e-mail	mustafa.qassab @uomosul.edu.iq
Peer Reviewer Name	Dr. Dhafir Abdulfattah Abdulqader	e-mail	dhafir.abdulfattah@uomosul.edu.iq
Scientific Committee Approval Date	12/08/2024	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course will cover many topics and concepts of computer networks. The topics that will be covered during this course will include the network, transport, and application layers of the TCP/IP. The main topics in this course discuss the general issues related to the network layer, IPV4 and IPV6, routing protocols unicast and multicast, discuss the general idea and issues behind the transport layer, discuss the two current protocols UDP, and TCP. Discuss general idea and issues behind the application layer and the protocols DHCP, FTP, TFTP, HTTP, TELNET, SMTP, POP, and IMAP.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1) An ability to identify, analyzes, and solves complex engineering problems according to principles of engineering, science, and mathematics. 2) An ability to acquire and apply new knowledge and using appropriate learning strategies. 3) An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4) Identify and describe the responsibility of network layer. 5) Identify, describe, and analyze the IPV4, IPV6 protocols. 6) Explain and compare the different types of routing protocols. 7) Identify and describe the responsibility of transport layer. 8) Identify, describe, and analyze the UDP, and TCP protocols. 9) Identify and describe the responsibility of application layer. 10) Identify and describe some of protocols in the application layer (HTTP, FTP, TFTP, DNS, DHCP, HTTPS, SNMP, SMTP).
Indicative Contents المحتويات الإرشادية	1) Discusses the Ethernet protocol in general. It explains that IEEE Project 802 defines the LLC and MAC sublayers for all LANs including Ethernet. Discusses the Standard Ethernet, and describes some characteristics of the Standard Ethernet. It then discusses the addressing mechanism, which is the same in all Ethernet generations. 2) Describes the Fast Ethernet, Gigabit Ethernet, 10 Gigabit Ethernet. Discusses the general issues related to the network layer. The current version of the IP protocol and its auxiliaries. Discussion of routing, unicast and multicas. 3) Introduces the idea behind a transport-layer protocol. 4) Discuss the general services we normally require from the transport layer, such as process-to-process communication, addressing, multiplexing and demultiplexing, error, flow, and congestion control. We then show that the transport-layer protocols are divided into two categories: connectionless and connection-oriented. We discuss the characteristics of each category and show the application of each category. 5) Discusses general transport-layer protocols. These protocols concentrate on flow and error control services provided by an actual transportlayer protocol. Understanding these protocols helps us better understand the

	design of the transport-layer protocols in the Internet, such as UDP, and TCP. 6) Introduces the application layer. The section first describes the services provided by the application layer. It then explains that there are two paradigms in which hosts in the Internet can exchange services: the client-server paradigm and the peer-to-peer paradigm. 7) Introduces client-server programming, the way in which the client-server paradigm can be implemented. It first describes application programming interfaces. It then shows how application programs use the services of the transport layer. It finally defines iterative communication using UDP or TCP. 8) Introduces the World Wide Web. It then discusses the HyperText Transfer Protocol, the most common client-server application program used in relation to the World Wide Web. 9) Discusses the File Transfer Protocol, which is the standard protocol provided by TCP/IP for copying a file from one host to another. 10) Discusses electronic mail, which involves two protocols: SMTP and POP. 11) Discusses TELNET, a general client-server program that allows users to log in to a remote machine and use any application available on the remote host. 12) Discusses Secure Shell, which can be used as a secured TELNET. but it can also provide a secure tunnel for other applications.
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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 type 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	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	20% (20)	2, 4, 6, 8, 10	LO # 1,2,4,5,6,7,8
	Assignments	2	5% (5)	3, 7	LO # 6, 8, 9, 10
	Projects / Lab	1	10% (10)	Continuous	All
	Report	5	5% (5)	Continuous	All
Summative assessment	Midterm Exam	2 hr	10% (10)	11	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1 & 2	1- Wired LANs: all Ethernet Networks Types : Wired LANs: Ethernet, Ethernet Protocol, IEEE Project 802, Standard Ethernet , Fast Ethernet (100 Mbps), Gigabit Ethernet, 10 Gigabit Ethernet
Week 3	2- Connecting LANs, Backbone Networks, and Virtual LANs: Connecting Devices and Virtual LANs, Connecting, Hubs, Link-Layer Switches, Routers, VIRTUAL LANS, Membership, Configuration, Communication between Switches.
Week 4	3- Introduction to Network Layer : Network-Layer Services, Packetizing, Routing and Forwarding, Other Services, Packet Switching, Datagram Approach: Connectionless Service, Virtual-Circuit Approach: Connection-Oriented Service , Network-Layer Performance, Delay, Throughput, Packet Loss, Congestion Control, IPV4 ADDRESSES, Address Space, Classful Addressing, Classless Addressing, Dynamic Host Configuration Protocol (DHCP), Network Address Resolution (NAT), Forwarding of IP Packets, Forwarding Based on Destination Address, Forwarding Based on Label, Routers as Packet Switches
Week 5 & 6	4- Network Layer and IPv4 and IPv6 Addresses
Week 7 & 8	5- Routing Fundamentals and Routing Protocols : Unicast Routing , Least-Cost Routing, Routing Algorithms, Distance-Vector Routing, Link-State Routing, Path-Vector Routing, Routing Information Protocol (RIP), Open Shortest Path First (OSPF) , Border Gateway Protocol Version 4 (BGP4)
Week 9	6- Introduction to Transport Layer
Week 10 & 11	7- Transport Layer Protocol: User Datagram Protocol (UDP), Transmission Control Protocol (TCP) Services, Port Numbers, User Datagram Protocol , User Datagram, UDP Services, UDP Applications, Transmission Control Protocol
Week 12	8- Introduction to the Application Layer, Providing Services, Application-Layer Paradigms, Client-Server Programming, Application Programming Interface, Using The Services of the Transport Layer, Iterative Communication Using UDP, Iterative Communication Using TCP, Concurrent Communication.

Week 13 & 14	9- Standard Client-Server Protocols (DHCP, NS,FTP,TFTP,HTTP,TELNET, SMTP, POP, IMAP)
Week 15	10- DHCP, ARP, ICMP

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

A computer network is a set of computers sharing resources located on or provided by network nodes. The computers use common communication protocols over digital interconnections to communicate with each other. These interconnections are made up of telecommunication network technologies, based on physically wired, optical, and wireless radio-frequency methods that may be arranged in a variety of network topologies.

Week	Material Covered
Week 1	Switch and router CLI commands
Week 2	Static routing
Week 3	Default routing
Week 4	Dynamic routing using RIP
Week 5 & 6	Subnetting
Week 7	Exam 1
Week 8	DHCP, DNS, HTTP servers configuration
Week 9	Wired WAN using RIP protocol
Week 10	Wireless router with multiple access points
Week 11 & 12	VLAN configuration and setup
Week 13	ISP implementation using DSL modem and cloud
Week 14	Comprehensive review
Week 15	Exam 2

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	3) Behrouz A. Forouzan, "Data communication and Networking", Fifth Edition, Tata McGraw – Hill, 2015. 4) James F. Kurose, Keith W. Ross, "Computer Networking – A Top-Down Approach Featuring the Internet", seventh Edition, Pearson Education, 2016.	No
Recommended Texts	3) Stallings W. , "Data & Computer Communications", 8th Edition , Prentice-Hall Publishing, 2012 . 4) McMillan, T. (2015). Cisco networking essentials. John Wiley & Sons.	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	Digital Signal Processing		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO308		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	3	Semester of Delivery	6
Administering Department	Computer Eng. Dept.	College	College of Engineering
Module Leader	Zahraa Talal Abed	e-mail	zahraatalal@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Muhammad Faris	e-mail	muhanad.faris@uomosul.edu.iq
Peer Reviewer Name	Dr. Dhafir Abdulfattah Abdulqader	e-mail	dhafir.abdulfattah@uomosul.edu.iq
Scientific Committee Approval Date	01/06/2023	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics V (CO302)	Semester	5
Co-requisites module	None	Semester	None

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	To analyze the discrete-time signals and systems in the frequency domain using Frequency response. To understand the relationship between S-transform and Z- transform. To applying the previous facts to find the Transfer function in the Z domain or S domain and find the total solution of the difference equation. To design FIR and IIR filters using a variety of techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2. An ability to acquire and apply new knowledge and using appropriate learning strategies. 3. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4. To Perform frequency-domain analysis of sequences and sampled-data systems depending on w-domain. 5. To Calculate the Amplitude and phase Response of the discrete System. 6. To Analyze the digital systems using z-Transform 7. To Applying Z-Transform to find the transfer function and total solution of the discrete system. 8. To Design different basic digital filter types: low and high-pass, band-pass and band-stop, digital resonators, oscillators, notch filters, minimum phase systems, and inverse systems. 9. To Asses design problems related to frequency selective filtering and design FIR/IIR filters.
Indicative Contents المحتويات الإرشادية	1) Introduction: This course introduces the fundamental knowledge needed for the design of digital filters. 2) Data Representation: Students learn to apply Z-transform and determine the $H(z)$ of any digital system.

	3) FILTER types: the student understand the type of filters and the properties of each type 4) Digital IIR filter : use the basic type to design the IIR filter 5) Digital FIR filter : use the basic type to design the FIR filter
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	i) Increase the ability of student to distinguish, identify, define, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics ii) Increase the ability of student to produce engineering designs that meet desired needs within certain constraints by applying both analysis and synthesis in the design process.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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	6	18% (18)	3,7,9,8,10,11	LO # 1-5, 6,8
	Assignments	2	4% (4)	3, 7, 12	LO # 1, 2, 3,4,7
	test summary	2	15 % (15)	14,7	All
	Report	1	3%(3)	14	-
Summative assessment	Midterm Exam	2 hr	10% (10)	15	LO # 1, 2, 3, 5,7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Overview of Frequency Response in Discrete-time systems
Week 2	Applied the relationship between the frequency domain and time domain
Week 3	z-transform and its properties
Week 4	ROC: Region of convergence and plot the poles and zeros in Domain
Week 5	Transform analysis of LTI systems using Z Transform
Week 6	
Week 7	Filter designing techniques: Types of filters
Week 8	

Week 9	
Week 10	Structures of discrete-time systems
Week 11	Evaluate design problems related to frequency-selective filtering and design FIR/IIR filters:
Week 12	
Week 13	Design and realize Digital filter
Week 14	Seminar or project discuss
Week 15	Mid-Semester exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Discrete-Time Signal Processing” 3rd Edition, ALAN V. OPPENHEIM and W. SCHAFER HEWLETT, Prentice-Hall Signal Processing Series, 2010.	NO
Recommended Texts	“Digital Signal Processing”, 3rd, Mithra, McGraw Hill Publications, 2008	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer Architecture 2		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO309		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	UGIII	Semester of Delivery	Six
Administering Department	Computer Eng. Dept.	College	College of Engineering
Module Leader	Dr. Dhafir Abdulfattah Abdulqader	e-mail	dhafir.abdulfattah@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Ms. Ola Marwan Assim	e-mail	ola.marwan@uomosul.edu.iq
Peer Reviewer Name	Dr. Dhafir Abdulfattah Abdulqader	e-mail	dhafir.abdulfattah@uomosul.edu.iq
Scientific Committee Approval Date	11/08/2024	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Computer Architecture I (CO303)	Semester	5
Co-requisites module	None	Semester	None

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1) Provides the basic knowledge necessary to understand the principle of microprogrammed control. 2) highlights on the central processing unit and the RISC & CISC Characteristics. 3) Gives the understanding of pipeline concepts and design.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1) An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2) An ability to acquire and apply new knowledge and using appropriate learning strategies. 3) An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. 4) Understand the principles and concepts of microprogrammed control, including mapping, sequencing, and programming of micro-instructions, for effective control of the central processing unit. 5) Design and implement microprogrammed control unit, including the design of decoding ALU control information, microprogram sequencer, and condition/branching implementation, to achieve efficient and flexible control of computer systems. 6) Gain knowledge of the organization and architecture of the central processing unit, including the organization of general registers, stack, instruction formats, addressing modes, and flags (processor status word). 7) Describing the characteristics of RISC (Reduced Instruction Set Computer) and CISC (Complex Instruction Set Computer). 8) Comprehend the concepts and design principles of pipelining, including instruction pipelining and its benefits in improving the performance and throughput of processors.
Indicative Contents المحتويات الإرشادية	1) This course introduces the concepts of the microprogrammed control. It includes: mapping and sequencer, micro-instructions, micro-instructions

	programming, design of decoding ALU control information and sequencer, and the condition and branching implementation. 2) This module explains the general registers organization of Central Processing Unit (CPU), stack organization, addressing modes and flags. 3) It highlights the Reduced Instruction Set Computer (RISC) & Complex Instruction Set Computer (CISC) characteristics, 4) It demonstrates the pipelining concepts and design and pipelined processor.
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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 type 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	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	25%(25)	3, 6, 9, 11, 15	LO # 1, 2, 4-8
	Assignments	3	9%(9)	2, 5, 8, 12	LO # 1, 2, 4-8
	Projects	1	3% (3)	Continuous	LO # 3-7
	Report	1	3% (3)	Continuous	LO # 2
Summative assessment	Midterm Exam	2 hr	10% (10)	11	LO # 4-8
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الاسبوعي النظري

	Material Covered
Week 1	Microprogrammed Control: Introduction
Week 2	Microprogrammed Control: Mapping and sequencer
Week 3	Microprogrammed Control: Micro-instructions
Week 4	Microprogrammed Control: Micro-instructions programming
Week 5	Microprogrammed Control: Design of decoding ALU control information
Week 6	Microprogrammed Control: Design of microprogram sequencer
Week 7	Microprogrammed Control: Condition and branching implementation
Week 8	Central Processing Unit: General registers organization

Week 9	Central Processing Unit: Stack organization
Week 10	Central Processing Unit: Instruction format and addressing mode
Week 11	Central Processing Unit: Flags (processor status word)
Week 12	RISC & CISC characteristics
Week 13	Pipelining concepts and design
Week 14	Pipelining concepts and design
Week 15	Pipelined processor

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Computer System Architecture. By: M. Morris Mano	No
Recommended Texts	Fundamentals of Computer Organization and Architecture. By: M. Abd-El-Barr and H. El-Rewini	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	Mathematics VI		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO310		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	3	Semester of Delivery	Sixth
Administering Department	Computer Eng. Dept.	College	College of Engineering
Module Leader	Dr.Sura Nawfal	e-mail	sura.nawfal@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PH.D.
Module Tutor	Nada Ismaeel	e-mail	nada.ismail@uomosul.edu.iq
Peer Reviewer Name	Dr. Dhafir Abdulfattah Abdulqader	e-mail	dhafir.abdulfattah@uomosul.edu.iq
Scientific Committee Approval Date	7/01/2026	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims

أهداف المادة الدراسية

- An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics.
- An ability to acquire and apply new knowledge and using appropriate learning strategies.
- An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams.
- To Analyze the Systems of ODEs by Phase Plane and Qualitative Methods.
- To apply the Wronskian, Constant-Coefficient Systems. Phase Plane Method, Criteria for Critical Points. Stability, Qualitative Methods for Nonlinear Systems)
- To understand the nonhomogeneous Linear Systems of ODEs
- To Understand, Solve and analyze Series Solutions of ODEs. Special Functions;(Power Series Method, Legendre's Equation, Legendre Polynomials).
- To apply the extended Power Series Method: Fresenius Method, Bessel's Equation. Bessel Functions.
- To understand the vector Integral Calculus and Integral Theorems: Green's Theorem in the Plane, surfaces for Surface Integrals, Surface Integrals
- To understand and analyze the Complex Numbers and Functions and Complex Differentiation (Analytic Function, Cauchy–Riemann Equations)
- To analyze and solve the Complex Integration.
- To solve The Power Series, Taylor Series.

Module Learning Outcomes

مخرجات التعلم للمادة الدراسية

11. An ability to identify, analyze, and solve complex engineering problems according to engineering, science, and mathematics principles.
12. An ability to acquire and apply new knowledge and using appropriate learning strategies.
13. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams.
14. To Perform the Systems of ODEs by Phase Plane and Qualitative Methods.

	15. To apply the Wronskian, Constant-Coefficient Systems. Phase Plane Method, Criteria for Critical Points. Stability, Qualitative Methods for Nonlinear Systems) 16. To solve the nonhomogeneous Linear Systems of ODEs 17. To perform Series Solutions of ODEs. Special Functions;(Power Series Method, Legendre's Equation, Legendre Polynomials). 18. To apply the extended Power Series Method: Fresenius Method, Bessel's Equation. Bessel Functions. 19. To perform the vector Integral Calculus and Integral Theorems: Green's Theorem in the Plane, surfaces for Surface Integrals, Surface Integrals 20. To analyze the Complex Numbers and Functions and Complex Differentiation (Analytic Function, Cauchy–Riemann Equations). 21. To solve the Complex Integration, the Power Series, and Taylor Series.
Indicative Contents المحتويات الإرشادية	5) Introduction: This course introduces the fundamental knowledge needed for the Engineering and sciences theories. 6) Data Representation and conversion: Students learn to apply FFT, DFT-transform and inverse DFT Transform to determine the frequency formula of any digital signals. 3) Find and understand the Systems of ODEs by Phase Plane and Qualitative Methods, the Wronskian, Constant-Coefficient Systems. Phase Plane Method, Criteria for Critical Points. Stability, Qualitative Methods for Nonlinear Systems) 4) To understand the nonhomogeneous Linear Systems of ODEs 5) To perform Series Solutions of ODEs. Special Functions;(Power Series Method, Legendre's Equation, Legendre Polynomials). 6) To apply the extended Power Series Method: Fresenius Method, Bessel's Equation. Bessel Functions. 7) To perform the vector Integral Calculus and Integral Theorems: Green's Theorem in the Plane, surfaces for Surface Integrals, Surface Integrals 8) To analyze the Complex Numbers and Functions and Complex Differentiation (Analytic Function, Cauchy–Riemann Equations). 9) To solve the Complex Integration, the Power Series, and Taylor Series.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

- iii) Increase the ability of student to distinguish, identify, define, formulate, and solve engineering problems by applying principles of engineering, science, and mathematics (functions of a complex variable; analytical functions; Cauchy-Riemann conditions; special functions (Gamma and Beta functions); Bessel function; orthogonal functions).
- iv) Increase the ability of student to produce engineering mathematics that meet desired needs within certain constraints by applying both analysis and synthesis in the design process.

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	112	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	20% (20)	3,6,8,10,11	LO # 1-6
	Class-work	1	3%(3)	5	LO # 1-6
	Assignments	2	2% (2)	7, 12	LO # 4,5,6
	Summary Test	1	10 % (10)	9	All
	Report/seminar	1	5% (5)	All	LO# 7, 8
Summative assessment	Midterm Exam	2 hr	10% (10)	15	LO # 5,6,7,8
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Applications of matrices and determinants : Review
Week 2	Applications of matrices and determinants : Eigen Value (Part I)
Week 3	Applications of matrices and determinants : Eigen Value (part II)
Week 4	Infinite Sequences and Series Power Series
Week 5	Taylor Series
Week 6	Extended Power Series Method: Fresenius Method
Week 7	Extended Power Series Method: Bessel's Equation. Bessel Functions
Week 8	Series Solutions of ODEs. Special Functions: (Legendre's Equation)
Week 9	Series Solutions of ODEs. Special Functions:(Legendre's Equation) properties
Week 10	Series Solutions of ODEs. Special Functions:(Legendre Polynomials)
Week 11	Vector Integral Calculus and Integral Theorems :Green's Theorem in the Plane (Part I)
Week 12	Vector Integral Calculus and Integral Theorems :Green's Theorem in the Plane (Part II)
Week 13	Complex Numbers and Functions and Complex Differentiation (Analytic Function ,Cauchy–Riemann Equations)
Week 14	Complex Numbers and Functions and Complex Differentiation :Complex Integration
Week 15	Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1-Modern Engineering Mathematics by Glyn James, sixth edition, ISBN: 978-1-292-25349-7 (print) 978-1-292-25353-4 (PDF) 978-1-292-25355-8 (ePub) British Library Cataloguing-in-Publication Data Description: Sixth edition. Harlow, England; Hoboken, NJ : Pearson,2020. 2- A text book of Engineering mathematics-I by H.S.Gangwar, Prabhakar Gupta, second edition. ISBN (13) : 978-81-224-2847-6 PUBLISHING FOR ONE WORLD NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS 4835/24, Ansari Road, Daryaganj, New Delhi - 110002 Visit us at www.newagepublishers.com	No
Recommended Texts		
Websites	https://tan-vectors.web.app/ https://www.geogebra.org/m/QPE4PaDZ https://phet.colorado.edu/sims/html/masses-and-springs/latest/masses-and-springs_all.html https://www.desmos.com/3d https://atozmath.com/MatrixEv.aspx?q=evector	

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	Physics II		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO311		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	UGIII	Semester of Delivery	Six
Administering Department	Computer Eng. Dept.	College	College of Engineering
Module Leader	Rabee M. Hagem	e-mail	rabeehagem@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PH.D.
Module Tutor	Ahmed Samir	e-mail	ahmedsa1983@uomosul.edu.iq
Peer Reviewer Name	Dr. Dhafir Abdulfattah Abdulqader	e-mail	dhafir.abdulfattah@uomosul.edu.iq
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 Aims أهداف المادة الدراسية	• To provide computer engineering students with a strong foundation in the principles of modern physics that underpin today's computing and electronic technologies. • To bridge the gap between physics theory and engineering applications in semiconductors, nanotechnology, photonics, and quantum devices. • To develop analytical and problem-solving skills for applying modern physics concepts in electronic circuits, devices, and future computing technologies. • To introduce students to the role of quantum mechanics, relativity, and solid-state physics in the design and operation of modern computer systems. • To prepare students for advanced studies and research in areas such as microelectronics, quantum computing, and embedded systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Explain the fundamental experiments and principles that led to the development of modern physics. • Apply quantum mechanics concepts (wave-particle duality, Schrödinger equation, tunneling) to analyze modern electronic and photonic devices. • Analyze the behavior of semiconductors using band theory, carrier dynamics, and doping mechanisms. • Demonstrate an understanding of the operation of key semiconductor devices such as diodes, MOSFETs, and transistors relevant to computer engineering. • Evaluate the impact of relativity and quantum physics on modern technologies including GPS, nanotechnology, and quantum computing. • Perform problem-solving and simple simulations related to solid-state physics, quantum computing concepts, and optoelectronic devices. • Communicate physics-based reasoning in the context of computer engineering applications, bridging theory with practice.
Indicative Contents المحتويات الإرشادية	Indicative Contents • Foundations of Modern Physics ◦ Limitations of classical mechanics and electromagnetism ◦ Blackbody radiation, photoelectric effect, and Compton scattering ◦ Wave-particle duality and de Broglie hypothesis • Quantum Mechanics Essentials ◦ Schrödinger equation (conceptual) ◦ Potential wells, barriers, and tunneling applications ◦ Atomic models and hydrogen atom spectrum • Relativity for Engineers

	○ Special relativity principles (time dilation, length contraction) ○ Energy–momentum relation and engineering applications • Statistical Physics and Solid-State Concepts ○ Fermi-Dirac and Bose-Einstein statistics ○ Crystal structures and band theory of solids ○ Classification of materials: conductors, semiconductors, insulators • Semiconductor Physics and Devices ○ Intrinsic and extrinsic semiconductors ○ Carrier concentration and mobility ○ pn-junctions, diodes, MOSFETs, and transistor operation • Advanced Topics in Modern Electronics ○ Superconductivity and nanomaterials ○ Nanoelectronics and quantum dots ○ Spintronics and emerging memory technologies • Photonics and Optoelectronics ○ Lasers, LEDs, and photodetectors ○ Optical fibers and integrated photonics • Quantum Information and Computing ○ Qubits, superposition, and entanglement ○ Basics of quantum algorithms ○ Quantum communication and cryptography • Applications to Computer Engineering ○ Microelectronics and VLSI relevance ○ Quantum computing hardware Nanotechnology in computing systems
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Learning and Teaching Strategies • Lectures • Core theoretical concepts will be introduced using multimedia presentations and real-world engineering examples. • Emphasis on linking physics theory to computer engineering applications.

- **Tutorials & Problem-Solving Sessions**

- Regular sessions to reinforce lecture material through worked examples and discussion.
- Focus on applying modern physics principles to engineering case studies.

- **Independent Study**

- Guided reading from textbooks and research articles.
- Assignments requiring literature review and self-directed learning.

- **Project/Case Study Work**

- Small projects on topics like quantum computing, optoelectronics, or nanotechnology.
 - Group work to encourage teamwork and application of concepts to real-world problems.

- **Blended/Interactive Learning**

- Online quizzes, video demonstrations, and simulation-based exercises.

Use of problem-based learning (PBL) for device-level engineering problems.

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 case studies 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	112	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	6	18% (18)	3,7,9,8,10,11	LO # 1-6
	Assignments	2	4% (4)	7, 12	LO # 4,5,6
	Summary Test	2	15 % (15)	14,7	All
	Report	1	3%(3)	14	LO# 7, 8
Summative assessment	Midterm Exam	2 hr	10% (10)	15	LO # 5,6,7,8
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
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Week 1	Introduction & Classical Physics Limitations
Week 2	Particle Nature of Light
Week 3	Wave Nature of Matter
Week 4	Quantum Mechanics Basics
Week 5	Atomic Structure
Week 6	Relativity Essentials for Engineers
Week 7	Statistical Physics Introduction
Week 8	Solid State Physics I
Week 9	Solid State Physics II
Week 10	Semiconductor Devices
Week 11	Superconductivity and Nanomaterials
Week 12	Photonics and Optoelectronics
Week 13	Introduction to Quantum Computing
Week 14	Modern Physics in Information Technology
Week 15	Preparatory week and final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Electronic Devices, Thomas L. Floyd, 7th edition, 2017 Modern Physics for Scientists and Engineers – Thornton & Rex • Solid State Electronic Devices – Ben Streetman & Banerjee	No

	• Concepts of Modern Physics – Arthur Beiser • Quantum Computation and Quantum Information – Nielsen & Chuang (Supplementary)	
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	Engineering Project Design and Planning		Module Delivery
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	CO312		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	3	Semester of Delivery	6
Administering Department	Computer Eng. Dept	College	College of Engineering
Module Leader	Dr. Mazin Hashim Aziz	e-mail	mazin.haziz@uomosul.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PhD
Module Tutor	Dr. Dhafir A. Alneema	e-mail	dhafir.abdulfattah@uomosul.edu.iq
Peer Reviewer Name	Dr. Dhafir Abdulfattah Abdulqader	e-mail	dhafir.abdulfattah@uomosul.edu.iq
Scientific Committee Approval Date	01/01/2026	Version Number	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This module aims To equip final-year computer engineering students with the knowledge, analytical skills, and professional competencies required to design, plan, and document a comprehensive engineering capstone project. The module prepares students for problem identification, engineering requirements, system design, project management, ethical considerations, and communication of a complete project proposal.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On successful completion of this course students will be able to: (1) An ability to identify, analyze, and solve engineering design problems. (2) An ability to acquire and apply new knowledge using appropriate learning strategies. (3) An ability to participate and work professionally and ethically in different projects to function on multidisciplinary teams. (4) Knowledge: Possess in-depth knowledge of system design methodologies, project management fundamentals (schedule, resources, budget, risk), requirements engineering, and design documentation. (5) Comprehension: Understand the relationships among system requirements, architecture, module design, verification/validation, and lifecycle constraints (e.g., safety, sustainability, and manufacturability). (6) Application: Apply system design tools (e.g., UML diagrams, data-flow diagrams, block diagrams), project planning tools (e.g., Gantt, PERT), resource/budget spreadsheets, and risk registers in the context of a capstone project. (7) Analysis: Analyze alternative design options using evaluation criteria (cost, performance, reliability, sustainability, and manufacturability). Critically examine project risks, dependencies, schedule bottlenecks, and resource constraints to refine the project plan. (8) Evaluation: Evaluate the selected design solution against stated requirements, constraints, and stakeholder needs, and justify why it is fit for purpose. Assess team processes, ethical implications, sustainability aspects, and the overall project plan's feasibility. (9) Creation: Create a comprehensive project proposal document that integrates a problem statement, literature review, requirements, system design, project schedule, resource/budget plan, risk management, and communication artifacts. Develop a prototype/test-plan outline, and produce design deliverables (diagrams, reports, and presentations) that demonstrate original engineering work and planning readiness.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: ➤ Introduction to capstone project structure and expectations ➤ Problem identification, scoping, and stakeholder analysis ➤ Literature review methods and state-of-the-art analysis

	➤ Requirements engineering: functional, non-functional, use cases ➤ System architecture and module design (UML, DFD, block diagrams) ➤ Detailed algorithmic and subsystem design ➤ Project scheduling: WBS, Gantt, PERT, milestone planning ➤ Resource planning: procurement, budgeting, staffing ➤ Risk management and quality assurance planning ➤ Ethics, sustainability, safety, and regulatory compliance ➤ Prototype and validation planning ➤ Technical communication: reports, presentations, posters ➤ Final proposal preparation and defense
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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 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	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	5	15% (15)	5,8,10,12,13	LO #1, 2, 4, 5 and 9
	Assignments	2	5% (5)	6, 10	LO #1, 2, 4, 5 and 9
	Presentation	2	20% (20)	7,11	All
Summative assessment	Midterm Exam	2hr	10% (10)	9	LO #4, 5 and 9
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المناهج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Project Design (Overview of project lifecycle, importance of project planning in computer engineering, and key components of a successful project)
Week 2	Identifying Project Ideas (Techniques for brainstorming project ideas, assessing feasibility and relevance, and aligning projects with current industry trends)
Week 3	Research Methodologies (Conducting literature reviews, identifying and utilizing research sources, and designing surveys and experiments)
Week 4	Requirement Analysis (Gathering and analyzing requirements, writing clear and concise specifications, and stakeholder analysis and engagement techniques)
Week 5	Project Planning Fundamentals (Introduction to project management principles, creating project timelines and milestones, and resource allocation and budgeting)
Week 6	Design Methodologies (Overview of software and hardware design approaches, prototyping and iterative design, documentation best practices)
Week 7	Tools for Project Management (Overview of project management software, version control systems, and Collaborative tools for teamwork)

Week 8	Development and Implementation (Transitioning from planning to execution, agile vs. Waterfall methodologies, testing and quality assurance practices)
Week 9	Evaluation Exam.
Week 10	Documentation and Reporting (Importance of documentation throughout the project lifecycle, writing project reports and presentations, and preparing for project defense)
Week 11	Ethical Considerations in Engineering Projects (Understanding intellectual property rights, ethical issues in technology and engineering, and professional conduct and responsibilities)
Week 12	Final Project Development (Supervised work sessions for project development, peer reviews and feedback sessions, and addressing common challenges and obstacles)
Week 13	Project Presentation Techniques (Effective presentation skills, structuring a project presentation, and engaging with an audience and handling questions)
Weeks 14	Final Project Submission and Defense (Guidelines for final project submission, preparing for project defense, and reflecting on the project experience and lessons learned)
Week 15	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Shanthi, Dr. P., Dr. Domenic T. Sanchez, Mr. Jaffer Ali Khan, and Dr. Alamelu Mangai Raman. "Project Management". Sci horizon, 2023.	No
Recommended Texts	Dandy, G., Walker, D., Daniell, T., & Warner, R. (2008). "Planning and design of engineering systems" (2nd ed.). Taylor & Francis.	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
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المرحلة الرابعة
الفصل الاول

الرمز	عدد الوحدات	عدد الساعات العملية	عدد الساعات النظرية	اسم المادة	
				باللغة العربية	باللغة الإنكليزية
PRET401	1	-	1	اخلاقيات مهنة	Professional Ethics
FUCS402	4	3	3	أساسيات أنظمة السيطرة	Fundamentals of Control Systems
RETS403	3	3	2	أنظمة الزمن الحقيقي	Real Time Systems
WINE405	3	3	2	هندسة البرمجيات	Software Engineering
ARPP406	2	-	2	معمارية حاسوب متوازية	Parallel Computer Processing
ELCO404	2	-	2	مادة اختيارية	Machine Learning Programing
	15	9	12	مجموع ساعات و وحدات	

المرحلة الرابعة
الفصل الثاني

الرمز	عدد الوحدات	عدد الساعات العملية	عدد الساعات النظرية	اسم المادة	
				باللغة العربية	باللغة الإنكليزية
GRPO411	4	-	4	مشروع تخرج	Graduation Project
COGR412	2	-	2	رسوم حاسوبية	Computer Graphics
CYSE413	2	-	2	الأمن السيبراني	Cyber Security
FUMS414	3	3	2	أساسيات الأنظمة المتنقلة	Fundamentals of Mobile Systems
IMPA415	2	-	2	معالجة الصور و تطبيقاتها	Image Processing and Applications
ELCO416	3	-	3	علوم تطبيقية	Applied Sciences
	16	3	15	مجموع ساعات و وحدات	

Course Description Form

2025-2026

1. Course Name:	
Graduation Project	
2. Course Code:	
GRPO411	
3. Semester/Year:	
First / Fourth	
4. Description Preparation Date:	
1/4/2026	
5. Available Attendance Forms:	
Project/Attendance	
6. Number of Credit Hours(Total)/Number of Units(Total):	
60 Hours /4 Units	
7. Course administrator's name	
Name: Prof. Dr. Rabee M. Hagem	
Email: rabeehagem@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Apply theoretical and practical knowledge of Computer Engineering to solve real-world engineering problems. • Design, develop, and implement hardware/software systems using appropriate

	engineering methodologies and tools. • Conduct literature review, problem analysis, and technical evaluation for engineering projects. • Integrate concepts from embedded systems, networking, artificial intelligence, IoT, cybersecurity, or related computer engineering fields into a complete project. • Develop project management, teamwork, communication, and technical documentation skills. • Use modern engineering tools, simulation platforms, and programming environments effectively. • Analyze system performance, reliability, efficiency, and scalability through testing and evaluation. • Demonstrate ethical, professional, and research-oriented practices in engineering project development. • Prepare and present technical reports, presentations, and demonstrations in a professional manner. • Enhance innovation, critical thinking, and independent learning abilities through project-based research and development.
9. Teaching and Learning Strategies	

Strategy	The course will employ a combination of teaching and learning strategies to enhance students' technical, research, and practical skills in Computer Engineering. These strategies include: • Project-Based Learning (PBL) Students develop and implement a real-world engineering project through supervised stages. • Research and Literature Review Students investigate recent technologies, journal papers, and engineering solutions related to their project topics. • Supervised Practical Work Regular meetings with supervisors for guidance, monitoring progress, and technical evaluation. • Collaborative Learning Teamwork activities to improve communication, problem-solving, and project management skills. • Hands-on Laboratory and Development Activities Use of hardware platforms, simulation tools, software development environments, and testing equipment. • Problem-Solving and Critical Thinking Students analyze engineering challenges and propose efficient and innovative solutions. • Technical Presentation and Discussion Oral presentations, seminars, and project demonstrations to strengthen presentation and defense skills.
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	• Independent Learning Encouraging students to acquire new technical knowledge and self-learning skills throughout the project duration. • Continuous Assessment and Feedback Ongoing evaluation through progress reports, presentations, prototype demonstrations, and supervisor feedback.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	4	Understand course objectives, regulations, and project requirements	Course Introduction and Project Orientation	Lecture & Discussion	Attendance and participation
2	4	Identify and formulate an engineering	Project Topic Selection and Problem	Supervised Discussion	Proposal evaluation

		problem	Definition		
3	4	Conduct effective literature review and identify related work	Literature Review	Research–Based Learning	Literature review assessment
4	4	Develop project objectives, methodology, and timeline	Project Planning and Methodology	Project–Based Learning	Project plan evaluation
5	4	Analyze hardware and software requirements	Requirements Analysis	Practical & Analytical Learning	Requirements report
6	4	Design system architecture and components	System Design	Design–Oriented Learning	Design assessment
7	4	Select suitable tools, platforms, and technologies	Development Environment Setup	Hands–on Learning	Supervisor evaluation
89	4	Develop initial	Prototype	Laboratory &	Prototype

		prototype or simulation model	Development	Practical Work	assessment
10	4	Present project progress and receive feedback	Progress Seminar	Presentation & Discussion	Seminar evaluation
11	4	Integrate project modules and perform testing	System Integration and Testing	Practical Implementation	Testing report
12	4	Evaluate system performance and optimize operation	Performance Analysis	Analytical Learning	Performance evaluation
13	4	Troubleshoot and resolve technical issues	Debugging and Troubleshooting	Problem-Solving Learning	Technical assessment
14	4	Prepare complete technical documentation	Report Writing and Documentation	Independent Learning	Report evaluation

15	4	Develop professional presentation and demonstration skills	Final Presentation Preparation	Presentation Practice	Presentation rehearsal
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11. Course Evaluation

Evaluation Component	Marks (%)	Description
Project Proposal	10%	Evaluation of project idea, objectives, methodology, and feasibility
Literature Review	10%	Assessment of related work analysis and research quality
Progress Reports	15%	Continuous assessment of project development and achievements
Prototype / Implementation	20%	Evaluation of system design, implementation, and functionality
Presentation and Seminar	10%	Assessment of technical presentation and communication skills
Final Report	20%	Evaluation of technical writing, documentation, and analysis
Final Defense (Viva)	15%	Assessment of project demonstration, understanding, and discussion
Total	100%	

12. Learning and Teaching Resources

- Recent journal papers and conference proceedings related to the selected project topic
- Undergraduate and postgraduate project reports from previous years
- Standard textbooks in computer engineering, embedded systems, IoT, and software engineering

Course Description Form

2025-2026

1. Course Name:	
Computer Graphics	
2. Course Code:	
COGR412	
3. Semester/Year:	
Second/fourth	
4. Description Preparation Date:	
29/4/2026	
5. Available Attendance Forms:	
Physical attendance	
6. Number of Credit Hours(Total)/Number of Units(Total)	
30/2	
7. Course administrator's name (mention all, if more than one name)	
Name: Amar Daood Email: Amar.daood@uomosul.edu.iq Name: Dr.Sura Nawfal abdulrazzaq Email: Sura.nawfal@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Be familiar with the basics of computer graphic operations. • Learn the concepts and the principles of the Scan conversion. • Understand and analyze the procedures of the Clipping Algorithm. • Comprehend all the required Transformations in motion and the animated scenes.
9. Teaching and Learning Strategies	
Strategy	1- Apply knowledge of mathematics, science, and engineering. 2- Learn all basic mathematical behind computer graphic and animation design. 3- Ability to work effectively within multidisciplinary teams
10. Course Structure	

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1,2	2	Understand basic operation of computer graphics	Introduction to computer graphics	lecture	Oral Exam
3,4	2	Learn DDA	DDA Algorithm	lecture	Oral Exam Homework
5,6	2	Learn BA	Bresenham Algorithm	lecture	Homework
7,8	2	Learn SC	Scan conversion Algorithm	lecture	Quiz
9,10	2	Understand clipping	Clipping Algorithm	lecture	Oral Exam
10	2	Learn Transformations	Transformations	lecture	Quiz
11	2	Learn OpenGL	Introduction to OpenGL	lecture	Oral Exam Homework
12	2	Code in OpenGL	OpenGL programming	lecture	Oral Exam
13	2	Learn by examples	OpenGL examples	lecture	Oral Exam
14	2	Learn by application	OpenGL applications	lecture	Oral Exam
15	2				
11. Course Evaluation					

2 quizzes	5pts
3 homework	5pts
Reports	5pts
Project	5pts
Term Exam	20pts
Final Exam	60pts
Total	100pts

12. Learning and Teaching Resources

Required textbooks(curricular books, if any)	Computer Vision and Image Processing, By: Scott E. Umbaugh.
Main references (sources)	Introduction to Computer Graphics, By: F. M. Sprout.
Recommended books and references (scientific journals, reports)	Open G.L .- Silicon Graphics.
Electronic references, websites	

Course Description Form

2025-2026

13.	Course Name:
	Cyber Security
14.	Course Code:
	CYSE413
15.	Semester/Year:
	Second / Fourth
16.	Description Preparation Date:
	30/4/2026
17.	Available Attendance Forms:
	Lectures
18.	Number of Credit Hours(Total)/Number of Units(Total):
	30 Hours /2 Units
19.	Course administrator's name
	Name: Asst. Prof. Dr. Mayada Faris Ghanim Email: mayada.faris@uomosul.edu.iq
20.	Course Objectives
Course Objectives	On successful completion of this course students will be able to: • Identify the main terminologies of Cyber security such as C-I-A triad and cryptography • Recognize the impact that malicious exploits and attacks have on network security • Comparing between different algorithms for encryption and other services of security • Evaluating the level of protection through the value of the encryption work factor • Analyzing the steps of encryption and decryption

	algorithms • Describing the ways of implementing access control • Describing the modes of IPSec security • Listing IPSec protocols and describing their principles of operation • Understanding the establishment of the security parameters via security association •
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21. Teaching and Learning Strategies

Strategy	The main strategy that will be adopted in delivering this subject 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 some sampling activities that are interesting to the students.
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22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	2	Identify the main terminologies of Cyber security	Introduction to Cyber Security	Theory	Exam
2	2	Identify the main terminologies of Cyber security	The OSI Security Architecture	Theory	Exam Quiz
3	2	Recognize the impact that malicious exploits and attacks have	Authentication	Theory	Exam

		on network security			
4	2	Identify the main terminologies of Cryptography	Cryptography Principles	Theory	Exam
5	2	Evaluating the level of protection through the value of the encryption work factor	Work factor and Data Encryption Standard (DES) Part 1	Theory	Exam
6	2	Analyzing the steps encryption and decryption algorithms	Work factor and Data Encryption Standard (DES) Part 2	Theory	Exam Assignment
7	2	Analyzing the steps encryption and decryption algorithms	Advanced Encryption Standard (AES) Part 1	Theory	Exam
8	2		Term Exam 1	Theory	
9	2	Describing the ways of implementing access control	Access Control	Theory	Exam
10	2	Describing the modes of IPSec security	IP Security	Theory	Exam Quiz
11	2	Describing the types of Firewalls	Firewalls		
12	2	Understanding	Introduction to	Theory	Exam

		the importance of AI in network security	Artificial intelligence in network security		
13	2	Describing the main applications of using AI in network security	Artificial intelligent Applications in network security	Theory	Exam
14	2	Identify the principles and methods of security in OS	Security in operating system	Theory	Exam
15	2		Term Exam 2	Theory	

23. Course Evaluation

2 Quizzes: 10% (10)

2 Term Exam: 30% (30)

1 Final Exam: 60% (60)

24. Learning and Teaching Resources

Required textbooks(curricular books, if any)

- Charles P. Pfleeger, Shari Lawrence Pfleeger and Jonathan Margulies, "Security in Computing", Prentice Hall, fifth edition, ISBN-13: 978-0-13-408504-3, 2015.
- William Stallings, "Cryptography and Network Security Principles and Practice", Pearson Education, seventh edition, ISBN 978-0-13-444428-4, 2017

Course Description Form

2025-2026

1. Course Name:	
Fundamentals of Mobile Systems	
2. Course Code:	
FUMS414	
3. Semester/Year:	
Second / Fourth	
4. Description Preparation Date:	
30/4/2026	
5. Available Attendance Forms:	
Lectures	
6 .Number of Credit Hours(Total)/Number of Units(Total):	
(30lectures+45 Laboratory) Hours /3 Units	
7. Course administrator's name	
Name: Asst. Prof. Dr. Mayada Faris Ghanim	
Email: mayada.faris@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	On successful completion of this course students will be able to: • Understand the Evolution and Architecture of Mobile Systems: Describe the evolution of mobile communication systems from 2G to 5G, including their architectures, key components, and design principles. • Analyze Mobility in Wireless Networks: Identify and model different mobility patterns and evaluate their impact on mobile network performance.

	• Explain and Differentiate Multiple Access Techniques: Demonstrate a clear understanding of multiple access methods (FDMA, TDMA, CDMA, OFDMA, SC-FDMA), including their advantages, limitations, and suitability for different generations of mobile systems. • Compare Duplexing Techniques: Compare Frequency Division Duplexing (FDD) and Time Division Duplexing (TDD) in terms of efficiency, delay, and practical applications in 4G/5G systems. • Evaluate Handover Mechanisms: Understand and differentiate between hard, soft, and seamless handovers. • Explore Advanced 5G Technologies: Understand and discuss advanced concepts such as Massive MIMO, mmWave communication, network slicing, virtualization (NFV/SDN), and edge computing with AI integration in mobile networks. • Apply Simulation Tools for Access Techniques: Use simulation tools to implement and analyze various multiple access techniques under different network conditions. • Integrate Theoretical Knowledge with Practical Implementation: Combine theoretical understanding with lab simulations to develop critical thinking, problem-solving, and system analysis skills relevant to modern wireless networks.
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this subject 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 some sampling activities that are interesting to the students.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	2	Identify the main terminologies of Mobile Systems	Introduction to Mobile Systems	Theory and Lab	Exam
2	2	Recognize the impact of Mobility	Mobility models for Wireless Networks	Theory and Lab	Exam Quiz
3	2	Identify the main terminologies modern Cellular Networks	Fundamentals of modern Cellular Networks and their architectures	Theory and Lab	Exam
4	2	Evaluating the performance of Multiple Access Techniques	Multiple Access Techniques: FDMA, TDMA, CDMA (2G–3G)	Theory and Lab	Exam
5	2	Evaluating the performance of Multiple Access Techniques	Multiple Access Techniques: OFDMA and SC–FDMA (4G–5G)	Theory and Lab	Exam
6	2	Analyzing the steps of executing	Multiple Access Techniques: Comparison of	Theory and Lab	Exam, Assignment

		Multiple Access Techniques	access techniques		
7	2	Identify the main principles of FDD and TDD	Multiple Access Techniques: Duplexing: FDD vs TDD	Theory and Lab	Exam
8	2	Identify the main principles of Mobility and Handover Management	Mobility and Handover Management: Types of handover: hard, soft, seamless	Theory and Lab	Exam
9	2	Describing the ways of implementing mobile systems	QoS and Performance Metrics (key metrics): throughput, latency, jitter and QoS mechanisms in LTE and 5G	Theory and Lab	Exam
10	2		Term Exam1	Theory and Lab	Exam
11	2	Understanding the importance of Massive MIMO and beamforming	Massive MIMO and beamforming		Exam
12	2	Understanding the importance	mmWave communication	Theory and	Exam

		of mmWave communication		Lab	
13	2	Describing the main applications of Network slicing and virtualization	Network slicing and virtualization (NFV/SDN)	Theory and Lab	Exam
14	2	Identify the principles and methods of Edge computing	Edge computing and AI in mobile networks	Theory and Lab	Exam
15	2		Term Exam 2	Theory and Lab	Exam

11. Course Evaluation

2 Quizzes: 10% (10)

2 Term Exam: 30% (30)

2 Lab Exam: 15% (15)

1 Final Exam: 50% (50)

12. Learning and Teaching Resources

Required textbooks(curricular books if any)

- 3rd Generation Partnership Project (3GPP) technical specifications (LTE & 5G NR releases)
- 5G NR: The Next Generation Wireless Access Technology – Erik Dahlman, Stefan Parkvall, Johan Skold

	• LTE for UMTS: Evolution to LTE-Advanced – Harri Holma, Antti Toskala • Fundamentals of 5G Mobile Networks – Jonathan Rodriguez
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Course Description Form

2025-2026

1. Course Name:	
Image Processing and Applications	
2. Course Code:	
IMPA415	
3. Semester/Year:	
Second / Fourth	
4. Description Preparation Date:	
2026	
5. Available Attendance Forms:	
Lectures	
6. Number of Credit Hours(Total)/Number of Units(Total):	
30 Hours /2 Units	
7. Course administrator's name	
Name: Dr. Ula Tarik Salim	
Email: ula.tariq@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• The course covers the basic theories and algorithms that are widely used in digital image processing and application. • Expose students to current technologies and issues that are specific to image processing systems. Where in this course students will learn digital image processing techniques including representation, sampling and quantization, image acquisition, imaging geometry, Noise and blur types and causes, image restoration models, image transforms, image enhancement, image smoothing and sharpening, image restoration and image compression. • as well as its applications in biometric field.
9. Teaching and Learning Strategies	

Strategy	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 some sampling activities that are interesting to the students.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	2	Identify a wide-range of image processing techniques and applications.	Introduction & Fundamentals of digital Image processing and applications.	Lecture	Exam
2	2	Describe how digital images are represented, manipulated, encoded, compressed and processed.	Image analysis, preprocessing, ROI, Image Algebra.	Lecture	Homework, Exam
3	2	Understanding image types, Spatial Filters and Image quantization methods.	Spatial Filters	Lecture	Quiz, Exam
4	2	Applying the edge detection, operators	Edge detection.	Lecture	Homework, Exam

		and masks on images.			
5	2	Explain the purpose of each process and the underlying mathematical principles.	Image quantization methods.	Lecture	Quiz, Exam
6	2	Applying the edge detection, operators and masks on images.	Operators, Masks.	Lecture	Exam
7	2	Analyzing noise and blur types.	Noise and blur in images & removals	Lecture	Homework, Quiz, Exam
8	2	Executing and designing appropriate image restoration systems.	System model, Image restoration, Measurements of image quality.	Lecture	Exam
9	2	Comparing image compression and decompression methods.	Image Compression types	Lecture	Exam
10	2		Term Exam 1		
11	2	Implementing image compression and decompression methods.	Image coding.	Lecture	Homework, Quiz, Exam

12	2	Monitoring recent developments in the field of image transforms and biometric application.	Discrete Transform (FFT, Cosine transforms and Wavelet transform)	Lecture	Exam
13	2	Implementing image compression and decompression methods.	JPEG & JPEG 2000	Lecture	Exam
14	2	Monitoring recent developments in the field of image transforms and biometric application.	Introduction to biometric systems types and applications.	Lecture	Report
15	2		Term Exam 2		

11. Course Evaluation

4 Quizzes: 10% (10)
4 Assignments: 2% (2)
1 Report 3%(3)
2 Term Exam: 25% (25)
1 Final Exam: 60% (60)

12. Learning and Teaching Resources

Required textbooks(curricular books, if any)

- Gonzalez, Rafael C._ Woods, Richard E. – Digital image Processing
- Lectures and notes

Course Description Form

2025-2026

1.Course Name:	
Applied Sciences	
2. Course Code:	
ELCO416	
3. Semester/Year:	
Second / Fourth	
4. Description Preparation Date:	
29/4/2026	
5. Available Attendance Forms:	
Lectures	
6. Number of Credit Hours(Total)/Number of Units(Total):	
45 Hours /3 Units	
7. Course administrator's name	
Name: Asst. Prof. Dr. Ina'am Fathi Khudher Email: inam.fathi@uomosul.edu.iq Name Dr. Basman Mahmood Hasan Email: Bm.alhafidh@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	Upon successful completion of this module, students will be able to demonstrate the following competencies, structured according to Bloom's Taxonomy of cognitive learning levels: - Recall, define, and explain fundamental concepts in applied physics, materials science, and thermodynamics as they relate to computing hardware and electronic systems. (LO1) - Identify a wide-range of applied sciences techniques, describe how these techniques are formed, represented, used and

	processed.(LO1) • In addition, understanding how it applied to practical applications.(LO1)
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9. Teaching and Learning Strategies

Strategy	This module employs a blended learning approach that combines formal lectures, class power point presentations, and self-directed study to accommodate diverse learning styles among senior engineering students. Lectures are designed to deliver core theoretical content using interactive presentations, worked examples, and real-world case studies drawn from contemporary computing technologies. Laboratory and practical sessions provide students with hands-on experience in applying scientific principles to experimental tasks, reinforcing conceptual understanding through empirical observation and measurement. Formative assessment activities, including quizzes, short reports, P.P presentation, and peer discussion, are embedded within teaching sessions to provide continuous feedback and monitor student progress against the stated learning outcomes.
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10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	3	Identify the main Applied sciences principles	Introduction	Theory	Exam
2	3	Identify the main Advanced Mathematical	Advanced Mathematics	Theory	Exam

		Methods, Numerical analysis, Optimization methods, Transform methods			
3	3	Recognize the impact of errors in numerical analysis	Error	Theory	Exam
4	3	Identify the main applications of Fourier transform in applied sciences	Fourier Transform	Theory	Exam Quiz
5	3	Illustrating the main Optimization Methods : Gradient Descent, Genetic Algorithms, Simplex Method, Particle Swarm Optimization, and Brute Force)	Optimization Methods	Theory	Exam
6	3	Illustrating Neural network training Techniques covering four core technique categories: root finding, numerical integration, differential equation solvers, and matrix computations)	Numerical Analysis Techniques	Theory	Exam Quiz
7	3	Introduces Data	Data Sciences	Theory	Exam Assignments

		Science as an applied science field			
8	3	Introduces remote sensing as the science of obtaining information about Earth from a distance using — both passive measuring and active measuring)	Remote Sensing	Theory	Exam
9	3	Identifying Programming building algorithms, Databases , intelligent repositories (like Netflix and Amazon), and Networking (the wired and wireless infrastructure), Cybersecurity.	Information Technology Applications	Theory	Exam
10	3	Understanding the main Thermodynamics & Energy laws (Zeroth Law, First Law, Second Law, and the Third Law	Thermodynamics & Energy Systems	Theory	Exam
11	3	Understanding the	Electromagnetic Theory	Theory	Exam

		main Electromagnetic Theory laws (Maxwell's Equations — Gauss's Law for Electricity, Gauss's Law for Magnetism,)			
12	3	Understanding the principles of engineering, medicine, and artificial intelligence	Biomedical Engineering tissue).	Theory	Exam Assignments
13	3	General Review	General Review	Theory	Exam
14	3	Discussion	Discussion	Theory	Exam Presentation
15	3		Term Exam	Theory	
11. Course Evaluation					
2 Quizzes: 10% (10) 2 Assignments: 10% (10) 1 Presentation: 10% (10) 1 Term Exam: 10% (10) 1 Final Exam: 60% (60)					
12. Learning and Teaching Resources					
Required textbooks(curricular books, if any)					