University of Mosul / College of Engineering

Bachelor's Degree in Computer Engineering Department (Second Cycle) 2024-2025

Level UGI (Semester One & Semester Two)

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 (2024 - 2025)

جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة الموصل
بكالوريوس في هندسة الحاسوب (الدورة الثانية)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوربية - كل وحدة اوربية = ٢٥ ساعة
المنهاج الدراسي للعام ٢٠٢٤-٢٠٢٥

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	ect (hr/w	ab (hr/w	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGI	One	1	UOM1021	English Language 1	اللغة الانكليزية 1	English	2		0				3	33	17	50	2.00	B	
		2	UOM1040	Democracy and Human Rights	ديمقراطية و حقوق انسان	Arabic	2		0				3	33	17	50	2.00	B	
		3	CO103	Mathematics 1	الرياضيات 1	English	4		0		1		3	78	97	175	7.00	C	
		4	CO104	Engineering Drawing by Computer	الرسم الهندسي بواسطة الحاسوب	English	0		3				3	48	52	100	4.00	S	
		5	CO105	Electrical Circuits Analysis1	تحليل الدوائر الكهربائية 1	English	3		3		1		3	108	67	175	7.00	C	
		6	CO106	Electronics Physics	فيزياء الالكترونيات	English	3		0		1		3	63	62	125	5.00	C	
		7	UOM1031	Computer 1	حاسوب 1	English	2		2				3	63	12	75	3.00	B	
						Total	16	0	8	0	3	0	21	426	324	750	30		
	Two	1	CO108	Programing using C++ Language	البرمجة بأستخدام لغة C++	English	3		3				3	93	82	175	7.00	C	
		2	UOM1011	Arabic Language 1	اللغة العربية 1	Arabic	2		0				3	33	17	50	2.00	B	
		3	CO110	Mathematics 2	الرياضيات 2	English	4		0		1		3	78	97	175	7.00	C	CO103
		4	CO111	Electrical Circuits Analysis 2	تحليل الدوائر الكهربائية 2	English	3		3		1		3	108	67	175	7.00	C	CO105
		5	CO112	Digital System Fundamentals	مبادئ النظم الرقمية	English	2		3		1		3	93	82	175	7.00	C	
						Total	14	0	9	0	3	0	15	405	345	750	30.00		

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

2025-2024

Module Information معلومات المادة الدراسية					
Module Title	**English Language**			**Module Delivery**	
Module Type	**Basic learning activities**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☒ **Practical** ☒ **Seminar**	
Module Code	**UOM102**				
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	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Prof.Qutaiba I. Ali		**e-mail**	Qutaibaali@uomosul.edu.iq	
Scientific Committee Approval Date	10/9/2024		**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 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	31	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	19	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.35
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

2025-2024

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	UOM104				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		1	**Semester of Delivery**		1
Administering Department		Computer Eng.	**College**	College of Eng.	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title			**Module Leader's Qualification**		
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Prof.Qutaiba I. Ali	**e-mail**	Qutaibaali@uomosul.edu.iq	
Scientific Committee Approval Date		10/9/2024	**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 أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	Among the objectives of the human rights course is to raise awareness of the Iraqi woman (the mother) about her role in the field of exercising her role within her small family, which serves as a micro-community and to exercise her role towards her children by granting them (children's rights), which are included in the framework of (human rights) because the child is the most important pillar and infrastructure In the Iraqi society, which serves as the first nucleus for the establishment of a healthy and healthy society, free from psychological complexes and behavioral disorders, and raising the awareness of the mother about her duties towards her children, not to practice beating and psychological and physical violence, and to treat them in a sound and humane manner, and that the circumstances and daily hard work do not reflect on her behavior towards her children, and this in my opinion is one of the most important goals Which I seek to consolidate when teaching the subject (Human Rights), which considers the rights of the child as one of the most important points and pillars,In addition to directing the father to treat her children with dignity and produce a healthy child mentally, physically and psychologically. Introducing the Iraqi human rights stipulated in the Iraqi constitutions, especially the permanent Iraqi constitution of 2005. Awareness of individuals about the types of rights they enjoy, such as the first generation of rights represented by civil and political rights and the second generation Of rights such as economic, social and cultural rights. Activating the role of civil society institutions in the field of Iraqi human rights. Introducing human rights and spreading a culture of awareness among individuals of the types of rights they enjoy as citizens.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	:Course Learning Outcomes (CLOs) for the "Human Rights" course CLO 1: Knowledge and Understanding of Human Rights: Demonstrate a comprehensive understanding of the concept of human rights, including their historical development, different types of rights, and their significance in the .context of Iraqi society and the international community CLO 2: Awareness of Women's Rights and Children's Rights: Develop an awareness of the rights and roles of Iraqi women, particularly as mothers, in promoting a healthy family environment and safeguarding the rights of their children. Recognize the importance of creating a nurturing and non-violent atmosphere for children's growth and development. CLO 3: Familiarity with Human Rights Legislation: Acquire knowledge of human rights laws and regulations, including the Iraqi constitution, international conventions, and declarations. Understand the legal framework that supports and protects human rights at the national and international levels. CLO 4: Cultural and Historical Perspectives on Human Rights: Explore the historical development of human rights in various civilizations, including Greek, Roman, Persian, and the Middle Ages. Analyze the impact of social, political, and religious institutions on the recognition and protection of human rights.

	CLO 5: Critical Thinking and Awareness of Regional Human Rights: Develop critical thinking skills to evaluate regional perspectives on human rights ,focusing on the European Convention on Human Rights and the Arab Organization for Human Rights. Understand the significance of regional efforts in promoting and safeguarding human rights. a comprehensive By the end of the "Human Rights" course, students will have gained understanding of human rights, including their historical, legal, cultural, and regional aspects. They will be able to critically analyze the roles of women and the importance ll also demonstrate of children's rights in creating a healthy society. Students wi knowledge of relevant legislation and conventions while understanding the broader context of human rights in Iraqi and international settings
Indicative Contents المحتويات الإرشادية	What is right and what is human What are human rights Historic Human Rights in Iraqi Civilizations, in Greek Civilization, Roman and Persian Civilization Historical Human Rights in the Middle Ages Feudalism, the Church, and the Institution of Monarchy (King) Historical Human Rights in the Middle Ages Feudalism, the Church, and the Institution of Monarchy (King) Human rights in law legislation revolutions of the west East revolutions and human rights Human rights in the Universal Declaration of 1948 Economic, social and cultural human rights modern human rights Regional recognition of human rights European Convention on Human Rights 1953 The Arab Organization for Human Rights 1998

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**	2	10% (10)	5, 10	LO #1, 3
	Assignments	2	10% (10)	2, 12	LO # 2, 4
	Projects / Lab.	0	0		
	Report	1	20% (10)	13	LO # 5
Summative assessment	**Midterm Exam**	2 hr	10% (20)	7	LO # 1-5
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	What is right and what is human
Week 2	What are human rights
Week 3	Historic Human Rights in Iraqi Civilizations, in Greek Civilization, Roman and Persian Civilization
Week 4	Historical Human Rights in the Middle Ages Feudalism, the Church, and the Institution of Monarchy (King)
Week 5	Historical Human Rights in the Middle Ages Feudalism, the Church, and the Institution of Monarchy (King)
Week 6	Human rights in law legislation
Week 7	revolutions of the west
Week 8	East revolutions and human rights

Week 9	Human rights in the Universal Declaration of 1948
Week 10	Economic, social and cultural human rights
Week 11	modern human rights
Week 12	Regional recognition of human rights
Week 13	European Convention on Human Rights 1953
Week 14	The Arab Organization for Human Rights 1998
Week 15	**Final Exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	كتب المقرر العلمي الاساسية ، مصادر خارجية ، ونصوص ومواثيق الامم المتحدة في مجال حقوق الانسان والاعلان العالمي الصادر عام 1948	Yes
Recommended Texts		
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

2025-2024

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics 1**			**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**		1
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		Prof.Qutaiba I. Ali	**e-mail**	Qutaibaali@uomosul.edu.iq	
Scientific Committee Approval Date		10/9/2024	**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 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, Vectors 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, and understand their applications in engineering and science. 7-CLO7: Understand the geometric interpretation of vectors and apply the properties of vector operations to solve problems involving vectors in the plane and in three-dimensional space. 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. 1. Prerequisites for calculus: 1.1. Coordinates and Graphs in the Plane 1.2. Slope, and Equations for Lines 1.3. Functions and Their Graphs 1.4. Shifts, Circles and Parabolas 1.5. A Review of Trigonometric Functions 2. Limits and Continuity : Limits of Functions 2.1. The Sandwich Theorem 2.2. Limits Involving Infinity 2.3. 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. Vector and Analytic Geometry in Space: 4.1 Vector Operations using Graphical methods and Algebraic methods 4.2 Properties of vector operations 4.3 magnitude and direction of vectors, Vector Decomposition 4.4 Unit vector in 2D and 3D space 4.5 Dot product and Cross product of vectors and their properties

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/	**Weight (Marks)**	**Week Due**	**Relevant Learning**

		Number			Outcome
Formative assessment	**Quizzes**	4	20% (20)	5, 7,11,13	LO #1,2,4-7
	Onsite Assignments	4	8% (8)	3, 7, 10, 12	LO # 4-7
	Online Assignments	4	8% (8)	4, 9, 11, 13	LO # 1,2,4,5,6,7
	Report	1	4% (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	Prerequisites for calculus: Coordinates and Graphs in the Plane. Slope, and Equations for Lines.
Week 2	Functions domain and range Their Graphs.
Week 3	Functions Shift. Circles and Parabolas.
Week 4	A Review of Trigonometric Functions. Their Graphs.
Week 5	Quiz 1 + Limits and Continuity : Limits of Functions
Week 6	The Sandwich Theorem Limits Involving Infinity
Week 7	Continuous Functions Quiz 2 + Derivatives: Slope, Tangent Lines, and Derivatives
Week 8	Differentiation Rules
Week 9	Derivatives of Trigonometric Functions
Week 10	The Chain Rule and Implicit Differentiation and Fractional Powers
Week 11	Velocity, Speed and Other Rate of Change Quiz 3 + Linear Approximations and Differentials
Week 12	Vector and Analytic Geometry in Space: Vector Operations using Graphical methods and Algebraic methods Properties of vector operations
Week 13	Magnitude and Direction of vectors, Vector Decomposition

	Unit vector in 2D and 3D space Quiz 4 + Dot product and Cross product of vectors and their properties
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

2024-2025

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	**CE104**				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level	1		**Semester of Delivery**	1	
Administering Department	Computer Eng.		**College**	College of Engineering	
Module Leader	Joan Atheel Ahmed		**e-mail**	Joan.akrawi@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	Ms.c	
Module Tutor	Jumana Abduallah		**e-mail**	jumana.abdullah@uomosul.edu.iq	
Peer Reviewer Name	Prof.Qutaiba I. Ali		**e-mail**	Qutaibaali@uomosul.edu.iq	
Scientific Committee Approval Date	10/9/2024		**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 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.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 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	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	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- SelecƟng 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 paleΣes 2
Week 11	Lab 11: Block I: 1- Block, Insert. 2- Wblock. 3- AΣributes, Block Editor. 4- Image, Draworder
Week 12	Lab 12: Block II: Parametric constraints. 2- Dynamic Block. 3- Tool paleΣes. 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/env_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

2025-2024

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	Prof.Qutaiba I. Ali		**e-mail**	Qutaibaali@uomosul.edu.iq	
Scientific Committee Approval Date	10/09/2024		**Version Number**	1.0	

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

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

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 15 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, $Y\ \Delta$ transformation[ch2]
Week 4	Basic relation: Ohm's law depended and indented sources, parallel resistor circuits, $Y\ \Delta$ 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)

المنهاج 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 (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

2025-2024

Module Information معلومات المادة الدراسية					
Module Title	**Electronics Physics**			**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	Prof.Qutaiba I. Ali		**e-mail**	Qutaibaali@uomosul.edu.iq	
Scientific Committee Approval Date	10/09/2024		**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 للطالب محسوب لـ **15** أسبوعا			
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	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

2025-2024

Module Information معلومات المادة الدراسية					
Module Title	**Computer**			**Module Delivery**	
Module Type	**Basic learning activities**			☐ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**UOM103**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level		UG1	**Semester of Delivery**		1
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 nizar		**e-mail**	sshaymaa266@uomosul.edu.iq	
Peer Reviewer Name		Prof.Qutaiba I. Ali	**e-mail**	Qutaibaali@uomosul.edu.iq	
Scientific Committee Approval Date		10/9/2024	**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	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.

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	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.9
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**	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

2025-2024

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		UG1	**Semester of Delivery**		2
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		Prof.Qutaiba I. Ali	**e-mail**	Qutaibaali@uomosul.edu.iq	
Scientific Committee Approval Date		10/9/2024	**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.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.

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 **15** 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	5.5
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

2025-2024

Module Information					
Module Title	Arabic Language 1			**Module Delivery**	
Module Type	Required			☒**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 Engineering		**College**	Engineering	
Module Leader	Omar Hazim Hamed		**e-mail**	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	Dr. Qutaiba I. Ali		**e-mail**	qutaibaali@uomosul.edu.iq	
Scientific Committee Approval Date	11/9/2024		**Version Number**	2.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	The goal of this semester is to enable the student to read correctly, to acquire the ability to use the language properly in communication with others, such as speed, quality of delivery, and good expression, to train the student in good listening, develop their literary taste, and familiarize them with clear and correct expressions.
Module Learning Outcomes	**CLO1:** Introducing the student to the necessity of practicing the rules of writing and speaking in classical Arabic. **CLO2:** Introducing the student to the levels of the Arabic language system. **CLO3:** Deepening the student's connection with Arab and Islamic heritage. **CLO4:** Enhancing scientific research in the field of Arabic language and its sciences for preparing studies and research. **CLO5:** Revealing the beauty of the Arabic language, its vast meanings, and its rhetorical styles. **CLO6:** Enabling the student to overcome linguistic errors and correct them. **CLO7:** Developing the student's literary taste to recognize the aesthetic aspects of speech, its imagery, and meanings. **CLO8:** Introducing the most prominent poets of the Abbasid era.

Learning and Teaching Strategies	
Strategies	The primary goal of Arabic language lessons is to eliminate the difficulty and rigidity that may accompany some of these lesson topics, in addition to conveying the required ideas and information to students in understandable ways that suit their individual differences. Among the key focuses in the lectures are Arabic grammar and literature. The study is conducted through lectures, exams, in-class assignments, discussions, and homework.
Indicative Contents	**Part One: (6 hours)** • Arabic Grammar (Syntax) • The Past Tense and the Present Tense Verbs • The Dual and Plural (Sound Masculine and Feminine Plurals) **Part Two: (6 hours)** • Paronomasia, Antithesis, and Metaphor • Exclamations, Nouns Prevented from Being Declined, and Simple and Derived Forms **Part Three: (6 hours)** • Midterm Exam • Accusative Nouns • The Five Verbs **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

Student Workload (SWL) The student's workload is calculated for 15 weeks			
Structured SWL (h/sem)	33	**Structured SWL (h/w)**	
Unstructured SWL (h/sem)	17	**Unstructured SWL (h/w)**	
Total SWL (h/sem)	**50**		

Module Evaluation					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative Assessment	**Quizzes**	2	14% (14)	4,8 and 10	All
	H.W Assignments	1	6% (6)	6, 7	CLO4, CLO5, and CLO6
	Seminars/Reports	1	10% (10)	12	All
	On-site Assignment	1	10% (10)	6, 10	CLO4, CLO5, and CLO6
Summative Assessment	**Midterm Exam**	2 hrs	10% (10)	7	All
	Final Exam	3 hrs	50% (50)	16	All
Total Assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
	Material Covered
Week 1	Arabic Grammar (Syntax).
Week 2	Introducing the student to the necessity of practicing the rules of writing and speaking in classical Arabic. Deepening the student's connection with Arab and Islamic heritage.
Week 3	Introducing the student to the levels of the Arabic language system
Week 4	Revealing the beauty of the Arabic language, its vast meanings, and its rhetorical styles.
Week 5	The Five Verbs
Week 6	Enabling the student to overcome linguistic errors and correct them.
Week 7	The Past Tense and the Present Tense Verbs.
Week 8	The Sound Masculine Plural
Week 9	Paronomasia, Antithesis, and Metaphor.
Week 10	Linguistic Errors.
Week 11	Spelling.
Week 12	Literature in the Abbasid Era.
Week 13	The Poet Al-Mutanabbi.
Week 14	The Poet Abu Tammam.
Week 15	The Poet Abu Firas al-Hamdani.
Week 16	Final Exam.

Delivery Plan (Weekly Lab. Syllabus)	
	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		
	Text	**Available in the Library?**
Required Texts	Al-Nahw al-Wafi / Abbas Hassan	Yes
Recommended Texts	In Abbasid Literature / Muhammad Mahdi Al-Basir	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

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

2025-2024

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics 2**			**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**	2	
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	Prof.Qutaiba I. Ali		**e-mail**	Qutaibaali@uomosul.edu.iq	
Scientific Committee Approval Date	11/09/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics 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	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. Identify and demonstrate matrix terminology to solve systems of linear equations using matrix methods, such as Gaussian elimination and matrix inverses. 5. 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. 6. Utilize techniques of integration, such as integration by parts, trigonometric integrals, and partial fractions, to simplify and solve complex mathematical expressions. 7. Understand and analyze the properties of transcendental functions, including the derivatives and integrals of exponential, logarithmic. 8. 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 المحتويات الإرشادية	1. Matrices: 1.1. Types and properties of Matrices 1.2. Operations of matrices: addition, subtraction, scalar multiplication and matrix multiplication. 1.3. Operations of matrices : transposition, determinant, adjoin and inverse matrix. 1.4. Solution of Linear Equations using Cramer's Rule. 1.5. Gaussian Elimination Method. 2. Integration

	2.1. Mathematics and Area. 2.2. Formulas for Finite sums. 2.3. Definite Integrals. 2.4. The Fundamental Theorems of Integral Mathematics. 2.5. Indefinite Integrals. 2.6. Mathematics and Area. 2.7. Integration by Substitution –Running the Chain Rule Backward 3. Applications of Definite Integrals 3.1. Areas between Curves. 3.2. Volumes of Solids of Revolution-Disks and Washers 3.3. Cylindrical Shells-An Alternative to Washers. 3.4. Lengths of Curves in the Plane 3.5. Areas of Surfaces of Revolution. 4. The Mathematics of Transcendental Function 4.1. Inverse Function and Their Derivatives. 4.2. Ln (x) ,exp , and Logarithmic Differentiation and Integration. 4.3. Other Exponential and Logarithmic Function. 4.4. The Inverse Trigonometric Function. 4.5. Derivatives and Integration of Inverse Trigonometric Functions. 5. Techniques of Integration 5.1. Basic Integration Formulas. 5.2. Integration by Parts. 5.3. Tabular Integration. 5.4. Trigonometric Integrals. 5.5. Trigonometric Substitutions. 5.6. Rational Functions and Partial Fractions.

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 15 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	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**	4	20% (20)	5,8, 11,13	LO # 1,2,4-8
	Onsite Assignments	4	8% (8)	2, 5, 10, 12	LO # 4, 5,6,7
	Online Assignments	4	8% (8)	3, 6, 11, 14	LO # 1,2,4-8
	Reports	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	Matrices: Types and properties of Matrices Operations of matrices: addition, subtraction, scalar multiplication and matrix multiplication.
Week 2	Operations of matrices: transposition, determinant, adjoint and inverse matrix.

	Solution of Linear Equations using Cramer's Rule.
Week 3	Gaussian Elimination Method. Integration: Mathematics and Area. Formulas for Finite sums.
Week 4	Definite and Indefinite Integrals. The Fundamental Theorems of Integral Mathematics. Mathematics and Area. Integration by Substitution –Running the Chain Rule Backward
Week 5	Quiz 1 + Applications of Definite Integrals: Areas between Curves. Volumes of Solids of Revolution using Disk method.
Week 6	Volumes of Solids of Revolution using Washer method. Cylindrical Shells-An Alternative to Washers.
Week 7	Lengths of Curves in the Plane. Areas of Surfaces of Revolution.
Week 8	Quiz 2 + The Mathematics of Transcendental Function: Inverse Function and Their Derivatives.
Week 9	Ln (x) ,exp , and Logarithmic Differentiation and Integration. Other Exponential and Logarithmic Function.
Week 10	The Inverse Trigonometric Function. Derivatives and Integration of Inverse Trigonometric Functions.
Week 11	Quiz 3 + Techniques of Integration: Basic Integration Formulas.
Week 12	Integration by Parts. Tabular Integration.
Week 13	Quiz 4 + Trigonometric Integrals. 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

2025-2025

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	Prof.Qutaiba I. Ali		**e-mail**	Qutaibaali@uomosul.edu.iq	
Scientific Committee Approval Date	11/09/2024		**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]

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 **15** 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 (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

2025-2024

Module Information معلومات المادة الدراسية					
Module Title	Digital System Fundamentals			**Module Delivery**	
Module Type	Core			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CE112				
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. Qutaiba I. Ali		**e-mail**	qutaibaali@uomosul.edu.iq	
Scientific Committee Approval Date	11/09/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module 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 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.5
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) المنهاج 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) المنهاج 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, 9th 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, 5th 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
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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.

University of Mosul / College of Engineering

Bachelor's degree in Computer Engineering Department (second cycle) 2024-2025

Level UGII (Semester Three & Semester Four)

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 (2024 - 2025)

جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة الموصل
بكالوريوس في هندسة الحاسوب (الدورة الثانية)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة اوربية - كل وحدة اوربية = ٢٥ ساعة
المنهاج الدراسي للعام ٢٠٢٤-٢٠٢٥

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	ect (hr/w)	ab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semn (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
UGII	Three	1	CO201	Engineering Mathematics 1	رياضيات هندسية 1	English	4		0				3	63	62	125	5.00	C	CO110
		2	CO202	Analog Electronics	الكترونيات تناظرية	English	3		3				3	93	57	150	6.00	C	CO111
		3	CO203	Microprocessors 1	معالجات دقيقة 1	English	2		3				3	78	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 Programing	البرمجة بالكائنات الموجهة	English	2		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	18	423	327	750	30.00		
	Four	1	CO207	Computational Methods for Data Analysis	طرق الحوسبة لتحليل البيانات	English	2		0		1		3	48	27	75	3.00	C	
		2	CO208	Engineering Mathematics 2	رياضيات هندسية 2	English	4		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	الكترونيات 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	3	0	24	429	321	750	30.00		

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

2025-2024

Module Information معلومات المادة الدراسية					
Module Title	Engineering Mathematics 1			**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**	3	
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	12/09/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics 2	**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, series and Fourier series and Multiple Integrals, 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) Chain rule for functions of two or three variables , Maxima and minima and saddle point 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 (Application) Fourier Series (Trigonometric form) Fourier Series (even and odd function , Half Wave Symmetry) Line Spectrum (harmonic) the Fourier Series Complex Exponential form of the Fourier Series Introduction to Vectors: (definition, notation, properties) Introduction to Vectors: (Vector algebra: addition, subtraction, multiplications) Vector functions: lines, planes, fields, Eigen vector and Eigen values

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 **15** 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	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	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) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Limits and continuity (multi-variable functions)
Week 2	Partial derivatives (definitions, functions of more than two variables)
Week 3	Chain rule for functions of two or three variables , Maxima and minima and saddle point
Week 4	Double integral (properties, Cartesian integrals form)
Week 5	Double integral (Polar form, Changing Cartesian integrals into polar form)
Week 6	Triple integrals (Properties, Triple integrals in Cartesian coordinates)
Week 7	Triple integrals (Triple integrals in cylindrical coordinates)
Week 8	Triple integrals (Application)
Week 9	Fourier Series (Trigonometric form)
Week 10	Fourier Series (even and odd function , Half Wave Symmetry),
Week 11	Line Spectrum (harmonic) the Fourier Series
Week 12	Complex Exponential form of the Fourier Series
Week 13	Introduction to Vectors: (definition, notation, properties)
Week 14	Introduction to Vectors: (Vector algebra: addition, subtraction, multiplications)
Week 15	Vector functions: lines, planes, fields, Eigen vector and Eigen values
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.	No
Recommended Texts	[2] E. Kreyszig, *Advance Engineering Mathematics*, 10th edition. 2011.	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

2025-2024

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		Lecturer	**Module Leader's Qualification**		Ph.D.
Module Tutor	Nada Ismail		**e-mail**	nada.ismail@uomosul.edu.iq	
Peer Reviewer Name		Prof.Qutaiba I. Ali	**e-mail**	Qutaibaali@uomosul.edu.iq	
Scientific Committee Approval Date		12/09/2024	**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 المحتويات الإرشادية	Semiconductor Materials and introduction to PN junction diode 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

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 **15** 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 DESCRIPTION FORM

نموذج وصف المادة الدراسية

2025-2024

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	Lecturer		**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	12/09/2024		**Version Number**	1.0	

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

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

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	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	8	16% (16)	5-10,12,13	LO #1, 2, 4, 5 and 9
	Assignments	4	4% (4)	4, 6, 8, 10	LO #1, 2, 4, 5 and 9
	Lab Report	5	5% (5)	5, 7, 9, 11, 13	LO # 3, 5-9
	Course Summary Test	5	5% (5)	14	LO #1, 2, 4, 5 and 9
	Lab	1	10% (10)	12	LO # 3, 6-9
Summative assessment	Midterm Exam	2hr	10% (10)	9	LO #1, 2, 4, 5 and 9
	Final Exam	3hr	50% (50)	16	LO #1, 2, 4, 5 and 9
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?
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 DESCRIPTION FORM

نموذج وصف المادة الدراسية

2025-2024

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**	3	
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 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	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 DESCRIPTION FORM

نموذج وصف المادة الدراسية

2025-2024

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		Lecturer	**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		12/09/2024	**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.

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 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		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	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.

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		

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

2025-2024

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	2		**Semester of Delivery**	3	
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	12/09/2024		**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].

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 15 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	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/ Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	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
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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 DESCRIPTION FORM

نموذج وصف المادة الدراسية

2025-2024

Module Information معلومات المادة الدراسية					
Module Title	**Computational Methods for Data Analysis**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CO207**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	2		**Semester of Delivery**	4	
Administering Department	Computer Eng. Dept		**College**	College of Engineering	
Module Leader	Akram Abdul Mawjood Dawood		**e-mail**	akram.dawood@uomosul.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Dr. amar Idrees daood		**e-mail**	amar.daood@uomosul.edu.iq	
Peer Reviewer Name	Dr. Rabee M. Hagem		**e-mail**	rabeehagem@uomosul.edu.iq	
Scientific Committee Approval Date	10/9/2024		**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 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 both numerical analysis and 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	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. Learn all basic mathematical of statistics and probability.Understand and analyze dataset. 5. Compute statistics measurements to conclude the distribution of the collected data Perform conducting predication analysis which can be applied into data mining. 6. Use the techniques and skills to design and analysis system using the engineering tools to provide better description of real-world data. 7. List theories and concepts used in Numerical Analysis. 8. Classifying the numerical techniques to compute approximate solutions of linear and nonlinear equations and differential equations. 9. Apply numerical techniques for interpolation, differentiation and integrations. 10. Analyze errors arising in numerical computation of solutions to mathematical and applied problems and execute some problems.Compare results for numerical root finding methods.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. The course "Computational Methods for Data Analysis" provides students with a comprehensive understanding of both numerical analysis and statistics, focusing on their application in computer engineering. By combining these two disciplines, 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. 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 15 أسبوعا			
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	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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**	5	20% (20)	5, 10	LO #2, 3, 8 and 9
	Online Assignments	1	5% (5)	2, 12	LO # 2, 4, 5 and 9
	Onsite Assignments	2	5% (5)	2,13	LO # 3, 4
	Report	1	10% (10)	13	LO # 5, 8 , 9 and 10
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	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	Conditional probability, Bayes rules for Data Mining and Machine Learning
Week 6	Discrete and continuous probability distributions (binomial, normal, exponential)
Week 7	Probability density and cumulative distribution functions
Week 8	Introduction to Numerical Methods for Data and error Analysis
Week 9	Numerical Methods for linear Data Analysis
Week 10	Numerical Methods for non- linear Data Analysis
Week 11	Interpolation and extrapolation
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- 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 DESCRIPTION FORM

نموذج وصف المادة الدراسية

2025-2024

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Mathematics II**			**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	Jumana Abdullah Kareem		**e-mail**	jumana.abdullah@uomosul.edu.iq	
Peer Reviewer Name	Dr. Ahlam Fadhil		**e-mail**	Ahlam.mahmood@uomosul.edu.iq	
Scientific Committee Approval Date	10/09/2024		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Engineering Mathematics I	**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.

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

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	4	20% (20)	3,6, 10,13	LO # 1 -6
	Home works	4	6% (6)	2,7,11,15	LO # 2-6
	Class work	2	7% (7)	5,12	LO # 2-6
	Report	1	7% (7)	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	1st Shifting theorem (Translation in S- domain) 2nd 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	1st order ordinary DEs (Linear, separable homogeneous)
Week 11	1st order ordinary DEs (Exact, not Exact, and Nonhomogeneous)
Week 12	Initial value problems, Boundary values problems of 2nd ODEs.,
Week 13	2nd order ordinary DEs(Linear 2nd order DEs with constant coefficients,
Week 14	Undetermined Coefficients method,
Week 15	2nd 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",6th edition 2017.	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

2025-2024

Module Information معلومات المادة الدراسية					
Module Title	**Statistics**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CO209				
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	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	11/9/2024		**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 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	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. Learn all basic mathematical of statistics and probability. 5. Understand and analyze dataset. 6. Compute statistics measurements to conclude the distribution of the collected data 7. Perform conducting predication analysis which can be applied into data mining. 8. 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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 أسبوعا			
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	25% (25)	3,5,7, 10,12	LO # 3, 4, 5, 6 ,7, and 8
	Homework Assignments	2	5% (5)	2, 12	LO # 1, 2,
	Onsite Assignments	2	5% (5)	2,13	LO # 3, 4
	Report	1	5% (5)	13	LO # 5-8
Summative assessment	**Midterm Exam**	2 hr	10% (10)	9	LO # 1-8
	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 DESCRIPTION FORM

نموذج وصف المادة الدراسية

2025-2024

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**		4
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		11/09/2024	**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. 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.

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 **15** 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		

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 , I2L
Week 7	The Field effect transistror 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
	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

2025-2024

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		**Semester of Delivery**	4	
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	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	11/09/2024		**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: (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: 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. (5) 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. (6) Application: Implement the interface circuits using the Proteus simulation design suite. (7) Analysis: Integrate the 8086 Microprocessor, memories, and simple input/output devices via interfacing circuits. (8) Evaluation: Monitor the digital signals of the Microprocessors and its interface circuits using the virtual devices of the Proteus design suite. (9) 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. 1. Introduction to the 8086 Microprocessor: Explanation of signals and functions of the 8086 Microprocessor. 2. 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. 3. 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. 4. 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.

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	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	8	16% (16)	5-10,12,13	LO #1, 2, 4, 5 and 9
	Assignments	4	4% (4)	4, 6, 8, 10	LO #1, 2, 4, 5 and 9
	Lab Report	5	5% (5)	5, 7, 9, 11, 13	LO # 3, 5-9
	Course Summary Test	5	5% (5)	14	LO #1, 2, 4, 5 and 9
	Lab	1	10% (10)	12	LO # 6-9
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) 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 (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

2025-2024

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	Lecturer		**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	11/09/2024		**Version Number**	1.0	

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

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	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) المنهاج الاسبوعي النظري	
	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 Solving-Problem 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) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Execute programs array, function, structure, and class
Week 2	Recursion in Programming and Solving-Problem 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 DESCRIPTION FORM

2025-2024

Module Information					
Module Title	Arabic Language 2			**Module Delivery**	
Module Type	Required			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐**Practical** ☒ **Seminar**	
Module Code	UOM2012				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	1		**Semester of Delivery**	4	
Administering Department	Computer Engineering		**College**	Engineering	
Module Leader	Omar Hazim Hamed		**e-mail**	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	Dr. Rabee M. Hagem		**e-mail**	rabeehagem@uomosul.edu.iq	
Scientific Committee Approval Date	11/ 9 /2024		**Version Number**	2.0	

Relation with other Modules			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents	
Module Objectives	The goal 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 aims to train the student in good listening, develop their literary taste, and familiarize them with clear and correct expressions.
Module Learning Outcomes	**CLO1:** Introducing the student to the necessity of practicing the rules of writing and speaking in classical Arabic. **CLO2:** Introducing the student to the levels of the Arabic language system. **CLO3:** Deepening the student's connection with Arab and Islamic heritage. **CLO4:** Enhancing scientific research in the field of Arabic language and its sciences for preparing studies and research. **CLO5:** Revealing the beauty of the Arabic language, its vast meanings, and its rhetorical styles. **CLO6:** Enabling the student to overcome linguistic errors and correct them. **CLO7:** Developing the student's literary taste to recognize the aesthetic aspects of

	speech, its imagery, and meanings. **CLO8:** Introducing the most prominent poets of the Abbasid era.
Indicative Contents	**Part One: (6 hours)** • Arabic Grammar (Syntax) • The Past Tense and Present Tense Verbs • The Dual and Plural (Sound Masculine and Feminine Plurals) **Part Two: (6 hours)** • Paronomasia, Antithesis, and Metaphor • Exclamations, Nouns Prevented from Being Declined, and Simple and Derived Forms **Part Three: (6 hours)** • Midterm Exam • Accusative Nouns • The Five Verbs **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

Learning and Teaching Strategies	
Strategies	The primary goal of Arabic language lessons is to eliminate the difficulty and rigidity that may accompany some of these topics, in addition to conveying the required ideas and information to students in ways that are understandable and suitable to their individual differences. Among the key focuses in the lectures are Arabic grammar and literature. The study consists of lectures, exams, in-class assignments, discussions, and homework.

Student Workload (SWL) The student's workload is calculated for 15 weeks.			
Structured SWL (h/sem)	33	**Structured SWL (h/w)**	
Unstructured SWL (h/sem)	17	**Unstructured SWL (h/w)**	
Total SWL (h/sem)	**50**		

Module Evaluation

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	Quizzes	3	15% (15)	4,8 and 10	All
	H.W Assignments	2	10% (10)	6, 7	CLO4, CLO5, and CLO6
	Seminars/Reports	1	5% (5)	12	All
	On-site Assignment	2	10% (10)	6, 10	CLO4, CLO5, and CLO6
Summative Assessment	Midterm Exam	2 hrs	10% (10)	7	All
	Final Exam	3 hrs	50% (50)	16	All
Total Assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

	Material Covered
Week 1	Arabic Grammar (Syntax)
Week 2	Introducing the student to the necessity of practicing the rules of writing and speaking in classical Arabic. Deepening the student's connection with Arab heritage.
Week 3	Introducing the student to the levels of the Arabic language system.
Week 4	Enhancing scientific research in the field of Arabic language and its sciences for preparing studies and research.
Week 5	Revealing the beauty of the Arabic language, its vast meanings, and its rhetorical styles.
Week 6	Enabling the student to overcome linguistic errors and correct them.
Week 7	The Verbs of "Zan" (ظن) and its sisters (أخواتها)
Week 8	Accusative Nouns
Week 9	The Absolute Object
Week 10	Linguistic Errors
Week 11	Spelling
Week 12	Literature in the Abbasid Era
Week 13	The Poet Al-Mutanabbi
Week 14	The Poet Abu Tammam
Week 15	The Poet Abu Firas al-Hamdani
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)	
	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		
	Text	**Available in the Library?**
Required Texts	Al-Nahw Al-Wafi / Abbas Hassan	Yes
Recommended Texts	In Abbasid Literature / Muhammad Mahdi Al-Basir	Yes
Websites	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

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

2025-2024

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	11/9/2025		**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	• 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..

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	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 in trinational 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 (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.

University of Mosul / College of Engineering / Computer Engineering Department

Curricula for the Academic Year 2024-2025

Curricula of the Computer Engineering Department,

Third Academic Level, First Semester

Curricula of the Computer Engineering Department

Third Academic Level (First Semester)								
Type of Requirement	**Requirement Type (Mandatory – Elective)**	**Course Name**	**Number of Theoretical Hours**	**Number of Practical Hours**	**Number of Credits**	**Prerequisite (if applicable)**	**Course Code**	**Notes**
College Requirements	Mandatory	English language – Intermediate	2	-	2	-	-	
Department Requirements	Mandatory	Computer Network I & Data Communication	3	2	4	-	CONE302	
	Mandatory	Signals & Systems	3	-	3	Engineering Mathematics II	SISY304	
	Mandatory	Computer Architecture I	3	-	3	Digital Systems Design	COAR305	
	Mandatory	Computer Interface	2	2	3	Microprocessors II	COIN306	
	Mandatory	Operating System I	2	2	3	Data Structures	OPSY307	
	Elective	Advanced Micro-Processor	2	-	2	-	AMPR310	The student chooses one course. The required number of credits = 2 credits.
		Soft Computing	2	-	2	-	SOCO311	
	Total Hours and Credits for the First Semester		**17**	**6**	**20**			

Course Description Form

1. Course Name:
English Language intermediate
2. Course Code:
N/A
3. Semester/Year:
Semester 1 / 2024-2025
4. Description Preparation Date:
2024/9/8
5. Available Attendance Forms:
In class + Online
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: Basman Mahmood Hasan Alhafidh Email: bm.alhafidh@uomosul.edu.iq
8. Course Objectives

Course Objectives	This course focuses on building on the language skills and knowledge acquired in previous levels, with the aim of developing students' fluency, accuracy and overall linguistic competence. By the end of the course,

	students will acquire these skills: 1) Vocabulary Expansion: Enhance students' vocabulary by introducing them to new words, idiomatic expressions, and constructions. This includes both general and subject-specific vocabulary relevant to upper intermediate level. 2) Grammar development: Enhance and expand students' understanding of English grammar. This may involve revisiting and reinforcing previously learned grammatical points and introducing more complex structures and tenses. 3) Reading Comprehension: Improving reading skills through a variety of texts, such as articles, short stories, and excerpts from novels. Students will focus on understanding main ideas, identifying supporting details, and inferring meaning from context. 4) Writing skills: Developing writing abilities through guided exercises and assignments. Students may be encouraged to write essays, reports, letters, or other types of texts, focusing on coherence, consistency, and accuracy. 5) Listening Comprehension: Enhance listening skills through a range of authentic audio materials, including dialogues, interviews and lectures. Students will practice understanding main ideas, specific details, and implicit information. 6) Speaking and Conversation: Encouraging students to express themselves confidently and fluently through various speaking activities. This includes participating in discussions, debates, role-plays and presentations, with an emphasis on accuracy, coherence and appropriate use of language. 7) Cultural Awareness: Expand students’ understanding of English-speaking cultures and societies through authentic materials and discussions on various topics. This aims to enhance intercultural communication skills and foster a deeper appreciation of diverse viewpoints.
9. Teaching and Learning Strategies	
Strategy	The main strategy to be adopted in the delivery of this unit is to encourage students' participation in the exercises, while at the same time improving and expanding their critical thinking skills. This will be achieved through interactive classroom and tutorials and by considering the type of simple experiments that include some sampling activities that are of interest to sudents.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	2	Review And learn grammar for the class	UNIT 1: A world of difference Grammar: Simple, continuous, perfect, active and passive. Reading: Saro's story "Lost and found".	In Class Lecture	daily oral
2	2	Learn conversation for class and speaking style	UNIT 1 A world of difference: Speaking: Missing words.	In Class Lecture	Quiz
3	2	Learn the art of listening by analyzing and applying synonyms	UNIT 1 A world of difference!: Listening: Things I miss from home. Vocabulary: Compound words.	In Class Lecture	daily oral and homework
4	2	Learn, analyze, create and present reports	Report submission feedback and instructions how to make a good presentation.	In Class Lecture	homework
5	2	Evaluation and application of instructions for making reports and presentations	Presentation day, giving feedback and presentation notes.	In Class Lecture	Quiz
6	2	Review And learn grammar for the class	UNIT 2 The working week: Grammar: Present perfect simple and continuous.	In Class Lecture	homework

			Reading: Our plastic planet.		
7	2	Learn conversation for class and speaking style	UNIT 2 The working week: Speaking: Fillers, adding emphasis.	In Class Lecture	daily oral and homework
8	2	Learn the art of listening by analyzing and applying synonyms	UNIT 2 The working week : Listening: Dreams come true. Vocabulary: Hot verbs, make and do.	In Class Lecture	homework
9	2	And learn grammar for the class	UNIT 3 Good times,bad times times: Grammar: Narrative tenses. Reading: Book at bedtime.	In Class Lecture	daily oral
10	2	Learn conversation for class and speaking style	UNIT 3 Good times, bad times: Speaking: Giving and receiving news.	In Class Lecture	daily oral
11	2	Learn the art of listening by analyzing and applying synonyms	UNIT 3 Good times, bad times: Listening: The clinging woman. Vocabulary: Books and films	In Class Lecture	Quiz
12	2	Learn conversation for class and speaking style	Speaking test for group 1 of students. Each students takes about 5-7 minutes for the test.	In Class Lecture + Online	Class test
13	2	Learn conversation for class and speaking style	Speaking test for group 2 of students. Each students takes about 5-7 minutes for the test.	In Class Lecture + Online	Class test
14	2	Analyze, apply and evaluate what the student has learned during the semester	Reviewing the Units 1-3, checking the workbook answers, and open discussion.	In Class Lecture	Full review

15	2	Final Evaluation	Pre-Final Exam	written exams	Pre-final test

11. Course Evaluation

Quizzes	5
Homework	5
Conversations	10
Report and Presentation	10
Pre-Final Test	10
Final Test	60
Total	100

12. Learning and Teaching Resources

Required textbooks(curricular books, if any)	
Main references (sources)	SOARS, J. & SOARS, L. 2014. New Headway -Intermediate Fourth Edit Student's Book and iTutor Pack, OUP Oxford.
Recommended books and references (scientific journals reports)	
Electronic references, website	https://elt.oup.com/student/headway/intermediate/?cc=u &selLanguage=en

Course Description Form

1. Course Name:
Computer Networks I and Data Communication
2. Course Code:
CONE302
3. Semester/Year:
Semester 1 / 2024-2025
4. Description Preparation Date:
2024/9/8
5. Available Attendance Forms:
In class / on meet
6. Number of Credit Hours(Total)/Number of Units(Total)
45/3
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Salah Abdulghani Email: eng.salah@uomosul.edu.iq
8. Course Objectives

Course Objectives	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.

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

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	3	Identify and describe the basics of Data Communications	Introduction to Data Communications and Underlying Technologies	Lecture	Quiz
2	3	Identify and describe the OSI Model and the TCP/IP Protocol Suite	The OSI Model and the TCP/IP Protocol Suite	Lecture	Quiz
3 & 4	6	Identify and describe the Data and Signal	Data and Signal Transmission	Lecture	Home work

		Transmission			
5 & 6	6	Identify, describe, explain and compare with various types of analogue and digital transmission	Analogue and Digital Transmission	Lecture	Home work
7 & 8	6	Identify and describe the Bandwidth Utilization, and Multiplexing	Bandwidth Utilization, Multiplexing	Lecture	Quiz
9 & 10	6	Identify and describe Circuit-Switched and Packet networks	Switching (Circuit-Switched and Packet networks)	Lecture	Quiz
11 & 12	6	Identify and describe the Data Link Control	Data Link Control (DLC) , Flow and Error Control Mechanisms	Lecture	Term Exam 1
13 & 14	6	Identify and describe the Multiple Access Links Protocols	Multiple Access Links and Protocols	Lecture	Home work
15	3	Identify and describe the Error Detection and Correction	Error Detection and Correction	Lecture	

11. Course Evaluation

Quizzes	**12% (12)**	**4**
Assignments	**3% (3)**	**3**
Report/Lab	**10% (10)**	**5**
Midterm Exam 1	**25% (25)**	**2 hr**

12. Learning and Teaching Resources

Required textbooks(curricular books, if any)	Behrouz A. Forouzan, “Data communication and Networking”, Fifth Edition, Tata McGraw – Hill,2015. Cory Beard and William Stallings, “Wireless

	Communication Networks and Systems” (ISBN: 0133594173, available online
Main references (sources)	James F. Kurose, Keith W. Ross, “Computer Networking – A Top-Down Approach Featuring the Internet”, seventh Edition, Pearson Education, 2016.
Recommended books and references (scientific journals, reports)	–––––
Electronic references, websites	–––––

Course Description Form

1. Course Name:	
Signal and system	
2. Course Code:	
CO302	
3. Semester/Year:	
Semester 1 / 2024-2025	
4. Description Preparation Date:	
2024/9/8	
5. Available Attendance Forms:	
In class/ Meet	
6. Number of Credit Hours(Total)/Number of Units(Total)	
45/ 3	
7. Course administrator's name (mention all, if more than one name)	
Name: zahra talal abed Email: zahraatalal@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	This course will cover many topics and concepts relate to digital systems, analogue and digital devices, and th characteristics. Topics to be covered during the discussion will include analogue and digital signals, ho analogue signals are generated, and the general characteristics of digital signals and systems. This material deals with the study of digital convolution methods, the study of the frequency effects of digital signals, and how to calculate them

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

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	3	Determine the analogue and digital signals	Introduction	Lecture	Oral t
2	3	Determine the digital system	digital system	Lecture	Quiz
3 & 4	6	Determine the transformation between analogue and digital signals	the transformation between analogue and digital signals	Lecture	Oral test+H.W.
5 & 6	6	Determine the basic properties of digital signals	properties of digital signals	Lecture	H.W.
7 & 8	6	Determine the convolution methods	the convolution methods	Lecture	Exam1
9 & 10	6	Determine the de-convolution method	The de-convolution methods	Lecture	Quiz
11 & 12	6	Determine the frequency response	the frequency response	Lecture	Oral test+H.W.

13 & 14	6	Determine the basic theory of DFT	DFT	Lecture	Quiz
15	1	Exam	Exam	Exam	exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports …. etc

Quizzes	2	5% (5)
Online assignments	2	5 % (5)
Projects	1	10% (10)
Report	1	)5% (5
Midterm Exam	2 hr	25% (25)
Final Exam	3 hr	50% (50)

12. Learning and Teaching Resources

Required textbooks(curricular books, if any)	
Main references (sources)	1- "1- Discrete-Time Signal Processing" 3rd Edit ALAN V. OPPENHEIM and W. SCHAFER HEWLE Prentice-Hall Signal Processing Series, 20 2- "Digital Signal Processing", 3rd, Mithra, McGraw Hill Publications, 2008
Recommended books and references (scientific journals, reports)	1- "Discrete-Time Signal Processing" 3rd Edit ALAN V. OPPENHEIM and W. SCHAFER HEWLE Prentice-Hall Signal Processing Series, 2 . 2- "Digital Signal Processing", 3rd, Mithra, McGraw Hill Publications, 2008
Electronic references, websites	

Course Description Form

13. Course Name:
Computer Architecture I
14. Course Code:
COAR305
15. Semester/Year:
Semester 1 / 2024-2025
16. Description Preparation Date:
2024/9/8
17. Available Attendance Forms:
1. Classroom 2. Google Classroom (55tl2mf)
18. Number of Credit Hours(Total)/Number of Units(Total)
125 Hour / 5 Units
19. Course administrator's name (mention all, if more than one name)
Name: Lecturer Dr. Dhafir Abdulfattah Email: dhafir.abdulfattah@uomosul.edu.iq Name: Lecturer Assistant Farah Natiq Email: farah.qassabbashi@uomosul.edu.iq

20. Course Objectives

Course Objectives	• Provides the basic knowledge necessary to understand the hardware operation of digital computer. • Presents the various digital components used in the organizatic and design of digital computer. • Shows the necessary steps that a designer must go through to design an elementary basic computer.

21. Teaching and Learning Strategies

Strategy	It includes: • Lecture Presentations. • Interactive Discussions. • Activities. • Problem-Solving Exercises.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	3	Knowledge: Identify the hardware principles of digital computer and data representation. Understanding: Interpret the various components of a digital computer.	Digital logic circuits and digital components review	Lecture	Discussions
2	3		Data representation: Signed number representation	Lecture	Classwork
3	3		Data representation: Fixed and floating point representation	Lecture	Quiz
4	3		Registers, bus and memory transfer	Lecture	Homework
5	3		Arithmetic micro-operations	Lecture	Homework
6	3		Logic and shift micro-operations	Lecture	Discussions
7	3		Application of logic micro-operations	Lecture	Quiz

8	3	Understanding: Interpret the types of instructions of a basic computer.	Basic Computer hardware design: Instruction codes and registers	Lecture	Discussions
9	3		Basic Computer hardware design: Computer instructions	Lecture	Classwork
10	3		Basic Computer hardware design: Timing, control and instruction cycle	Lecture	Classwork
11	3		Basic Computer hardware design: Memory reference instructions	Lecture	Homework
12	3		Basic Computer hardware design: Register reference instructions	Lecture	Quiz
13	3		Basic Computer hardware design: Input-output and interrupt instructions	Lecture	Classwork
14	3	Analysis: Outline the basic components of elementary basic computer.	Basic Computer hardware design: Complete design	Lecture	Project
15	3		Programming of Basic Computer	Lecture	Discussions

23. Course Evaluation

2 quizzes	4pts
3 homework	3pts
1 project	3pts
2 Term Exam	30pts
Final Exam	60pts
Total	100pts

24. Learning and Teaching Resources

Required textbooks (curricular books, if any)	M. Morris Mano "Computer System Architecture", 3rd Edition, 1992.
Main references (sources)	M. Morris Mano "Computer System Architecture", 3rd Edition, 1992.
Recommended books and references (scientific journals, reports)	
Electronic references, websites	

Course Description Form

25. Course Name:	
Computer Interface	
26. Course Code:	
COIN306	
27. Semester/Year:	
Semester 1 / 2024-2025	
28. Description Preparation Date:	
2024/9/8	
29. Available Attendance Forms:	
In class/ Meet	
30. Number of Credit Hours(Total)/Number of Units(Total)	
60/ 2	
31. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ina'am Fathi Khudher Email: inam.fathi@uomosul.edu.iq	
32. Course Objectives	
Course Objectives	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. Understanding the main I/O chips in terms of (internal architecture, I/O programming and applications. 4. interfacing the external devices to the processor.
33. Teaching and Learning Strategies	
	The main strategy that will be adopted in delivering this module is to encourage stude participation in the exercises, while at the same time refining and expanding their crit

Strategy	thinking skills. This will be achieved through classes, interactive tutorials and considering type of simple experiments involving some sampling activities that interesting to the students.

34. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	2	Exploring The 80386 Microprocessor	The 80386 Microprocessor	lecture	
2	2	Identifying PPI interfacing	I/O interfacing (Parallel input/output using 8255 PPI and its applications)	Lecture+Lab	
3	2	Identifying PPI interfacing modes	8255 PPI Mode 1 & 8255 PPI Mode 2	Lecture+Lab	Quiz
4	2	Describing 8254 timer / counter	8254 timer / counter and applications	Lecture+Lab	H.W.
5	2	Describing 8279 keyboard/display controller	8279 keyboard/display controller	Lecture+Lab	
6	2	8237 DMA chip and its applications	8237 DMA chip and its applications	Lecture+Lab	
7	2	Describing A/D converters	A/D converters	Lecture+Lab	
8	2	Describing D/A converters	D/A converters	Lecture+Lab	H.W.
9	2	defining RS-232 bus	RS-232 bus	Lecture+Lab	
10	2	Exploring Serial I/O vs USART 8251 and applications 8250,16650 UART	Serial I/O vs USART 8251 and applications 8250,16650 UART	Lecture+Lab	Quiz

		chips.	chips.		
11	2	Exploring Microprocessor interrupts (HW and SW).	Microprocessor interrupts (HW and SW).	Lecture+Lab	
12	2	Exploring Microprocessor interrupts (HW and SW).	Microprocessor interrupts (HW and 13SW) 8259 PIC chip , master/slave of 8259 and its programming. (part1)	Lecture+Lab	
13	2	Defining 8259 PIC chip	8259 PIC chip , master/slave of 8259 (part2)	Lecture+Lab	
14	2	Exam	Theoretical Midterm Exam	Exam	
15	2	Seminar	Presentation.	Seminar	

35. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports …. etc

Quizzes	2	5% (5)
Online assignments	2	5 % (5)
Projects / Lab.	1	10% (10)
Report	1	5% (5)
Midterm Exam	2 hr	25% (25)
Final Exam	3 hr	50% (50)

36. Learning and Teaching Resources

Required textbooks(curricular books, if any)	
Main references (sources)	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.
Recommended books and references (scientific journals, reports)	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.
Electronic references, websites	

Course Description Form

37. Course Name:
Operating System I
38. Course Code:
CO305
39. Semester/Year:
Semester 1 / 2024-2025
40. Description Preparation Date:
2024/9/8
41. Available Attendance Forms: ✓ Providing lectures in the designated classroom, in addition to creating a special electronic classroom for the subject. ✓ Lectures are presented on paper, in addition to an electronic Power Point presentation presented to students. ✓ Giving and explaining lectures in detail to students. ✓ Asking students to submit periodic reports and homework assignments on the basic topics of the subject.
42. Number of Credit Hours(Total)/Number of Units(Total)
150/6
43. Course administrator's name (mention all, if more than one name)
Name:Dr.Sura Ramzi Shareef

Email:sura.ramzishareef@uomosul.edu.iq	
44. Course Objectives	
Course Objectives	• Exploring the importance of operati systems, their goals and functions. • Introduction to designing a implementing operating systems. • Covers the various techniques used the operating system to mana resources. • Introducing the student to the conce and structure of various operati systems, how they work internally, a their most important main parts. • Teaching the student the concept of program, methods of scheduling it on central processing unit, and how implement it using many differ algorithms. How to manage clustering of processes (process threads, CPU schedulir synchronization, and learning about concept of deadlock). And ways to so the problem of system stagnation and to prevent or avoid it.
45. Teaching and Learning Strategies	
Strategy	The main strategy in this course is to: Encouraging students' participation in exercises, as well improving and expanding their critical thinking skills. Throu familiarity with the workings of the system, the purpose of its u and cases of complete system downtime and dealing with them they occur. This will be achieved through classrooms, interact educational programs, and by considering the type of sim

	experiments that include some sampling activities that are of inter to students.

46. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
exams, homework, reports+ Discuss	Lectures	Introduction Chapter 1	Introduction operating syste basic definitions the hardw components software used operating syste types of syste their origin development, types of mod systems..	8	2-1
exams, homework, reports+ Discuss ion	Lectures	Operating-System Services Chapter 2	Learn about structure of operating syst how it works, and most important ba components.	8	4-3
exams, homework, reports+ Discuss ion	Lectures	Processes Chapter 3	Learn about the concept of the program How to schedule i through the systen on the central processing unit Implementation ar types of programs	4	5

			alike Whether it is a system-specific program Belongs to the us		
exams, homework, reports+ Discuss ion	Lectures	Threads & Concurrency Chapter 4	Basic princip and concepts process management operating syste including proc creation, scheduling, synchronization, communication,,	8	7-6
exams, homework, reports+ Discuss ion	Lectures	CPU Scheduling Chapter 5	Learn about concept of program methods scheduling it throu the system on central process unit and how implement it us many dive algorithms.	4	8
exams, homework, reports+ Discuss ion	Lectures	Synchronization Tools Chapter 6	Analyze examp of synchronizat problems operating syste such as produ consumer, read writers, and f philosophers, propose soluti using appropr synchronization techniques.	8	10-9

exams, homework, reports+ Discussion	Lectures	Synchronization Examples Chapter 7	The problem of t section is critical sync devices, Signals, classic problems Of synchronicity.	8	12-11
exams, homework, reports+ Discussion	Lectures	Deadlocks Chapter 8	Identify the conc of stagnation ways to solve problem of syst stagnation and try prevent it or av its occurrence	8	14-13
Exam		Final exam		3	15

47. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports…. etc

		Time/Number	Weight (Marks)
Formative assessment	**Quizzes**	3	15% (5)
	Assignments	2	5% (2.5)
	Lab	15	15% (15)
	Report	1	5% (5)
Summative assessment	**Midterm Exam**	3 hr	10% (10)
	Final Exam	3 hr	50% (50)
Total assessment			100% (100 Marks)

48. Learning and Teaching Resources

Required textbooks(curricular books, if any)	1. Operating Systems Concepts, 1(Edition Silberschatz, Abraham, Galv Peter B., and Gagne, Gr JohnWiley&Sons.,Inc. ISE 9781119320913.
Main references (sources)	1. Operating Systems Concepts, 1(Edition Silberschatz, Abraham, Galv Peter B., and Gagne, Gr JohnWiley&Sons.,Inc. ISE 9781119320913. 2. An Introduction to GCC: For the GI Compilers GCC and G++, Brian Gough, Richard M. Stallman, Netw Theory Ltd, ISBN : 978-095416179
Recommended books and references (scientific journals, reports)	جميع المجلات العلمية الرصينة في موضوع نظم التشغيل وانواعها وتطورها.
Electronic references, websites	1. Lectures notes at www.tutorial.com 2. Other lectures notes on t Internet network

Course Description Form

49. Course Name:	
Soft computing	
50. Course Code:	
SOCO311	
51. Semester / Year:	
Semester 1 / 2024−2025	
52. Description Preparation Date:	
11/9/2024	
53. Available Attendance Forms:	
Attend	
54. Number of Credit Hours (Total) / Number of Units (Total):	
3/75	
55.Course administrator's name (mention all, if more than one name)	
Name: Dr. Ali Mukhlif Ahmed Al-Saegh E-mail: ali.alsaegh@uomosul.edu.iq	
56. Course Objectives	
Course Objectives	• Finding reasonable solutions for real-world problems whose specific mathematical model is unknown. • Applying modern algorithms that mimics the behavior of organisms. • Integrating human intelligence with electronic devices to produce intelligent systems. • Learn how to build intelligent systems that facilitate the process of classification and identification of different objects.
57. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encourage studer participation in the exercises, while at the same time refining and expanding their criti thinking skills. This will be achieved through classes, interactive tutorials and by consider type of simple experiments involving some sampling activities that are interesting to students.

58. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
	2	Understanding basic concepts	Introduction to soft computing	Lecture	Discussion
	2	Know what is an artificial neural network	Introduction to artificial neural networks	Lecture	Oral exam
	2	Understanding the construction of the artificial neuron	Training a perceptron	Lecture	Discussion
	2	Studying a training algorithm	Training neural networks	Lecture	Homework
	2		Exam or tutorial	Lecture	Homework
	2	Understanding the basics of fuzzy logic	Introduction to Fuzzy logic	Lecture	Homework
	2	Studying an operation of fuzzy logic	Fuzzy sets and fuzzy operations	Lecture	Discussion
	2	Studying an operation of fuzzy logic	Fuzzification and defuzzification	Lecture	Homework
	2	Studying an operation of fuzzy logic	Designing a fuzzy control system	Lecture	Homework
	2		Exam or tutorial	Exam	Quiz
	2	Understanding the basics of evolutionary computations	Introduction to evolutionary algorithms and genetic algorithm	Lecture	Homework
	2	Studying an operation of genetic algorithm	Selection and fitness function	Lecture	Homework
	2	Studying an operation of genetic	Mutation and	Lecture	Oral exam

		algorithm	crossover		
	2	Analysis of a specific engineering problem	Case study of genetic algorithm	Lecture	Homework
	2		Exam or tutorial	Exam	

59. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports …. etc

	Time/Number	Weight (Marks)
Quizzes	2	15% (15)
Online Assignments	2	10% (10)
Onsite Assignments	1	5% (5)
Projects	1	10% (10)
Midterm Exam	2 hr	10% (10)
Final Exam	3hr	50% (50)
Total assessment		100% (100 Marks)

60. Learning and Teaching Resources

Required textbooks (curricular books, if any)	Lecture notes
Main references (sources)	**Principles of Soft Computing** by S.N. Sivanandam
Recommended books and references (scientif journals, reports)	**Soft Computing and its Applications** by Kumar S. Ray
Electronic references, websites	**Principles of Soft Computing** by S.N. Sivanandam

University of Mosul / College of Engineering / Computer Engineering Department

Curricula for the Academic Year 2024-2025

Curricula of the Computer Engineering Department

Third Academic Level, Second Semester

Curricula of the Computer Engineering Department

Third Academic Level (Second Semester)								
Type of Requirement	**Requirement Type (Mandatory – Elective)**	**Course Name**	**Number of Theoretical Hours**	**Number of Practical Hours**	**Number of Credits**	**Prerequisite (if applicable)**	**Course Code**	**Notes**
Department Requirements	Mandatory	Computer Network II	2	2	3	Computer Network I & Data Communication	CONE351	
	Mandatory	Digital Signal Processing	3	-	3	Signals and Systems	DSPR352	
	Mandatory	Computer Architecture II	3	-	3	Computer Architecture I	COAR353	
	Mandatory	Operating System II	2	2	3	Operating System I	OPSY 354	
	Mandatory	Embedded System	2	2	3		EMSY358	
	Elective	Circuits VLSI	2	-	2		VLSI356	The student chooses one course. The required number of credits = 2 credits.
		Image Processing	2	-	2		IMPR355	
	Elective	Optimization	2	-	2		OPTI357	The student chooses one course. The required number of credits = 2 credits.
		Database System	2	-	2		DASY359	
	Total Hours and Credits for the Second Semester		**16**	**6**	**19**			

Note: Summer Training is a graduation requirement to be completed after the student finishes the third level, during the period from July 1 to July 31, or from August 1 to August 31.

Course Description Form

1. Course Name:
Computer Networks II
2. Course Code:
CONE351
3. Semester/Year:
Semester 2 / 2025-2024
4. Description Preparation Date:
11/9/2024
5. Available Attendance Forms:
In class / on meet
6. Number of Credit Hours(Total)/Number of Units(Total)
45/3
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Salah Abdulghani Email: eng.salah@uomosul.edu.iq
8. Course Objectives

Course Objectives	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

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

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1&2	6	Identify and describe the basics of wireed networks	Wired LANs	Lecture	Quiz
3	3	Explain and compare with various types of Networks	Connecting LANs, Backbone Networks, and Virtual LANs	Lecture	Quiz

4	3	Identify and describe the Network layer	Introduction to Network Layer	Lecture	Home work
5 & 6	6	Explain and compare with various types of protocols in the network layer	Network Layer and IPv4 and IPv6 Addresses	Lecture	Home work
7 & 8	6	Identify and describe the Routing Protocols	Routing Fundamentals and Routing Protocols	Lecture	Exam
9	3	Identify and describe Transport Layer	Introduction to Transport La	Lecture	Quiz
10 & 11	6	Identify and describe the Transport Layer protocols	Transport Layer Protocols	Lecture	Home work
12	3	Identify and describe the Application Layer	Introduction to the Application Layer	Lecture	Quiz
13 & 14	6	Identify and describe the application layer protocolss	Standard Client-Server Protocols (DHCP, NS,FTP,TFTP,HTTP, TELNET, SMTP, POP, IMAP)	Lecture	Home work
15	3	Identify and describe The DHCP, ICMP, ARP	DHCP, ARP, ICMP	Lecture	

11. Course Evaluation

Quizzes	**12% (12)**	**4**
Assignments	**3% (3)**	**3**
Report/Lab	**10% (10)**	**5**
Midterm Exam	**25% (25)**	**2 hr**

12. Learning and Teaching Resources

Required textbooks(curricular books, if any)	Behrouz A. Forouzan, “Data communication and Networking”, Fifth Edition, Tata McGraw – Hill,2015. Cory Beard and William Stallings, “Wireless Communication Networks and Systems” (ISBN: 0133594173, available online
Main references (sources)	James F. Kurose, Keith W. Ross, “Computer Networking – A Top-Down Approach Featuring the Internet”, seventh Edition, Pearson Education, 2016.
Recommended books and references (scientific journals, reports)	–––––
Electronic references, websites	–––––

Course Description Form

1. Course Name:	
DSP	
2. Course Code:	
CO308	
3. Semester/Year:	
Semester 2 / 2025-2024	
4. Description Preparation Date:	
11/9/2024	
5. Available Attendance Forms:	
In class/ Meet	
6. Number of Credit Hours(Total)/Number of Units(Total)	
45/ 3	
7. Course administrator's name (mention all, if more than one name)	
Name: zahra talal abed Email: zahraatalal@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	This course will cover many topics and concepts relate to digital systems, analogue and digital devices, and th characteristics. Topics to be covered during the discussion will include analogue and digital signals, ho to generate digital signals and general characteristics c digital signals and systems. This course deals with the study of conversion methods and how to design digital filters based on FIR and IIR properties.
9. Teaching and Learning Strategies	
	The main strategy that will be adopted in delivering this module is to encourage stude participation in the exercises, while at the same time refining and expanding their crit thinking skills. This will be achieved through classes, interactive tutorials and

Strategy	considering type of simple experiments involving some sampling activities that interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	3	Introduction of Z transform to determine the basic theory	Introduction of Z transform	Lecture	Oral t
2	3	Determine the properties of Z transform	properties of Z transform	Lecture	Quiz
3 & 4	6	Determine the method of Z transform	method of Z transform	Lecture	Oral test+H.W.
5 & 6	6	Determine the properties of inverse Z transform	inverse Z transform	Lecture	H.W.
7 & 8	6	Determine the method to find the transfer function	Transfer function	Lecture	Exam1
9 & 10	6	Introduction of digital filter	Introduction of digital filter	Lecture	Quiz
11 & 12	6	Determine the method of IIR filter design	IIR filter design	Lecture	Oral test+H.W.

13 & 14	6	Determine e method of FIR filter design	FIR filter design	Lecture	Quiz
15	1	exam	Exam	Exam	exam

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports …. etc

5% (5)	2	**Quizzes**
5 % (5)	2	**Online assignments**
10% (10)	1	**Projects**
5% (5)	1	**Report**
25% (25)	2 hr	**Midterm Exam**
50% (50)	3 hr	**Final Exam**

12. Learning and Teaching Resources

Required textbooks(curricular books, if any)	
Main references (sources)	1- Discrete-Time Signal Processing" 3rd Edition, N V. OPPENHEIM and W. SCHAFER HEWLETT, ntice-Hall Signal Processing Series, 2010. 2- "Digital Signal Processing", 3rd, Mithra, McGraw Hill Publications, 2008
Recommended books and references (scientific journals, reports)	Discrete-Time Signal Processing" 3rd Edition, N V. OPPENHEIM and W. SCHAFER HEWLETT, ntice-Hall Signal Processing Series, 2010 . 2- "Digital Signal Processing", 3rd, Mithra, McGraw Hill Publications, 2008
Electronic references, websites	

Course Description Form

13. Course Name:
Computer Architecture II
14. Course Code:
COAR353
15. Semester/Year:
Semester 2 / 2025-2024
16. Description Preparation Date:
11/9/2024
17. Available Attendance Forms:
1. Classroom 2. Google Classroom (jjx3p5i)
18. Number of Credit Hours(Total)/Number of Units(Total)
125 Hour / 5 Units
19. Course administrator's name (mention all, if more than one name)
Name: Lecturer Dr. Dhafir Abdulfattah Email: dhafir.abdulfattah@uomosul.edu.iq Name: Lecturer Assistant Farah Natiq Email: farah.qassabbashi@uomosul.edu.iq

20. Course Objectives	
Course Objectives	• Provides the basic knowledge necessary to understar the principle of microprogrammed control unit. • Highlights the central processing unit and the RISC & CISC Characteristics. • Gives the understanding of pipeline concepts and design.

21. Teaching and Learning Strategies	
Strategy	It includes: • Lecture Presentations. • Interactive Discussions. • Activities. • Problem-Solving Exercises.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	3	Knowledge: Identify the principle of the microprogrammed control unit. Analysis: analyze the basic components of the microprogrammed control unit by writing microprograms.	Microprogrammed Control: Introduction	Lecture	Discussions
2	3		Microprogrammed Control: Mapping and sequencer	Lecture	Quiz
3	3		Microprogrammed Control: Micro-instructions	Lecture	Classwork
4	3		Microprogrammed Control: Micro-instructions programming	Lecture	Homework

5	3		Microprogrammed Control: Design of decoding ALU control information	Lecture	Homework
6	3		Microprogrammed Control: Design of microprogram sequencer	Lecture	Discussions
7	3		Microprogrammed Control: Condition and branching implementation	Lecture	Quiz
8	3	Understanding: Interpret the components of the central processing unit and the RISC & CISC Characteristics. Application: illustrate the concepts of addressing modes and stacking.	Central Processing Unit: General registers organization	Lecture	Discussions
9	3		Central Processing Unit: Stack organization	Lecture	Classwork
10	3		Central Processing Unit: Instruction format and addressing mode	Lecture	Classwork
11	3		Central Processing Unit: Flags (processor status word)	Lecture	Quiz
12	3		RISC & CISC characteristics	Lecture	Homework
13	3	Knowledge: Identify the principle of the pipelining. Analysis: analyze the basic components of the pipeline.	Pipelining concepts and design	Lecture	Classwork
14	3		Pipelining concepts and design	Lecture	Discussions
15	3		Pipelined processor	Lecture	Discussions
23. Course Evaluation					
2 quizzes 4pts					

2 homework 4pts 2 Term Exam 32pts Final Exam 60pts Total 100pts	
24. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	M. Morris Mano "Computer System Architecture", 3rd Edition, 1992.
Main references (sources)	M. Morris Mano "Computer System Architecture", 3rd Edition, 1992.
Recommended books and references (scientific journals, reports)	
Electronic references, websites	

Course Description Form

25. Course Name:
Operating System II
26. Course Code:
CO311
27. Semester/Year:
Semester 2 / 2025-2024
28. Description Preparation Date:
11/9/2024
29. Available Attendance Forms: ✓ Providing lectures in the designated classroom, in addition to creating a special electronic classroom for the subject. ✓ Lectures are presented on paper, in addition to an electronic Power Point presentation presented to students. ✓ Giving and explaining lectures in detail to students. ✓ Asking students to submit periodic reports and homework assignments on the basic topics of the subject. ✓ Urging students to follow the material by asking questions directly to each student to show the extent of their interaction with the material and motivating the rest of the students to pay attention.
30. Number of Credit Hours(Total)/Number of Units(Total)
150/6
31. Course administrator's name (mention all, if more than one name)

Name:Dr.Sura Ramzi Shareef

Email:sura.ramzishareef@uomosul.edu.iq

32. Course Objectives	
Course Objectives	• The operating system provides an established, convenient, and efficient interface between user programs and the bare hardware of the computer on which they run. • In this course we will explore the core principles of operating systems design and 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. • This course provides an established, convenient, and efficient interface between user programs and the bare hardware of the computer on which they run. • Gives the understanding principles operating systems design a implementation, including file systems a storage; memory management techniqu virtualization and distributed systems.

33. Teaching and Learning Strategies	
	1. Understand the core principles and concepts of proce management in operating systems, including process creati

Strategy	scheduling, synchronization, and communication, to effectively mana system resources and facilitate efficient execution of user programs. 2. Gain knowledge of different memory management techniques, su as main memory management and virtual memory, including conce like paging, segmentation, and demand paging, to optimize mem utilization and support multitasking in operating systems. 3. Explore the structure and functionality of mass storage syste including disk organization, file systems, and I/O systems, to ens efficient and reliable storage and retrieval of data in operating syste 4. Comprehend the file system interface, implementation, and interna including file organization, directory structures, and access methods, effective management and manipulation of files and directories operating systems. 5. Develop an understanding of virtual machines and distribut systems, including virtualization techniques, distributed file syste and network communication protocols, to enable the deployment a management of scalable and reliable computing environments acr multiple machines and networks. This course introduces the concepts of the operating system. • It includes: different memory management techniques, such main memory management and virtual memory, pagi segmentation, and demand paging, to optimize mem utilization including concepts like and support multitasking operating systems and file systems and storage; virtualizat

	and distributed systems. It demonstrates the structure and functionality of mass stora systems, including disk organization, file systems, and I/O systems.

34. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
exams, homewor reports+ Discuss	Lectures	Overview of Process Management	Understand the c principles a concepts of proce management operating syste including proce creation, schedul synchronization, a communication, effectively mana system resourc and facilit efficient execut of user programs.	4	1
exams, homewor reports+	Lectures	Main Memory	Gain knowledge different mem management techniques, such	8	2-3

Discussion			main memo management		
exams, homewor reports+ Discussion	Lectures	Virtual memory	virtual memo including conce like pagi segmentation, a demand paging, optimize mem utilization a support multitask in operat systems.	8	4-5
exams, homewor reports+ Discussion	Lectures	Mass-Storage Struactuer	Explore the structure functionality of m storage systems, inclu disk organization, systems, and I/O syste to ensure efficient reliable storage retrieval of data operating systems.	8	6-7
exams, homewor reports+ Discussion	Lectures	I/O System	Explore structure a functionality of systems, and systems, to ensu	8	8-9

			efficient and relia storage a retrieval of data operating system		
exams, homewor reports+ Discuss ion	Lectures	File–System Interface	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.	4	10
exams, homewor reports+ Discuss ion	Lectures	File-System Implementatic	Comprehend file syst interface, implementation, and interna including organization,	8	11-12

			directory structures, a access metho for effect management a manipulation files and director in operat systems.		
exams, homewor reports+ Discuss ion	Lectures	Virtual Machine	Develop understanding virtual machir and distribut systems, includ virtualization techniques, distributed systems, a network communication protocols, to ena the deployment a management scalable a reliable comput	8	13-14

			environments across multi machines a networks.		
xam		Final exam		3	15

35.

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports…. etc

		Time/Number	Weight (Marks)
Formative assessment	**Quizzes**	3	15% (5)
	Assignments	2	5% (2.5)
	Lab	15	15% (15)
	Report	1	5% (5)
Summative assessment	**Midterm Exam**	3 hr	10% (10)
	Final Exam	3 hr	50% (50)
Total assessment			100% (100 Marks)

36. Learning and Teaching Resources

Required textbooks(curricular books, if any)	1. Operating Systems Concepts, 1(Edition Silberschatz, Abraham, Galv Peter B., and Gagne, Gr JohnWiley&Sons.,Inc. ISB 9781119320913.
Main references (sources)	1. Operating Systems Concepts, 1(Edition Silberschatz, Abraham, Galv

	Peter B., and Gagne, Gr JohnWiley&Sons.,Inc. ISB 9781119320913. 2. An Introduction to GCC: For the GI Compilers GCC and G++, Brian J. Goug Richard M. Stallman, Network Theory L ISBN : 978-095416179
Recommended books and references (scientific journals, reports)	جميع المجلات العلمية الرصينة في موضوع نظم التشغيل وانواعها وتطورها.
Electronic references, websites	1. Lectures notes at www.tutorial.com 2. Other lectures notes on t Internet network

Course Description Form

37. Course Name:	
Embedded Systems	
38. Course Code:	
EMSY358	
39. Semester/Year:	
Semester 2 / 2025-2024	
40. Description Preparation Date:	
11/9/2024	
41. Available Attendance Forms:	
In class / on meet	
42. Number of Credit Hours(Total)/Number of Units(Total)	
60/ 2	
43. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ina'am Fathi Khudher Email: inam.fathi@uomosul.edu.iq	
44. Course Objectives	
Course Objectives	1. Introduce the fundamentals of embedded system design and implementation, including specifications and modeling of embedded systems, hardware/software partition and exploring ATmega2560 Micro-controller Architecture. 2. co-design: validation and implementation, peripherals and interfacing :memory : development methodologies and tools. 3. learn about: low-level microcontroller programming, hardware aspects, I/O interfacing, timers and signal conversion
45. 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 type of simple experiments involving some sampling activities that are interesting to the students.

46. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	2	Defining embedded systems and identify applications to real word systems.	Introduction to Micro-controller vs. Microprocessor	lecture	
2	2	Learn about the Arduino ATmega2560 architecture Learn about the set of special instructions for programming the Arduino	ATmega2560 Micro-controller Architecture	Lecture+ Lab.	H.W.
3	2	Describe the different I/O configurations available in General Purpose I/O (GPIO)	Arduino Mega 2560 General Purpose Input/ Output Pins description	Lecture+ Lab.	
4	2	Learn about the set of special instructions for programming the Arduino	Addressing modes, instruction set (part1)	Lecture+ Lab.	
5	2	Learn about the set of special instructions for programming the Arduino	Addressing modes, instruction set (part2)	Lecture+ Lab.	
6	2	Describe the basic features and operation	ATmega2560 6-timer/Counter	Lecture+ Lab.	Quiz

		of typical hardware timers used in embedded systems	modes (part1)		
7	2	Describe the basic features and operation of typical hardware timers used in embedded systems	ATmega2560 6-timer/Counter modes (part2)	Lecture+ Lab.	
8	2	Identify and define interrupts supported on the embedded system(s).	ATmega2560 Interrupts (part1)	Lecture+ Lab.	
9	2	Describe architectural methods for ADCs and write programs that use one or more external sensors	ATmega2560 Interrupts (part2)	Lecture+ Lab.	
10	2	Describe the basic features and operation of typical serial communications for devices used in embedded systems	ATmega2560 Serial Communication modes of operation (part1)	Lecture+ Lab.	Quiz
11	2	Describe the basic features and operation of typical serial communications for devices used in embedded systems	ATmega2560 Serial Communication modes of operation (part2)	Lecture+ Lab.	
12	2	Identify the power system in embedded systems	Micro-controller power management	Lecture	H.W.
13	2	Embedded systems applications	Micro-controller features and applications	Lecture	
14	2	Semester exam	Theoretical Midterm Exam	Exam	
15	2	Project presentation	Presentation	Seminar	
47. Course Evaluation					

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports …. etc

Quizzes	2	5% (5)
Online assignments	2	5 % (5)
Projects / Lab.	1	10% (10)
Report	1	5% (5)
Midterm Exam	2 hr	25% (25)
Final Exam	3 hr	50% (50)

48. Learning and Teaching Resources

Required textbooks(curricular books, if any)	
Main references (sources)	The ATmega640/1280/2560/V Microcontroller Data sheet.
Recommended books and references (scientific journals, reports)	Embedded system Design: Embedded systems Foundations of Cyber-Physical Systems, Peter Marwedel, Spriner Nov. 16, 2010.
Electronic references, websites	

49. Course Name:

Database Systems

50. Course Code:

DASY359

51. Semester/Year:

Second-Semester / Third Year

52. Description Preparation Date:

11/4/2024

53. Available Attendance Forms:

In class

54. Number of Credit Hours(Total)/Number of Units(Total)

60/2

55. Course administrator's name (mention all, if more than one name)	
Name: Ass. Prof. Dr. Turkan Ahmed Khaleel Email: turkan@uomosul.edu.iq	
56. Course Objectives	
Course Objectives	• Understand the fundamental concepts of database systems, including data models, database language • Learn how to design and implement relational database schemas using normalization techniques • Gain proficiency in SQL (Structured Query Languag for querying and manipulating relational database
57. Teaching and Learning Strategies	
Strategy	• Hands-on Projects: Engage students in building databases to reinforce concepts. • Case Studies: Analyze real-world database scenarios to illustrate theory in practice. • Interactive Lectures: Encourage discussions and questions to enhance understanding.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2	Gain the basic principles of database management systems	Introduction Database Environment. Database Development.	Lecture	Oral exam
Week 2	2	Gain the basic principles of database management systems	Modeling Data in the Organization.	Lecture	Oral exam
Week 3	2	Gain the ability to Draw Entity-Relationship diagrams to represent simple database application scenarios	Logical Database Design and the Relational model, Physical Database Design, and Performance.	Lecture	Oral exam Homework
Week 4	2	Gain the ability to write SQL queries for a given context in a relational database	SQL	Lecture	Quiz
Week 5	2	Gain the ability to write SQL queries for a given context in a relational database	Advanced SQL Getting Started with SQL in Access Beginning SQL Commands in access	Lecture	Oral exam Homework

Week 6	2	Gain the ability to write SQL queries for a given context in a relational database	SQL Joins	Lecture	Quiz
Week 7	2	Gain the ability to write SQL queries for a given context in a relational database	SOL Functions	Lecture	Quiz
Week 8	2	Gain the ability to write SQL queries for a given context in a relational database	SQL Query Development and Derived structures, SQL set Operations		Exam
Week 9	2	Gain the design and development of distributed systems and distributed systems applications.	Client/Server Database Environment	Lecture	Quiz Oral exam Homework
Week 10	2	Gain the design and development of distributed systems and distributed systems applications.	Internet Database Environment, Data Warehousing, Creating and Populating	Lecture	Quiz Oral exam Home work
Week 11	2	Gain the design and development of distributed systems and distributed systems applications.	Data and Database Administration	Lecture	Oral exam Home work
Week 12	2	Gain the design and development of distributed	Distributed Database	Lecture	Quiz

		systems and distributed systems applications.			
Week 13	2	Gain the design and development of distributed systems and distributed systems applications.	Object-Oriented Data ModelingObject-Oriented Database Development	Lecture	Presentation
Week 14	2	Gain the design and development of distributed systems and distributed systems applications.	Students support	Lecture	Exam
Week 15	2		Study week and preparations for assignment submission and Exams		Exam
11. Course Evaluation:					
		Quizzes	2	5% (2.5)	
		Assignments	2	15% (4.5)	
		Project	1	10% (3)	
		Midterm Exam	2 hr	10% (30)	
		Final Exam	3hr	60% (60)	
Required Textbooks: Hoffer, Prescott& McFadden, (2005). " Modern Database Management", (7th ed.) Prentice- Hall, Inc. ISBN: 0-13-145320-3.					
Main reference: Lectures and notes					

Recommended Textbooks: Bagui, S. & Earp, R(2004). "Learning SQL A Step-Step Guide using Access" Addison-Wesley Publishing. ISBN: 0-32-111904-5.
Electronic Reference/ Website:

Course Description Form

58. Course Name:
Image Processing
59. Course Code:
IMPR355
60. Semester/Year:
Semester 2 / 2025-2024
61. Description Preparation Date:
11/9/2024
62. Available Attendance Forms:
Physical attendance in class
63. Number of Credit Hours(Total)/Number of Units(Total)
30/2

64. Course administrator's name (mention all, if more than one name)

Name: Akram Abdul Mawjood Dawood , Dr. amar Idrees daood

Email: akram.dawood@uomosul.edu.iq , amar.daood@uomosul.edu.iq

65. 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.

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

67. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
Week1	2hr	Identify a wide-range of image processing techniques and applications.	Introduction & Fundamentals of digital Image processing and applications.	Lecture	Oral Exam
Week2	2hr	Describe how digital images are represented, manipulated, encoded, compressed and processed.	Image analysis, preprocessing, ROI, Image Algebra.	Lecture	Homework
Week3	2hr	Understanding image types, Spatial Filters and Image quantization methods.	Spatial Filters	Lecture	Quiz
Week4	2hr	Applying the edge detection, operators and masks on images.	Edge detection.	Lecture	Homework, Report
Week5	2hr	Explain the purpose of each process and the underlying mathematical principles.	Image quantization methods.	Lecture	Quiz
Week6	2hr	Applying the edge detection, operators and masks on images.	Operators, Masks.	Lecture	Oral Exam
Week7	2hr	Analyzing noise and blur types.	Noise and blur in images	Lecture	Homework

			removals		
Week8	2hr	Executing and designing appropriate image restoration systems.	System model, Image restoration.	Lecture	Quiz
Week9	2hr	Executing and designing appropriate image restoration systems.	Measurements of image quality.	Lecture	Homework
Week10	2hr	Implementing image compression and decompression methods.	Image Compression types	Lecture	Quiz
Week11	2hr	Implementing image compression and decompression methods.	Image coding.	Lecture	Homework
Week12	2hr	Monitoring recent developments in the field of image transforms and biometric application.	Discrete Transform (FFT, Cosine transforms and Wavelet transform)	Lecture	Oral Exam
Week13	2hr	Implementing image compression and decompression methods.	JPEG & JPEG 2000	Lecture	Homework
Week14	2hr	Monitoring recent developments in the field of image transforms and biometric application.	Introduction to biometric systems types and applications.	Lecture	Quiz

Week15	2hr				Final Exam

68. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports …. etc .As illustrated in the table below

As		Time/Number	Weight (Marks)
Formative assessment	**Quizzes**	2	15% (15)
	Onsite Assignments	1	5% (5)
	Report	1	10% (10)
Summative assessment	**Midterm Exam**	2 hr	10% (10)
	Final Exam	3hr	60% (60)
		Total assessment	100% (100 Marks)

69. Learning and Teaching Resources

Required textbooks(curricular books, if any)	
Main references (sources)	• Gonzalez, Rafael C._ Woods, Richard E. - Digital image Processing • Lectures and notes
Recommended books and references (scientific journals, reports)	Umbaugh, Scott E. *Digital image processing and analysis: applications with MATLAB® and CVIPtools*. CRC press, 2017. Zhang, Yu-Jin. *A Selection of Image Processing Techniques: From Fundamentals to Research Front*. CRC Press, 2022.
Electronic references, websites	

University of Mosul / College of Engineering / Computer Engineering Department

Curricula for the Academic Year 2024-2025

Curricula of the Computer Engineering Department

Fourth Academic Level, First Semester

Curricula of the Computer Engineering Department

Fourth Academic Level (First Semester)								
Type of Requirement	**Requirement Type (Mandatory – Elective)**	**Course Name**	**Number of Theoretical Hours**	**Number of Practical Hours**	**Number of Credits**	**Prerequisite (if applicable)**	**Course Code**	**Notes**
College Requirements	Elective	Public Safety	2	-	2		ENGE429	Mandatory for Department Students
Department Requirements	Mandatory	Graduation Project I	2	-	2	All Mandatory Department Requirements for the Third Level		
	Mandatory	Control Systems	3	2	4	Signals and Systems	COSY403	
	Mandatory	Real Time Systems	2	2	3	Embedded Systems	RETS404	
	Mandatory	Computer Graphics	2	-	2		COGR405	
	Mandatory	Artificial Intelligence	2	-	2		ARIN409	
	Elective	Wireless Network	2	-	2		WINE406	The student chooses one course. The required number of credits = 2 credits.
		Advanced Computer Architecture	2	-	2		ACAR408	
	Elective	Optical Communication	2	-	2		OPCO407	The student chooses one course. The required number of credits = 2 credits.
		Biometric Engineering	2	-	2		BIEN411	
	Total Hours and Credits for the First Semester		**17**	**4**	**19**			

Course Description Form

1. Course Name:
Public safety
2. Course Code:
ENGE429
3. Semester/Year:
Semester 1 / 2024-2025
4. Description Preparation Date:
12/9/2024
5. Available Attendance Forms:
0n class-google meet
6. Number of Credit Hours(Total)/Number of Units(Total)
7. Course administrator's name (mention all, if more than one name)
Name: modhar ahmed hammoudy hussain Email: modharhammoudy@uomosul.edu.iq
8. Course Objectives

Course Objectives	This course focuses on meaning of public safety, and verifying the hazard types and the safety margins, risks, controlling for all types of hazards. The course includes activities and exercises that guide students to interface and deal with many problems issues in the real practical life, so it will be easier to face such of these problems in the future.

9. Teaching and Learning Strategies

Strategy	1. An ability to skillfully communicate orally with gathering of people and in writing with various managerial levels. 2. An ability to perceive ethical and professional responsibilities in engineering cases and make brilliant judgments taking into account the consequences in worldwide financial, ecological and social considerations. 3. An ability to perceive the continual necessity for professional knowledge growth and how to find, assess, assemble and apply it properly 4. An ability to work adequately on teams and to set up objectives, plan activities, meet due dates, and manage risk and uncertainty.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
Week 1	2	Naming all the Types of hazards in the work places	What is health and safety all about?	lecture	oral exam
Week 2	2	Using the basic concepts of engineering to determine the risk levels for the work places	Getting started – hazards, risk assessment and control	lecture	oral exam
Week 3	2	Monitoring the figure of merit of the safety and controlling ways	Managing health and safety	Lecture	oral exam
Week 4	2	Select the suitable assessments after summarizing the	Monitor and review of health and safety	Lecture	oral exam

		hazard types of work palaces	performance		
Week 5	2	Ability of decide suitable assessment for any situations	Framework of health, safety and fire law	Lecture	Quiz
Week 6	2	Make the place healthy and safety to perform a certain duty	Consultation and safety representatives	Lecture	oral exam
Week 7	2	Naming all the Types of hazards	Control of safety hazards	Lecture	oral exam
Week 8	2	Naming all the Types of dangerous materials	Hazardous substances – Health hazards	Lecture	oral exam
Week 9	2	Make the place healthy and safety to perform a certain duty.	Providing a health and safety method statement	Lecture	Quiz
Week 10	2	some types of hazards	Physical and psychological health hazards	Lecture	oral exam
Week 11	2		Term exam		Exam
Week 12	2	Make the place healthy and safety to perform a certain duty	Construction and contractors	Lecture	oral exam
Week 13	2	Ability of deconstruct any situation to evaluate the problems	Accidents and emergencies	Lecture	oral exam
Week 14	2	Select the suitable solution after	Sources of information and	Lecture	oral exam

		summarizing the different types of hazards	guidance		
Week 15	2		Final exam		Exam

11. Course Evaluation
2-quizzes 5 Project 10 Term Exam 25 Final Exam 60

12. Learning and Teaching Resources	
Required textbooks(curricular books, if any)	
Main references (sources)	"Easy Guide to Health and safety" by: Phil Hughes, Hughes (2008)
Recommended books and references (scientific journals, reports)	
Electronic references, websites	

Course Description Form

13. Course Name:	
Control Systems	
14. Course Code:	
COSY403	
15. Semester/Year:	
Semester 1 / 2024-2025	
16. Description Preparation Date:	
12/9/2024	
17. Available Attendance Forms:	
In class / on meet	
18. Number of Credit Hours(Total)/Number of Units(Total)	
200/8	
19. Course administrator's name (mention all, if more than one name)	
Name: Dr.Sura Nawfal abdulrazzaq Email: Sura.nawfal@uomosul.edu.iq Name: Ola Marwan Email: ola.marwan@uomosul.edu.iq	
20. Course Objectives	
Course Objectives	• Understanding Control System Principles: Students will develop a solid understanding of the principles and fundamentals of control systems. • Analyzing and Designing State

	Variable Models: Students will learn to analyze and design control systems using state variable models. • Evaluating System Performance: Students will gain the ability to evaluate the performance of control systems, particularly focusing on the time response and dynamic performance of second-order systems. • Analyzing Frequency Response: Students will learn to analyze control systems in the frequency domain. • Designing PID Controllers and Digital Control Systems: Students will acquire the knowledge and skills to design proportional-integral-derivative (PID) controllers and understand their application in control systems. They will also explore the stability analysis of digital control systems in the Z-plane and learn techniques like Jury's test.

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

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
Week 1	3	Understand the differential equations of	Introduction : Control system	Lecture	Oral exam

		physical systems open & closed loop systems.	[ch1]		
Week 2	3	An ability to solve the transfer function of linear systems block diagram models.	Mathematical representation of control system [ch2]	Lecture &Tutorial	Oral exam Home work
Week 3	3	An ability to use Signal flow graph Models, State variables of dynamic systems.	Mathematical representation of control system [ch2]	Lecture	Home work
Week 4	3	Understand the State equation and solution of state equation State diagram.	Mathematical representation of control system [ch2]	Lecture & Tutorial	Oral exam Home work
Week 5	3	Analyze Controllability Observability of systems.	Fundamental of control system [ch3]	Lecture	Oral exam
Week 6	3	Analyze of state variable models , 1st Quiz	State variable models [ch4]	Lecture & Tutorial	Quiz Home work
Week 7	3	An ability to design with state feed back	State variable models [ch4]	Lecture	Oral exam Home work
Week 8	3		Mid-term exam.		Exam
Week 9	3	Understand the time response of 2nd order systems.	Transient and steady state response [ch5]	Lecture	Oral exam Home work

Week 10	3	Understand the Dynamic performance of 2nd order systems	Transient and steady state response [ch5]	Lecture & Tutorial	Oral exam Home work
Week 11	3	Apply the concept of stability	Control system analysis and design [ch6]	Lecture	Oral exam
Week 12	3	Analyze Routh-Hurwritz criterion Relative stability, 2nd Quiz	Control system analysis and design [ch6]	Lecture & Quiz	Quiz
Week 13	3	Apply root locus Design	Control system analysis and design [ch6]	Lecture	Oral exam
Week 14	3	Stability analysis by root locus,	Control system analysis and design [ch6]	Lecture & Tutorial	Oral exam Home work
Week 15	3		Final exam		Exam

23. Course Evaluation

Quiz	2	5%
Assignment	8	20%
Midterm Exam	30	75%

24. Learning and Teaching Resources

Required textbooks(curricular books, if any)	Modern control Engineering by Katsuhiko ogata
Main references (sources)	Lectures and notes
Recommended books and references (scientific journals, reports)	Benjamin C. Kuo "Automatic Control System
Electronic references, websites	control system – Google Drive

Course Description Form

1. Course Name:
Real Time Systems
2. Course Code:
RETS404
3. Semester/Year:
Semester 1 / 2024-2025
4. Description Preparation Date:
12/9/2024
5. Available Attendance Forms:
Physical attendance
6. Number of Credit Hours(Total)/Number of Units(Total)
150/6
7. Course administrator's name (mention all, if more than one name)
Name: amar daood Email: Amar.daood@uomosul.edu.iq Name: Basman Mahmood Email: bm.alhafidh@uomosul.edu.iq

8. Course Objectives

Course Objectives	● Be familiar with the basics of real time system. ● Analyze and design any required real time system and provide solutions to any problem will be faced during testing stage. ● Understand the basic knowledge of the sensor's types. ● Be familiar with the Signal conditioning. ● Have the ability to code with the Real time languages.

9. Teaching and Learning Strategies

Strategy	1- Apply knowledge of mathematics, science, and engineering 2- Ability to work effectively within multidisciplinary teams 3- Identify, formulate, and solve engineering problems

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
2	1	Learn basic of real time system	Classifying real time system, HW & SW	Lecture/lab	Oral Exam
2	2,3	Understand types of sensors	Sensors: Characteristics & types	Lecture/lab	Oral Exam Homework
2	4,5	Learn Signal conditioning	Signal conditioning	Lecture/lab	Oral Exam Homework
2	6,7	Understand data buses	Data buses.	lecture	Oral Exam Quiz
2	8	Learn types of storages	Types of storage devices, non-volatile memories & interconnection between them	lecture	Oral Exam

2	9	Understand single and multitasking	Single chip computer, board comp., multitasking	lecture	Oral Exam
2	10	Learn Real time application	Real time software-control & software application	Lecture/lab	Quiz
2	11	Understand Processes synchronization	Processes interconnections & synchronization	lecture	Homework
2	12,13	Learn scheduling	Real time scheduler, deadlocks	lecture	Exam
2	14	Learn Real time data base and Real time languages	Real time data base and Real time languages	lecture	Oral Exam
	15		**Final exam**		
			Classifying real time system, HW & SW		

11. Course Evaluation

5pts	2 quizzes
5pts	3 homework
5pts	reports
5pts	Project
20pts	Term Exam
10pts	Lab
50pts	Final Exam
100pts	Total

12. Learning and Teaching Resources

Required textbooks(curricular books, if any)	Real Time Microcomputer System Design (peter D. Lawrence)McGraw-Hill Education (ISE Editions).)
Main references (sources)	Measurement and Instrumentation Systems (W. Bolton) (Butterworth-Heinemann).
Recommended books and references (scientific journals, reports)	Measurement and Instrumentation Principles (Alan S. Morris)(British Library Cataloguing in Publication Data).
Electronic references, websites	

Course Description Form

1. Course Name:
Computer Graphics
2. Course Code:
COGR405
3. Semester/Year:
Semester 1 / 2024-2025
4. Description Preparation Date:
12/9/2024
5. Available Attendance Forms:
Physical attendance
6. Number of Credit Hours(Total)/Number of Units(Total)
100/4
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	4- Apply knowledge of mathematics, science, and engineering. 5- Learn all basic mathematical behind computer graphic and animation design. 6- Ability to work effectively within multidisciplinary teams
	7-

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 Algorith	lecture	Homework
7,8	2	Learn SC	Scan convers	lecture	Quiz

			Algorithm		
9,10	2	Understand clipping	Clipping Algorithm	lecture	Oral Exam
10	2	Learn Transformations	Transformations	lecture	Quiz
11	2	Learn openGL	Introduction OpenGL	lecture	Oral Exam Homework
12	2	Code in OpenGL	OpenGL programm	lecture	Oral Exam
13	2	Learn by examples	OpenGL examples	lecture	Oral Exam
14	2	Learn by application	OpenGL applicatior	lecture	Oral Exam
15					

11. Course Evaluation

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

12. Learning and Teaching Resources

Required textbooks(curricular books,	Computer Vision and Image Processing, By: Scott E. Umbaugh.

if any)	
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

1. Course Name:	
Artificial Intelligence	
2. Course Code:	
ARIN409	
3. Semester / Year:	
Semester 1 / 2024−2025	
4. Description Preparation Date:	
12/9/2024	
5. Available Attendance Forms:	
Attend	
6. Number of Credit Hours (Total) / Number of Units (Total):	
3/75	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Ali Mukhlif Ahmed Al-Saegh E-mail: ali.alsaegh@uomosul.edu.iq Name: Akram Abdulmawjood E-Mail: akram.dawood@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• This course let the students to be familiar with some of the new algorithms and methods in artificial intelligence and machine learning. • The algorithms are based on the natural behavior of the different organisms. • Also, to give the ability to apply these methods in designing and understanding real-world systems.
9. Teaching and Learning Strategies	

Strategy	The main strategy that will be adopted in delivering this module is to encourage stude participation in the exercises, while at the same time refining and expanding their crit thinking skills. This will be achieved through classes, interactive tutorials and considering type of simple experiments involving some sampling activities that interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	2	Understanding basic concepts	Introduction to artificial intelligence and machine learning	Lecture	Discussion
2	2	Understanding the difference between the main tasks of artificial intelligence	Classification, regression, clustering, and association	Lecture	Oral exam
3	2	Understanding the dimensionality of data and using appropriate methods for feature extraction and selection.	Data exploration and types of learning	Lecture	Discussion
4	2	Understanding of model evaluation by using several metrices such as accuracy and cross-validation.	Confusion matrix and evaluation metrices	Lecture	Homework
5	2	Handling several preprocessing methods	Data normalization and conversion (categorical and numerical)	Lecture	Homework
6	2		Exam or tutorial	Lecture	
7	2	Studying regression	Regression algorithms (linear,	Lecture	Homework

		algorithms	polynomial, and multiple)		
8	2	Studying classification algorithm	k-nearest neighbors algorithm	Lecture	Homework
9	2	Studying classification algorithm	Naive Bayes	Lecture	Homework
10	2		Exam or tutorial	Exam	Quiz
11	2	Studying classification algorithm	Decision Tree	Lecture	Homework
12	2	Studying classification algorithm	Support vector machine	Lecture	Homework
13	2	Studying a feature reduction algorithm	Principle component analysis	Lecture	Oral exam
14	2	Studying a feature reduction algorithm	Linear discriminant analysis	Lecture	Homework
15	2		Exam or tutorial	Exam	

11. Course Evaluation

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports …. etc

Weight (Marks)	Time/Number	
15% (15)	2	**Quizzes**
10% (10)	2	**Online Assignments**
5% (5)	1	**Onsite Assignments**
10% (10)	1	**Projects**
10% (10)	2 hr	**Midterm Exam**
50% (50)	3hr	**Final Exam**
100% (100 Marks)		**Total assessment**

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	Lecture notes
Main references (sources)	**Pattern Recognition and Machi Learning** by Christopher M. Bishop
Recommended books and references (scientifi journals, reports)	**Soft Computing and its Applications** by Kumar S. Ray
Electronic references, websites	**Pattern Recognition and Machi Learning** by Christopher M. Bishop

Course Description Form

1. Course Name:	
Wireless Network	
2. Course Code:	
WINE406	
3. Semester/Year:	
Semester 1 / 2024-2025	
4. Description Preparation Date:	
12/9/2024	
5. Available Attendance Forms:	
In class / on meet	
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: Dr. Salah Abdulghani Email: eng.salah@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	1-This course will cover the fundamental aspects of wireless networks, with emphasis on current and next-generation wireless networks. 2-The course should provide the students with a good understanding of the wireless networking concepts and research directions. 3-Various aspects of wireless networking will

	be covered including: Fundamentals of Wireless LAN IEEE 802.11, IEEE 802.11 Distributed Coordination Function (DCF), Multiple Access Techniques and Hidden Node Problem, Bluetooth IEEE 802.15.1. 4-Introduction of Wireless Mesh Networks (WMNs), MAC and Network Layers of WMNs. 5- Introduction of Mobile Ad-Hoc Networks (MANET), MAC and Network Layers of Mobile Ad-Hoc Networks (MANET). 6- Introductions, Applications and Challenges of wireless sensor networks (WSNs), Energy Consumption and MAC (Media Address Control) Layer of Wireless ensor Networks, Routing Protocols of WSNs. 7-Introduction of Wireless Network Coding (WNC). 8- Introduction of Introduction to Internet of Things (IoT).

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

10. Course Structure

Week	Hours	Required Learning	Unit or Subject	Learning	Evaluation

		Outcomes	Name	Method	Method
1	2	Identify and describe the basics of wireless networks	Introduction to Wireless Signal Propagation	Lecture	
2	2	Explain and compare with various types of Coding And Modulation	Introduction to Wireless Coding And Modulation	Lecture	Quiz
3	2	Identify and describe the basics of wireless networks	Fundamentals of Wireless Networks Technology	Lecture	
4,5	4	Explain and compare various types of wireless networks IEEE 802.11	Wireless LANs (IEEE 802.11x)	Lecture	Home work
6	2	Identify and describe IEEE 802.11 Distributed Coordination Function	IEEE 802.11 Distributed Coordination Function	Lecture	Home work
7,8	4	Identify and describe Bluetooth IEEE 802.15.1	Bluetooth IEEE 802.15.1	Lecture	Quiz
9	2	Identify and describe the Internet of Thing	Introduction Internet of Things (IoT)	Lecture	
10	2	Identify and describe the Wireless Mesh Networking (WMN)	Introduction Wireless Mesh Networking (WMN)	Lecture	Quiz
11,12	4	Identify and describe the Wireless Sensor Network (WSN)	Introduction Wireless Sensor Network (WSN)	Lecture	Home work
13,14	4	Identify and describe the Mobile Ad Hoc Wireless Network (MANET)	Introduction Mobile Ad Hoc Wireless Network (MANET)	Lecture	Quiz

15	2	Identify and describe The Wireless Network Architecture and Wireless Device Roles	Wireless Network Architecture and Wireless Device Roles	Lecture	Exam

11. Course Evaluation

Quizzes	**12% (12)**	**4**
Assignments	**3% (3)**	**3**
Midterm Exam	**25% (25)**	**2 hr**

12. Learning and Teaching Resources

Required textbooks(curricular books, if any)	Behrouz A. Forouzan, “Data communication and Networking”, Fifth Edition, Tata McGraw – Hill,2015. Cory Beard and William Stallings, “Wireless Communication Networks and Systems” (ISBN: 0133594173, available online Ian F. Akyildiz , Mehmet Can Vuran, “Wireless Sensor Networks”, John Wiley and Sons, Ltd, Publication, first edit 2010
Main references (sources)	C. Siva Ram Murthy, and B. S. Manoj “Ad Hoc Wireless Networks Architectures and Protocols”,Prentice Hall Professional Technical Reference, 2004
Recommended books and references (scientific journals, reports)	–––––
Electronic references, websites	–––––

Course Description Form

1. Course Name:	
Advanced Computer Architecture	
2. Course Code:	
ACAR408	
3. Semester/Year:	
Semester 1 / 2024-2025	
4. Description Preparation Date:	
12/9/2024	
5. Available Attendance Forms:	
In class	
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: Dr. Ula Tarik Salim	Email: ula.tariq@uomosul.edu.iq
8. Course Objectives	
Course Objectives	Provides the necessary knowledge to • design a new computer system • improve an existing architecture • develop fast parallel computing algorithms a systems
9. Teaching and Learning Strategies	
Strategy	The main strategy that will be adopted in delivering this module is to encoura students' participation in the exercises, while at the same time refining a expanding their critical thinking skills. This will be achieved through class

	interactive tutorials and by considering type of simple experiments involv some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	2	Understanding the factors that influence computer speed, including hardware design, architectural choices, and algorithmic efficiency. In addition, understanding of the architecture of standard computers, including the organization and design principles of processors, memory systems, and I/O subsystems	Computer Speed and the Architecture of Standard Computers	Lecture	Exam
2	2	Understand the advantages and challenges of parallel computing and how it can improve performance in certain applications	Flynn Classification	Lecture	Exam

3	2	Understand how performance metrics are measured and evaluated, including concepts such as latency, throughput, and Amdahl's Law	The Performance, Cost and Amdahl's Law	Lecture	Home work, Quiz, Exam
4	2	Study the memory hierarchy in computer systems and understand the role of cache memory in improving performance	Cache Memory	Lecture	Exam
5	2	Learn about cache organization, replacement policies, and cache coherence protocols	Cache Memory	Lecture	Home work, Exam
6	2	Study memory interleaving technique to enhance memory access efficiency	Memory Interleaving	Lecture	Home work, Exam
7	2	Identify the hardware design for arithmetic operations (addition/ subtraction)	Parallel Arithmetic (Carry Save Adder)	Lecture	Home work, Exam
8	2	Identify the hardware design for arithmetic operation (multiplication)	Parallel Arithmetic (Carry Save Multiplier)	Lecture	Exam

9	2		Mid-term Exam1	Lecture	Exam
10	2	Understand the design principles, and applications associated with the parallel processing architectures including SIMD and vector processors	SIMD Architecture (Vector Processor)	Lecture	Exam
11	2	Understand the design principles, and applications associated with the parallel processing architectures including SIMD and vector processors	SIMD Architecture (Vector Processor)	Lecture	Home work, Quiz, Exam
12	2	Understand the design principles, algorithms, and applications associated with the architecture DSP	Mid-term Exam2 + Digital Signal Processor	Lecture	Exam
13	2	Understand the design principles, algorithms, associated with the architecture of Array Processors Such as DFT and FFT	Array Processor (DFT and FFT processor)	Lecture	Home work, Exam
14	2	Understand the application and architecture of DFT and FFT Understand the	Array Processor (DFT and FFT processor), Systolic Array	Lecture	Exam

		design principles of 1D Systolic Array Processor architecture and its application on 1D convolution	Processor (1D)		
15		Preparatory week before the final Exam			Exam

11. Course Evaluation

Quizzes(9), Homeworks(6), Midterm Exam1(15), Midterm Exam2(10),Final exam (60)

12. Learning and Teaching Resources

Required textbooks(curricular books, if any)	1. K. Hwang and F.A. Briggs "computer Architecture and parallel processing" 2. Peter Pirch "Architectures for DSP"
Main references (sources)	Lectures and notes
Recommended books and references (scientific journals, reports)	
Electronic references, websites	

Course Description Form

1. Course Name:	
Biometric Engineering	
2. Course Code:	
BIEN411	
3. Semester/Year:	
Semester 1 / 2024-2025	
4. Description Preparation Date:	
12/9/2024	
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: Asst. Prof. Dr. Mayada Faris Ghanim Email: mayada.faris@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• The main objectives of a Biometrics Engineering course typically revolve around educating students on various aspects of biometrics technology and its applications. Here are some common objectives: • Understanding Biometrics Principles: To impart fundamental knowledge about biometrics, including its principles, techniques, and methodologies for

	recognizing individuals based on their physiological or behavioral characteristics. • Exploring Biometric Technologies: To introduce students to various biometric modalities such as fingerprint recognition, iris recognition, facial recognition, voice recognition, etc., including their underlying mechanisms, advantages, limitations, and real-world applications. • Technical Proficiency: To develop technical skills necessary for designing, implementing, and evaluating biometric systems, including signal processing techniques, feature extraction, pattern recognition algorithms, and machine learning approaches. • Security and Privacy: To address the security and privacy concerns associated with biometric systems, including issues related to data protection, biometric template security, spoof attacks, and ethical considerations.

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.

10. Course Structure

Week	Hours	Required	Unit or Subject		Evaluation

		Learning Outcomes	Name	Learning Method	Method
1	2	Identify the main terminologies of Biometrics Engineering	Introduction to Biometrics Engineering	Theory	Exam
2	2	Identify the main terminologies of Biometrics Engineering	Biometrics and Authentication	Theory	Exam Quiz
3	2	Understand Biometric Performance Metrics	Biometrics Performance Evaluation Criteria	Theory	Exam
4	2	Compare and Contrast Operation Modes	Operation Modes of Biometric System	Theory	Exam
5	2	Understand the Principles of Face Recognition	Face Recognition System	Theory	Exam
6	2	Understand Biometric Performance of	Real Face Recognition System	Theory	Exam Assignment

		the system			
7	2		Term Exam 1	Theory	Exam
8	2	Understand the Principles of Iris Recognition	Iris Recognition System	Theory	
9	2	Understand Biometric Performance of the system	Real Iris Recognition System	Theory	Exam
10	2	Understand the Principles of Handwriting Recognition	Handwriting Recognition System	Theory	Exam Quiz
11	2	Understand Biometric Performance of the system	Real Handwriting Recognition System		
12	2	Understand Multimodal Biometrics	Multimodal Biometrics	Theory	Exam

13	2	Understand the principle of Continuous Authentication System working	Biometrics Continuous Authentication Systems	Theory	Exam
14	2	Explore Biometric Applications in Electronic Health Records (EHR)	Biometrics in Healthcare	Theory	Exam
15	2		Term Exam 2	Theory	

11. Course Evaluation
2 Quizzes: 8% (8) 1 Assignments: 2% (2) 2 Term Exam: 30% (30) 1 Final Exam: 60% (60)

12. Learning and Teaching Resources	
Required textbooks(curricular books, if any)	• Theses from University of Mosul . • Anil K. Jain, Arun Ross, and Karthik Nandakumar, “Biometric Recognition: Challenges and Opportunities”, Springer, 2011

University of Mosul / College of Engineering / Computer Engineering Department

Curricula for the Academic Year 2024-2025

Curricula of the Computer Engineering Department

Fourth Academic Level, Second Semester

Curricula of the Computer Engineering Department

Fourth Academic Level (Second Semester)								
Type of Requirement	**Requirement Type (Mandatory – Elective)**	**Course Name**	**Number of Theoretical Hours**	**Number of Practical Hours**	**Number of Credits**	**Prerequisite (if applicable)**	**Course Code**	**Notes**
College Requirements	Mandatory	English language – Upper Intermediate	2	-	2			
	Mandatory	Professional Ethics	2	-	2		UOMC104	
Department Requirements	Mandatory	Graduation Project II	2	-	2	Graduation Project I	GRPR450	
	Mandatory	Digital Control	3	2	4	Control Systems	DICO452	
	Mandatory	Software Engineering	2	-	2		SOEN451	
	Elective	Network Security	2	-	2		NESE453	The student chooses one course. The required number of credits = 2 credits.
		Special Purpose Processors	2	-	2		SPPR456	
	Elective	Network Application & Management	2	-	2		NAMA455	The student chooses one course. The required number of credits = 2 credits.
		Distributed System	2	-	2		DISY457	
	Elective	Industrial Network	2	-	2		INNE454	The student chooses one course. The required number of credits = 2 credits.
		Antenna and Propagation	2	-	2		ANPR458	
		Intelligent Control	2	-	2		INCO459	
	Total Hours and Credits for the Second Semester		**17**	**2**	**18**			

Course Description Form

1. Course Name:	
English Language – Upper-intermediate	
2. Course Code:	
N/A	
3. Semester / Year:	
Semester 2 / 2024–2025	
4. Description Preparation Date:	
12/9/2024	
5. Available Attendance Forms:	
In class only	
6. Number of Credit Hours (Total) / Number of Units (Total)	
30 hours / 2 units	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr. Mustafa Siham Abdulrahman Qassab Email: mustafa.qassab@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• Speak about topics contained in the textbook accurately and fluently (with a certain error-tolerance). • Use basic reading techniques (scanning, skimming, and selecting what is relevant). To be able to follow English lessons, to follow instructions, descriptions and explanations, to take notes when listening. • Understand a complicated sentence construction and relations between sentences from a language point of view; to acquire new semi-technical vocabulary. • Use a wide range of vocabulary. • Apply newly acquired knowledge of

	grammar. • Understand, analyze, translate, and paraphrase texts. • Understand, analyze, translate, and paraphrase listening.

9. Teaching and Learning Strategies

Strategy	• Theoretical lecturing. • Group working. • One-to-one speaking test. • Passage reading and questioning. • Extracting information from audio scripts.

10. Course Structure

	Hours	Required Learning	Unit or subject name	Learning method	Evaluation
1	2	- Introducing the subject / different activities. - The strategy of evaluating. - The course contents.	**Introduction to the course**	**Theory about the subject and the course plan.**	N/A
2	2	- Simple, continuous, perfect, active and passive tenses. - Compound words. - Reading.	**Unit 1: Home and away! (part 1)**	**Reading paragraphs, study grammar, listen to audio scripts.**	
3	2	- Simple, continuous, perfect, active and passive tenses. - Compound words. - Reading.	**Unit 1: Home and away! (part 2)**	**Reading paragraphs, study grammar, listen to audio scripts.**	
4	2	- Simple, continuous, perfect, active and passive tenses. - Compound words. - Reading.	**Unit 1: Home and away! (part 3)**	**Reading paragraphs, study grammar, listen to audio scripts.**	Homework 1
5	2	- Present perfect and simple and continuous. - Spoken English. - Hot verbs: make, do. - Reading.	**Unit 2: Been there, got the T-shirt (part 1)**	**Reading paragraphs, study grammar, listen to audio scripts.**	Quiz 1
6	2	- Present perfect and simple and continuous. - Spoken English. - Hot verbs: make, do. - Reading.	**Unit 2: Been there, got the T-shirt (part 2)**	**Reading paragraphs, study grammar, listen to audio scripts.**	

7	2	- Present perfect and simple and continuous. - Spoken English. - Hot verbs: make, do. - Reading.	**Unit 2: Been there, got the T-shirt (part 3)**	**Reading paragraphs, study grammar, listen to audio scripts.**	Homework 2
8	2	- Narrative tenses: past simple, past continuous, past perfect, active and passive. - Spoken English. - Reading.	**Unit 3: News and views (part 1)**	**Reading paragraphs, study grammar, listen to audio scripts.**	Quiz 2
9	2	- Narrative tenses: past simple, past continuous, past perfect, active and passive. - Spoken English. - Reading.	**Unit 3: News and views (part 2)**	**Reading paragraphs, study grammar, listen to audio scripts.**	
10	2	- Narrative tenses: past simple, past continuous, past perfect, active and passive. - Spoken English. - Reading.	**Unit 3: News and views (part 3)**	**Reading paragraphs, study grammar, listen to audio scripts.**	Homework 3
11	2	Three language skills are assessed in the written exam which are listening, reading, and writing.	**Written test (for listening, reading, and writing skills)**		Quiz 3
12	2	The speaking skill is tested for each student for 2 to 3 minutes of daily English spoken topics.	**Speaking test (part 1)**		Speaking sessions
13	2	The speaking skill is tested for each student for 2 to 3 minutes of daily English spoken topics	**Speaking test (part 2)**		Speaking sessions
14	2	Presentation is done by a group of 2 students for 3-5 minutes. Including critical notes after performing.	**Presentation (part 1)**		On stage
15	2	Presentation is done by a group of 2 students for 3-5 minutes. Including critical notes after performing.	**Presentation (part 2)**		On stage

Course Description Form

1. Course Name:
Professional Ethics
2. Course Code:
UOMC104
3. Semester/Year:
Semester 2 / 2024-2025
4. Description Preparation Date:
12/9/2024
5. Available Attendance Forms:
On site
6. Number of Credit Hours(Total)/Number of Units(Total)
50/2
7. Course administrator's name (mention all, if more than one name)
Name: Joan Atheel Ahmed Email: joan.akrawi@uomosul.edu.i Name: Hasan Fakhry Hasan Email: hasan.allayla@uomosul.edu.iq
8. Course Objectives

Course Objectives	• define and understand concepts of ethics and professional ethics. • develop knowledge of and describe basic ethical theories and principles for ethical decision-making. • identify and think through moral situations and issues encountered by a wide range of different professionals. • apply ethical theories and principles to specific moral challenge and dilemmas faced by professionals.

	• develop and improve skills essential in analyzing and resolving ethical problems and conflicts in professional settings through th use and application of ethical theories.

9. Teaching and Learning Strategies

Strategy	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.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
Week 1	2	Defines and understands concepts Morals and ethics Professional	Introduction earning Outcomes	On class	l exam
Week 2	2	Defines and understands concepts Morals and ethics Professional	Meaning of Ethics Branches of Philosophical Ethics	On class	Quiz
Week 3	2	Defines and understands concepts Morals and ethics Professional	The Meaning and Nature of Professional Ethics Summary	On class	Oral exam Home work

Week 4	2	Defines what it is and what it is not Moral	Possible Answer Self-Assessment Exercise	On class	Quiz
Week 5	2	Defines areas of .Ethical Study	Normative Ethical Theories: Consequentialism	On class	Oral exam Home work
Week 6	2	Identify ethical Issues computing business applications and/or ,Use cases	Egoism Psychological Egoism Ethical Egoism	On class	Quiz
Week 7	2	Distinguish them from technical, legal, commercial business issues/challenges Related to .public relations	Utilitarianism Normative Ethical Theories – Deontology	On class	Quiz
Week 8	2		Mid Exam	On class	Exam
Week 9	2	Identify ethical issues in computing business applications and/or Use cases	Kantian Deontology Russian Deontology	On class	Quiz Oral exam Home work
Week 10	2	Computer science contexts	Normative Ethical Theories – Virtue Ethics	On class	Quiz Oral exam Home work

		Identify owners Moral interest relevant in the scenario			
Week 11	2	Identify owners Moral interest relevant in the scenario	The Nature of Moral Virtue Aristotle's Virtue Ethics	On class	Oral exam Home work
Week 12	2		Report	On class	Quiz
Week 13	2	Learn about some important moral values And interests nd the risks And conflicts vulnerab	Ethical Principles the Medical Profession	On class	Oral exam Home work
Week 14	2	In a certain scenario One or more applications From general frameworks To make decisions Ethical in Context of science projects Computer	Preparatory week before the final exam	On class	Quiz
Week 15	2		Final Exam	On class	Exam
11. Course Evaluation					

Distributing the score out of 100 according to the tasks assigned to the student such as daily preparation, daily oral, monthly, or written exams, reports …. etc 1- Monthly exam 25%-100% 2- 10%-100% report 3- Daily preparation 5%-100% 4- Final exam 60% - 100%

12. Learning and Teaching Resources	
Required textbooks (curricular books, if any)	**The Ground of Professional Ethics** By Daryl KoehnCopyright 1994
Main references (sources)	
Recommended books and references (scient journals, reports)	1st Edition **Ethical Issues in Journalism and the Media** Edited By Andrew Belsey, Ruth ChadwickCopyright 1992
Electronic references, websites	https://nou.edu.ng/coursewarecontent/PHL%20242.pdf

Course Description Form

1. Course Name:	
Digital Control	
2. Course Code:	
DICO452	
3. Semester/Year:	
Semester 2 / 2024-2025	
4. Description Preparation Date:	
12/9/2024	
5. Available Attendance Forms:	
In class / on meet	
6. Number of Credit Hours(Total)/Number of Units(Total)	
200/8	
7. Course administrator's name (mention all, if more than one name)	
Name: Dr.Sura Nawfal abdulrazzaq Email: Sura.nawfal@uomosul.edu.iq Name: Ola Marwan Email: ola.marwan@uomosul.edu.iq	
8. Course Objectives	
Course Objectives	• The course provides the principles necessary to understand the modern digital control systems, how to analyze these systems in discrete time domain including different techniques and methods, also it learns how to design a complete digital controller, test its stability and improve it. Other topics that are covered sampling process, A/D, D/A converters, z-transform and s-transform relations. • Discuss the differences between digital and continuous control systems and identify its applications across different industries and contexts. • Solve digital control system problems using z-transform. Sketch

	simulation diagram of a digital control systems. • Analyze the systems by reducing the interconnection of sampled data transfer function to single sampled data transfer function . • Examine the time response of digital control sys and measuring the stability of these systems, and decide whether their initial design is acceptable or can be improved. • Produce design of digital control systems using transform techniques and state-space methods. • Produce design of various digital controllers using MATLAB and design a control system for motors. Integrate and program real-time control systems with smart sensors.

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

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
Week 1	3	Understand digital control, the structure of a digital control system, and examples of digital control systems.	Introduction to Digital Control [ch1]	Lecture	Oral exam
Week 2	3	An ability to solve the Discrete–time system Analysis.	Discrete-Time Systems [ch2]	Lecture &Tutorial	Oral exam Home work
Week 3	3	An ability to use Sampled data systems, ADC/DAC.	Discrete-Time Systems [ch2]	Lecture	Home work

Week 4	3	Understand the State equation and solution of state equation State diagram.	Discrete-Time Systems [ch2]	Lecture & Tutorial	Oral exam Home work
Week 5	3	Analyze the Zero-order hold transfer function (ZOH transfer function).	Fundamental of digital control system [ch3]	Lecture	Oral exam
Week 6	3	Analyze Z-transform and inverse z-transform, Final value theorem, 1st Quiz	Fundamental of digital control system [ch3]	Lecture & Tutorial	Quiz Home work
Week 7	3	An ability to discrete opened and closed loop T.F, Solution of Difference Equations, Solution of State Equations.	Transfer Function of Discrete Control Systems [ch4]	Lecture	Oral exam Home work
Week 8	3		Mid-term exam.		Exam
Week 9	3	Understand the Simulation diagram.	Transfer Function of Discrete Control Systems [ch4]	Lecture	Oral exam Home work
Week 10	3	Analyze the Transfer function and state space equations transformations	Stability of Digital Control System [ch5]	Lecture & Tutorial	Quiz Home work
Week 11	3	Understand the Time response of digital control system, 2nd quiz	Stability of Digital Control System [ch5]	Lecture	Oral exam
Week 12	3	Apply the Relationship	Control system	Lecture & Quiz	Quiz

		between z-plane & z-plane	analysis and design [ch6]		
Week 13	3	Analyze Jury's stability test, 3d quiz	Control system analysis and design[ch6].	Lecture	Oral exam
Week 14	3	Apply Z-domain root locus design	Control system analysis and design [ch6]	Lecture & Tutorial	Oral exam
Week 15	3		Final exam		Exam

11. Course Evaluation

Quiz	3	10%
Assignment	8	20%
Midterm Exam	30	70%

12. Learning and Teaching Resources

Required textbooks(curricular books, if any)	Fadali, M.S. and Visioli, A., 2012. Digital control engineering: analysis and design. Academic Press.
Main references (sources)	Lectures and notes
Recommended books and references (scientific journals, reports)	Golnaraghi, F. and Kuo, B.C., 2017. *Automatic control systems*. McGraw-Hill Education.
Electronic references, websites	

Course Description Form

1. Course Name:
Software Engineering
2. Course Code:
SOEN451
3. Semester/Year:
Semester 2 / 2024-2025
4. Description Preparation Date:
12/9/2024
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. Sura Ramzi Shareef Email: sura.ramzishareef@uomosul.edu.iq
8. Course Objectives

Course Objectives	On successful completion of this course students will be able to: • Introduction of software engineering • The principles of software engineering and software process. • Identify the key activities in Software Project Management and compare software process models. • To understand the phases in a software project Compare different process models. • To understand fundamental concepts of requirements engineering and Analysis Modeling. • Understand the major considerations for enterprise integration and deployment. • To learn various testing and maintenance measures • To Design and program an application and how to maintain it . On the other side they learn the basics of OOP and Java programming. • To contrast the various testing and maintenance • Apply systematic procedure for software design and deployment.

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, reports and seminars, while at the same time refining and expanding their critical thinking skills. This will be achieved through class's room, group of students, interactive tutorials and by considering some sampling activities that are interesting to the students.

10. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	2	Identify the main terms of software engineering	Introduction to Software Engineering	Theory	Exam

2	2	Identify the main terminologies of software processes	Software Process & Problem	Theory	Exam
3	2	Identify the main terminologies of software process models	Software life-cycle Models	Theory	Exam Quiz
4	2	Identify the main terminologies of CASE	Steps Wise Refinement- CASE	Theory	Exam
5	2	Identify the main terminologies of Testing	Testing Principles	Theory	Exam
6	2	Identify why it is important, and development of software engineering	Software cost Estimation	Theory	Exam
7	2	Understand the concepts of user and system requirements and why these requirements should be written in different ways,	Requirement Phase	Theory	Exam
8	2		Term Exam 1	Theory	

9	2	Describing the ways of software process models, Design	Design Phase	Theory	Exam
10	2	Describing the Maintenance Phase and identify why it is important,	Maintenance Phase	Theory	Exam
11	2	Describing the Integration Phase	Implementation & Integration Phase	Theory	Exam
12	2	Understanding the importance of Java in software engineering	Introduction to Java Programming Language	Theory	Exam Quiz
13	2	Describing the main applications of object oriented programming in software engineering	Introduction to object oriented programming with Java Programming Language	Theory	Assignment
14	2	Identify the principles declaration oop and why it is important as programming language	Report of project	Theory	Seminar and report
15	2		Term Exam 2	Theory	

11. Course Evaluation

2 Quizzes: 8% (8)

1 Assignments:2% (2)

1 Term Exam: 20% (20)

1- Seminar 10%(5 report,5 presentation)

1- Final Exam: 60% (60)

12. Learning and Teaching Resources

Required textbooks	1. Ian Sommerville,"Software Engineering", 9th Edition, Pearson Education Asia, 2011. 2. Ian Sommerville,"Software Engineering", 10th Edition, Pearson Education Asia, 2016. 3. Stephen R. Schach," Software Engineering with JAVA " 4. Roger S. Pressman, "Software Engineering – A Practitioner's Approach", Seventh Edition, Mc
Website / URL References	• http://nptel.ac.in/ • :https://www2.cs.siu.edu/~mengxia/Courses%20PPT/435/Chapter_03.pdf • http://www.cs.tau.ac.il/~nachumd/models/Nets.pdf • https://www.engppt.com/2011/12/software-engineering-ppt-slides.html

Course Description Form

13. Course Name:
Network Security
14. Course Code:
NESE453
15. Semester/Year:
Semester 2 / 2024-2025
16. Description Preparation Date:
12/9/2024
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 Network 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 network 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

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.

22. Course Structure

Week	Hours	Required Learning Outcomes	Unit or Subject Name	Learning Method	Evaluation Method
1	2	Identify the main terminologies of Network security	Introduction to Network Security	Theory	Exam
2	2	Identify the main terminologies of Network 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	IP Security	Theory	Exam Quiz

		security			
11	2	Describing the types of Firewalls	Firewalls		
12	2	Understanding the importance of AI in network security	Introduction to Artificial intelligence in network security	Theory	Exam
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: 8% (8) 1 Assignments: 2% (2) 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

1. Course Name:
Distributed Systems
2. Course Code:
DISY457
3. Semester/Year:
Semester 2 / 2024-2025
4. Description Preparation Date:
12/9/2024
5. Available Attendance Forms:
In class
6. Number of Credit Hours(Total)/Number of Units(Total)
60/2
7. Course administrator's name (mention all, if more than one name)
Name: Ass. Prof. Dr. Turkan Ahmed Khaleel Email: turkan@uomosul.edu.iq
8. Course Objectives

Course Objectives	• Understand the fundamental concepts and princip of distributed systems architecture. • Explore different communication models a protocols used in distributed computing. • Learn about distributed system models such as clie server, peer-to-peer, and hybrid architectures.

9. Teaching and Learning Strategies	
Strategy	• Interactive Lectures: Engagingly deliver lectures, encouraging questions and discussions to ensure students grasp fundamental concepts. • Case Studies: Present real-world examples of distributed systems architectures, failures, and successes to illustrate theoretical concepts in practical contexts. • Group Projects: Assign group projects that require students to design, implement, and analyze distributed systems, fostering collaboration and problem-solving skills.

10. Course Structure

Week	Hours	Required Le Outcomes	Unit or subject name	Learning method	Evaluation method
Week 1	2	Gain the characterization of Distributed Systems.	1 .Characterization of Distributed Systems 1.1 Introduction 1.2 Examples of distributed systems	Lecture	Oral exam
Week 2	2	Gain the characterization of Distributed Systems.	Distributed Systems 1.4 Focus on resource sharing	Lecture	Oral exam
Week 3	2	Gain the characterization of Distributed Systems.	1.5 Challenges 1.6 Case study: The World Wide Web	Lecture	Oral exam Homework
Week 4	2	Gain the design and development of distributed systems and distributed systems applications.	2. System Models 2.1 Introduction	Lecture	Quiz
Week 5	2	Gain the design and development of distributed systems and distributed systems applications.	2.2 Physical models 2.3 Architectural models	Lecture	Oral exam Homework
Week 6	2	Analyze the Failure Recovery in Distributed Systems and Fault Tolerance.	2.4 Fundamental models	Lecture	Quiz

Week 7	2	Gain the design and development of distributed systems and distributed systems applications.	3. Interprocess Communication 3.1 Introduction	Lecture	Quiz
Week 8	2	Gain the design and development of distributed systems and distributed systems applications.	3.2 The API for the Internet protocols 3.3 External data representation and marshaling		Exam
Week 9	2	Gain the design and development of distributed systems and distributed systems applications.	3.4 Multicast communication 3.5 Network virtualization: Overlay networks 3.6 Case study: MPI	Lecture	Quiz Oral exam Homework
Week 10	2	Gain the design and development of distributed systems and distributed systems applications.	4 .Remote Invocation 4.1 Introduction	Lecture	Quiz Oral exam Home work
Week 11	2	Gain the design and development of distributed systems and distributed systems applications.	4.2 Request-reply protocols 4.3 Remote procedure call 4.4 Remote method invocation 4.5 Case study: Java RMI	Lecture	Oral exam Home work
Week 12	2	Gain the design and development of distributed systems and distributed systems applications.	5 .Indirect Communication 5.1 Introduction 5.2 Group communication	Lecture	Quiz

Week 13	2	Gain the design and development of distributed systems and distributed systems applications.	5.3 Publish-subscribe systems 5.4 Message queues 5.5 Shared Memory Approaches	Lecture	Presentation
Week 14	2	Gain the design and development of distributed systems and distributed systems applications.	Students support	Lecture	Exam
Week 15	2		Study week and preparations for assignment submission and Exams		Exam
11. Course Evaluation:					
		Quizzes	2	5% (2.5)	
		Assignments	2	15% (4.5)	
		Project	1	10% (3)	
		Midterm Exam	2 hr	10% (30)	
		Final Exam	3hr	60% (60)	

Required Textbooks:
1- Distributed Systems: Concepts and Design by G. Coulouris, J. Dollimore, and T. Kindberg, 5th edition, 2011.

Main reference: Lectures and notes

Recommended Textbooks: Distributed Computing: Concepts and Applications by M.L Liu,. 1st edition, 2006.

Electronic Reference/ Website:

Course Description Form

1. Course Name:
Industrial Networks
2. Course Code:
INNE454
3. Semester / Year:
Semester 2 / 2024-2025
4. Description Preparation Date:
12/9/2024
5. Available Attendance Forms:
In class only
6. Number of Credit Hours (Total) / Number of Units (Total)
30 hours / 2 units
7. Course administrator's name (mention all, if more than one name)
Name: Dr. Qutaiba Ibrahim Ali Email: qutaibaali@uomosul.edu.iq Name: Dr. Mustafa Siham Abdulrahman Qassab Email: mustafa.qassab@uomosul.edu.iq

8. Course Objectives

Course Objectives	This course will cover many topics such as Corporate and industrial networks, OSI model, Ethernet and TCP/IP, Modbus, Foundation Fieldbus, DevicNet, PROFIBUS, AS-I, propriety buses protocols and interfaces, distributed I/O, drivers and devices and their implementation in PC and PLC based systems.

9. Teaching and Learning Strategies

Strategy	• Theoretical lecturing. • Group discussion. • Report and presentation. • Homework.

10. Course Structure

Week	Hours	Outcomes	name	method	Evaluation
1-4	8	Understanding course introduction, Basic Elements	**Industrial Control**	**Lecturing in class**	Quiz 1

	of an Automated System, Levels of Automation, Process Industries vs. Discrete Manufacturing Industries, Continuous Control, DCS Systems, Networking: Process Control, Supervisory Control, enterprise Control	**Systems and Networking**	**Group discussion**		
5-6	4	Understanding TCP and UDP, Troubleshooting, Socket programming, Automation Trends, TCP/IP Based Factory Automation, Thin Servers, Network Security	**Industrial Ethernet & TCP/IP**	**Lecturing in class** **Group discussion**	
7-8	4	Understanding topics covered: ODVA, OSI reference model, EtherNet/IP Terms & Definitions, Design of Ethernet IP Networks, Web Compatible SCADA Systems.	**Ethernet IP**	**Lecturing in class** **Group discussion**	Quiz 2
9	2	Topics covered: Modbus Overview, Modbus Protocol Structure, Modbus Function Codes, Troubleshooting, Modbus Plus Technical Overview	**Modbus, Modbus Plus and Modbus TCP**	**Lecturing in class** **Group discussion**	Homework 1
10	2	Topics covered: CAN Technical Overview, Application Layers, CANopen, DeviceNet Technical Overview, ODVA,	**CANBUS and DeviceNet**	**Lecturing in class** **Group discussion**	Report assignment
11	2	Topics covered: Reduced IOS reference model, AS-interface, Technical Overview, AS-i Applications, AS-i Consortium, AS-i Troubleshooting	**AS-I Interface**	**Lecturing in class** **Group discussion**	
12	2	Introduction to Profibus, Profibus-PA (Process Automation), Profibus-DP (Decentralized Periphery), Network design and configuration	**Profibus**	**Lecturing in class** **Group discussion**	Quiz 3
13-14	4	- Understanding different industrial IoT devices and differences between IoT and IIoT.	**Industrial Wireless Sensor Network**	**Lecturing in class** **Group discussion**	
15	2	The gathered knowledge throughout the course is tested.	**Written test**		Term exam