



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Fundamentals of Electrical Engineering I		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL111				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		UGI	Semester of Delivery		One
Administering Department		Electrical Engineering Dept.	College	Engineering	
Module Leader	Dr. Ali Abdul Karim Mohsen Ali		e-mail	aliabdalkreem@uomisan.edu.iq	
Module Leader's Academic Title		lecturer	Module Leader's Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

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



Module Objectives, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives 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. To deal with the basic concept of electrical circuits. 4. To understand Kirchhoff's current and voltage laws problems. 5. To perform Mesh and Nodal analysis. 6. To apply Thevenin's, Norton's, superposition, and maximum power transfer theorems to find different electric quantities.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe electrical quantities such as charge, current, voltage, power and energy, and list the various terms associated with electrical circuits. 2. Define Ohm's law and identify resistance of material and the effect of temperature on resistance. 3. Explain the two Kirchhoff's laws used in series and parallel circuit analysis. 4. Apply analysis methods to series-parallel circuits. 5. Explain the mesh analysis in DC circuits with and without current sources. 6. Explain the nodal analysis in DC circuits with and without voltage sources. 7. Introduce superposition theorem to find the solution to networks with two or more sources. 8. Understand Thevenin's theorem to provide an equivalent circuit for any selected terminal of the circuit. 9. Understand Norton's theorem to provide an equivalent circuit for any selected terminal of the circuit. 10. Use Thevenin's and Norton's theorems to find maximum power transfer to the load. 11. Explain substitution, reciprocal and Millman's theorems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Circuits Analysis 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, analysis of a circuit, network reduction, introduction to mesh and nodal analysis. [40 hrs] Part B - Circuits Theorems Superposition theorem, Thevenin theorem, Norton theorem, maximum power transfer theorem, Millman theorem, substitution theorem, and reciprocal theorem. [20 hrs]



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Delivery combines structured lectures with interactive tutorials that walk students through worked circuit problems step by step, moving from single-loop DC circuits to full mesh/nodal analysis and network theorems. Weekly problem sets and short in-class exercises reinforce each new law as it is introduced, while a dedicated laboratory component lets students verify Kirchhoff's laws, Thevenin/Norton equivalents and magnetic-circuit behavior on real hardware, closing the loop between theory and measurement.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.5
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

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



Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Basic concepts: system of units, charge, current, voltage, power, energy, circuit elements
Week 2	Resistance of conductors and temperature effects, temperature coefficient of resistance
Week 3	Basic laws: Ohm's law, series resistance, Kirchhoff's voltage law and voltage divider
Week 4	Basic laws: parallel resistance, Kirchhoff's current law and current divider
Week 5	Basic laws, series-parallel network, ladder network, Star-delta connection
Week 6	Methods of analysis: Mesh Analysis
Week 7	Methods of analysis: Mesh Analysis with special case
Week 8	Review + MID EXAM
Week 9	Methods of analysis: Nodal Analysis
Week 10	Methods of analysis: Nodal Analysis with special case
Week 11	Circuit theorems: superposition theorem, source transformation
Week 12	Circuit theorems: Thevenin theorem
Week 13	Circuit theorem: Norton's theorem
Week 14	Circuit theorem: Maximum power transfer theorem
Week 15	Substitution theorem, reciprocal theorem and Millman's theorem
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction: types of resistance and how to read its values, measurement instruments (Ammeter, voltmeter, ohmmeter) and how to connect them in the electric circuit
Week 2	Series, parallel, series-parallel connection
Week 3	Kirchhoff voltage law & Kirchhoff current law
Week 4	Superposition theorem
Week 5	Thevenin's Theorem
Week 6	Norton's Theorem
Week 7	Maximum Power Transfer



Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Charles K. Alexander and Matthew N.O. Sadiku, "Fundamentals of Electric Circuits"	Yes
Recommended Texts	Boylestad, "Introductory Circuit Analysis"	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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Mathematics I		Module Delivery		
Module Type	Basic Science		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EE112				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGI			Semester of Delivery
Administering Department		Electrical Engineering Dept.	College	Engineering	
Module Leader	Dr. Sinan Imad Sabri		e-mail	sisabri@uomisan.edu.iq	
Module Leader's Academic Title		Lecturer	Module Leader's Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Mathematics I aims to provide a comprehensive introduction to the mathematical concepts and techniques that are fundamental to the study of electrical engineering. During this course, students will develop a solid mathematical foundation that will support their understanding of advanced electrical engineering topics in subsequent semesters. The main module objectives are: 2. Introduce students to the basic mathematical concepts and notation. 3. Develop proficiency in algebraic manipulations and solving equations. 4. Introduce students to the concepts of sets, intervals and inequalities. 5. Provide an understanding of analytical geometry. 6. Provide an understanding of trigonometric functions and their applications. 7. Familiarize students with basic concepts of differentiation and the laws of differentiation on various mathematical functions. 8. Familiarize students with basic concepts in linear algebra.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the basic concepts related to this course. 2. Learn the concept of mathematical functions and related mathematical operations. 3. Understand how to represent mathematical functions and equations by drawing. 4. Understand trigonometric functions and their applications. 5. Learn the concept of differentiation and the laws of differentiation on various mathematical functions. 6. Understand how to apply differentiation to various engineering applications in general and applications related to Electrical Engineering in particular. 7. Understand some of the mathematical topics needed to enter other courses in the Department of Electrical Engineering.
Indicative Contents المحتويات الإرشادية	Introduction to calculus: equations and solution methods; elements and sets; real numbers and the real line; intervals, union and intersections of intervals; inequalities; analytical geometry, distance between points and midpoint formula; slope and equation of a line; functions (sums, difference, product and quotients of functions); domain and range of functions; composition of functions; absolute value function; graph of functions; shifting, shrinking and stretching of functions; trigonometric functions. Derivatives: definition; derivatives by the limits; laws of derivatives; second and higher order derivatives; implicit differentiation; the quotient rule; the chain rule; derivative of parametric equations; derivative of trigonometric functions; applications of derivatives. Matrices: introduction to matrices, definition and notation, matrix elements, dimensions, special types of matrices, equality of matrices; matrix operations



	(addition, subtraction, scalar and matrix multiplication); matrix determinant; matrix inverses; matrix transpose; systems of linear equations; Cramer's rule. Limits and Continuity: introduction; definition; properties of the limits; right-hand and left-hand limits; limit involving infinity; continuous functions; algebraic properties of continuous functions.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Teaching centers on guided problem-solving: each new concept (functions, derivatives, matrices, limits) is introduced through short lectures followed immediately by worked examples and in-class exercises, so students practice the technique before it appears in a homework assignment or quiz. Interactive tutorials give students the chance to solve problems at the board and receive immediate feedback, building the analytical and manipulative skills electrical engineering study demands.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4 and 6	LO #3, #4 and #5
	Assignments	4	20% (20)	3,5,9 and 12	LO #1,#2,#3,#4,#6,#7,#8,#10,#11
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	13	#6, #7, #8 and #9
Summative assessment	Midterm Exam	2hr	10% (10)	10	LO #1 - #8
	Final Exam	3hr	50% (50)	16	All



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
بكالوريوس في الهندسة الكهربائية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



Total assessment	100% (100 Marks)		
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Delivery Plan (Theoretical Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to calculus, equations and solution methods, elements and sets, real numbers and the real line, interval, union and intersections of intervals, and inequalities
Week 2	Analytical geometry: distance between points, slope and equation of line, point-slope equation, distance from a point to a line, and angles between two lines
Week 3	Assignment + Functions: definition, domain and range of functions, absolute value function, the greatest integer function, and composition of functions
Week 4	Quiz + Graph of Functions: symmetry test for graphs, shifting, shrinking and stretching
Week 5	Assignment + Trigonometric Functions: definition and identities, graph of trigonometric functions
Week 6	Quiz + Derivatives: definition, derivatives by the limits, laws of derivatives, and second and higher order derivative
Week 7	Implicit differentiation and the quotient rule for derivatives
Week 8	The chain rule, derivative of parametric equations, and derivative of trigonometric functions
Week 9	Assignment + Applications of Derivatives, analysis of functions: increase and decrease, concavity and inflection points, horizontal and vertical asymptotes, and oblique asymptotes
Week 10	Mid Term + Matrices: introduction, definition and notation, matrix elements, dimensions, special types of matrices
Week 11	Matrices: equality of matrices, matrix operations, matrix determinant, matrix inverses, matrix transpose
Week 12	Assignment + Matrices: systems of linear equations and Cramer's rule
Week 13	Report + Limits and Continuity: introduction, definition, and properties of the limits
Week 14	Right-hand and left-hand limits, limit involving infinity, continuous function, and algebraic properties of continuous functions
Week 15	Review and solve related problems
Week 16	Preparatory week before the final Exam



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
بكالوريوس في الهندسة الكهربائية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	George B. Thomas, Jr., "Calculus", 14th edition, Cengage Publisher Services, 2018.	Yes
Recommended Texts	Anthony Croft, Robert Davison, Martin Hargreaves and James Flint, "Engineering Mathematics, A Foundation for Electronic, Electrical, Communications and Systems Engineers", Pearson Education, 2017.	Yes
Websites		



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
بكالوريوس في الهندسة الكهربائية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



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
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امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Basic Physics		Module Delivery		
Module Type	Basic Science		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	EE113				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGI			Semester of Delivery
Administering Department		Electrical Engineering Dept.	College	Engineering	
Module Leader	Anwar Jabbar Hassan Al-Saadi		e-mail	anwer.jabbar@uomisan.edu.iq	
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification		Ms.c.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

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

Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives	1. To introduce the fundamental concepts of physics which provide a foundation for further study of materials, structures, mechanics and



أهداف المادة الدراسية	electronics at a level necessary to commence an engineering degree programme. 2. To consolidate a common knowledge base and begin the development of a learning methodology appropriate to an engineering degree programme. 3. To demonstrate understanding of the fundamentals of physics. 4. To apply basic concepts in the analysis of mechanical, electrical and thermal problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Introduction: physical parameters, dimensions and units, scalar and vector quantities, measurements, conservation of energy. 2. Statics (including forces and moments). 3. Structure of matter. 4. Thermal properties and heat transport. 5. Electrical properties.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Circuit Theory Electrical Circuits: AC Circuits, Kirchhoff's laws for AC circuits, complex reactance and impedance, series LCR circuit (resonance, power dissipation, quality factor, bandwidth), parallel LCR circuit. [15 hrs] Semiconductor Diodes: P and N type semiconductors, energy level diagram, conductivity and mobility, concept of drift velocity, PN junction fabrication, barrier formation in a PN junction diode, static and dynamic resistance, current flow mechanism in forward and reverse biased diodes, derivation for barrier potential and barrier width, rectifier diode. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] Half-wave, centre-tapped and bridge-type full-wave rectifiers, calculation of ripple factor and rectification efficiency, L and C filters, Zener diode and voltage regulation, LEDs, photodiodes, solar cells. [15 hrs] Revision problem classes. [6 hrs] Part B - Analogue Electronics Fundamentals: resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input/output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over-voltage protection. [15 hrs] Components and active devices: components vs. elements and circuit modeling, real and ideal elements, sensors and actuators, simple circuit interfacing. [7 hrs] Diodes and diode circuits: diode characteristics and equations, signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	The module bridges classical physics and electronics through progressively layered lectures: semiconductor physics and diode behavior, letting students see the physical basis of components they will meet again in later electronics courses. Illustrated examples and revision problem classes are used throughout to connect abstract physical laws (energy conservation, drift velocity, barrier formation) to measurable circuit quantities.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	62	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
بكالوريوس في الهندسة الكهربائية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



	Material Covered
Week 1	Semiconductor introduction
Week 2	Energy band
Week 3	Si and Ge properties
Week 4	Crystal structure of Si and Ge
Week 5	Mobility in semiconductors
Week 6	Doping in semiconductors
Week 7	Types of semiconductors
Week 8	Drift and diffusion currents in semiconductors
Week 9	P-N junction characteristics
Week 10	Diode
Week 11	Load line analysis for diode
Week 12	Diode models
Week 13	Types of diode
Week 14	Series and parallel diode configuration
Week 15	Gates of diode
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
بكالوريوس في الهندسة الكهربائية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



	Text	Available in the Library?
Required Texts	1. Electronic Devices and Circuits, R.L. Boylestad (Pearson India). 2. Electronic Principles, A.P. Malvino (Tata McGraw Hill).	
Recommended Texts	3. Principles of Electronics, V.K. Mehta and Rohit Mehta (S. Chand Publication).	
Websites		

Grading Scheme مخطط الدرجات				
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Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks with 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.				
ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.				



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Computer Programming I		Module Delivery	
Module Type	Basic Science		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UM114			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level		UGI		
Administering Department		Electrical Engineering Dept.	College	Engineering
Module Leader	Yasir Ali Khalid		e-mail	Yasseralnaimi6@uomisan.edu.iq
Module Leader's Academic Title		Asst. Lecturer	Module Leader's Qualification	
Module Tutor			e-mail	
Peer Reviewer Name			e-mail	
Scientific Committee Approval Date			Version Number	1.0

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



Module Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	Identify the function of the computer and computer hardware components. Identify the factors that go into an individual or organizational decision on how to purchase computer equipment. Identify how to maintain computer equipment and solve common problems relating to computer hardware. Develop students' understanding of number systems and codes used in computing. Identify how software and hardware work together to perform computing tasks and how software is developed and upgraded. Identify different types of software, general concepts relating to software categories, and the tasks to which each type of software is best suited. Familiarize students with thinking and problem-solving techniques using algorithms and flowcharts. Develop students' understanding of programming languages, syntax and semantics such as C++.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Demonstrate an understanding of computer system architecture. Design algorithms and flowcharts to solve computational problems. Understand the syntax of the C++ programming language. Apply programming language features, such as variables, data types, and control structures, to develop software solutions. Write code that adheres to the syntax and semantics of the C++ programming language.
Indicative Contents المحتويات الإرشادية	Computer System Architecture: computer system architecture, input/output devices, CPU, memory types. Number Systems and Coding: introduction to binary, decimal, octal and hexadecimal number systems, coding schemes and conversion between different number systems. Computer Software Applications: operating systems (Windows). Design of algorithms and flowcharts to solve computational problems. Principles of Programming in C++: introduction to programming in C++, input/output instructions, header files, constants, variables, data types and type modifiers. C++ Programming Operators: arithmetic operators, logical and relational operators, control flow and looping instructions.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	The course follows a hands-on, incremental approach: each concept (variables, control flow, functions, arrays) is introduced in lecture, then immediately practiced in a dedicated lab session using multiple languages (C++, C#, Java, JavaScript, Python) so students see the same logic expressed differently. Two graded quizzes and a
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project/lab component keep students writing and debugging code throughout the semester rather than only before exams.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.3
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Principles of Computer System 1: introduction to computer systems, history, features and applications
Week 2	Principles of Computer System 2: types of computer systems, data and information, number systems, computer components
Week 3	Computer System Hardware 1: hardware components, input devices, output devices, CPU and GUI



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Week 4	Computer System Hardware 2: storage devices, computer memory, register/cache/primary memory, RAM, ROM, secondary memory
Week 5	Computer System Software 1: introduction to system software, classifications, operating system definition, OS functions and goals
Week 6	Computer System Software 2: classification of operating systems, Windows OS, installation requirements, desktop components
Week 7	Mid Term Exam
Week 8	Programming Hierarchy 1: Algorithms
Week 9	Programming Hierarchy 2: Flowcharts
Week 10	Computer Programming 1: introduction to C++, basic source character set, keywords and identifier names
Week 11	Computer Programming 2: C++ data types, type modifiers, variables and constants, basic input/output operators and header files
Week 12	Quiz and Discussion
Week 13	Computer Programming 3: C++ operators, arithmetic, relational, logical, bitwise and remainder operators
Week 14	Computer Programming 4: notations, postfix and prefix notations, math library, exercises
Week 15	Preparatory week before the final Exam
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Assembly and maintenance of computer system components (input/output devices, CPU, memory storage devices, motherboard, cards)
Week 2	
Week 3	Windows Operating System Installation #1
Week 4	
Week 5	Windows Operating System #2
Week 6	
Week 7	C++ compilers (terminals) interfaces, menu bars and debugging process



Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Braunschweig, D. and Busbee, K. L. (2018). Programming Fundamentals - A Modular Structured Approach, 2nd Edition.	Yes
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

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

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كل وحدة ائتمانية = ٢٥ ساعة



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Chemistry		Module Delivery	
Module Type	Basic Science		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	EE123			
ECTS Credits	3			
SWL (hr/sem)	75			
Module Level	UGI	Semester of Delivery		
Administering Department		Electrical Engineering Dept.	College	Engineering
Module Leader	Zaidon Tarik Hashim Al-aqbi		e-mail	zaidon.alaqbi@uomisan.edu.iq
Module Leader’s Academic Title		Assistant Professor	Module Leader’s Qualification	
Module Tutor			e-mail	
Peer Reviewer Name		Name	e-mail	E-mail
Scientific Committee Approval Date		21/09/2025	Version Number	1.0

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	To introduce and develop key concepts in physical chemistry, in particular those of importance in chemical engineering processes. To cover energy conservation in closed, open and reacting systems. To understand the phase behaviour of substances and how to use the phase rule. To understand the concepts of chemical potential, ideal and non-ideal conditions, and activity coefficients. To calculate changes in enthalpy, entropy, Gibbs' free energy, and equilibrium constants of chemical reactions. To understand the basic principles of electrochemistry. To understand the basic principles of the physical chemistry of interfaces.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Understand conductance of electrolytes and their behavior. Describe strong and weak ions and their conductance behavior. Calculate conductivity, resistance, and cell constant for electrolyte solutions. Understand principles of measuring conductivity using conductometric sensors. Describe types of conductometric sensors and their applications. Use conductivity measurements to determine the concentration of electrolyte solutions. Define the degree of dissociation and calculate it for a given solution. Understand the effect of concentration, temperature, and pressure on dissociation of electrolyte solutions. Define the transference number and relate it to the mobility of ions in electrolyte solutions. Describe methods to measure the transference number. Understand concepts of oxidation and reduction and their relation to electron transfer. Identify oxidizing and reducing agents in chemical reactions. Apply the concept of oxidation and reduction to balance redox equations and predict spontaneous redox reactions.
Indicative Contents المحتويات الإرشادية	Part A - Electric Conductance in Electrolytes Electric conductance in electrolytes measures how well electrolytes conduct electricity; factors affecting it include concentration, temperature and ionic mobility, measured in siemens using a conductometer, with applications in determining molar and equivalent conductance. [6 hrs] Measurement of conductivity of electrolytes using a conductometer; conductivity is affected by concentration, temperature, and the type and mobility of ions; used to determine molar/equivalent conductance and ion concentration. [6 hrs] Degree of dissociation of electrolytes in solution and its experimental determination; affected by temperature, concentration and the nature of the electrolyte. [6 hrs] Revision problem classes. [3 hrs] Part B - Transference Number of Ions



	Transference number of ions as a measure of ionic mobility in solution, its experimental determination, and its dependence on the nature/concentration of the electrolyte, temperature and pressure, with applications in electrochemistry and battery technology. [6 hrs] Oxidation and reduction reactions: transfer of electrons between substances, redox reactions in combustion, photosynthesis, respiration and corrosion, balancing using the half-reaction method, and detection using redox indicators and electrode potentials. [6 hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	The course is organised around the physical measurement of electrolyte behaviour: conductance, degree of dissociation, transference number and redox reactions are each introduced conceptually and then linked to how they are measured in the laboratory (conductometry, electrode potentials). Revision problem classes are scheduled between topics so students consolidate calculations (conductivity, dissociation degree) before moving to the next concept.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (hr/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	-	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	-	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	-	10% (10)	Continuous	All
	Report	-	10% (10)	13	LO #5, #8 and #10



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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to electrochemistry; its role in the synthesis of materials
Week 2	Overview of the wide range of applications and current research in electrochemistry
Week 3	Electric conductance in electrolytes and the factors affecting it
Week 4	Measurement of conductivity of electrolytes using a conductometer
Week 5	Using conductivity measurements to determine molar conductance, equivalent conductance and ion concentration
Week 6	Degree of dissociation of electrolytes in solution
Week 7	Experimental determination of the degree of dissociation
Week 8	Factors affecting the degree of dissociation
Week 9	Importance of the degree of dissociation in determining properties/behavior of electrolyte solutions
Week 10	Transference number of ions as a measure of ionic mobility
Week 11	Experimental determination of the transference number
Week 12	Factors the transference number depends on and its fields of application
Week 13	Oxidation and reduction reactions: transfer of electrons between substances
Week 14	Oxidation as loss of electrons, reduction as gain of electrons (redox)
Week 15	Redox reactions in chemical and biological processes
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	



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كل وحدة ائتمانية = ٢٥ ساعة



Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	1. The Degree of Dissociation of Electrolytes in Solution: P. Atkins and J. de Paula, "Physical Chemistry," 11th ed., Oxford University Press (2017); Electronic Principles, A.P. Malvino (Tata McGraw Hill).	Online
Recommended Texts	2. Physical Chemistry by Peter Atkins and Julio De Paula, Chapter 11, Oxford University Press, 2017. 3. Inorganic Chemistry by Catherine E. Housecroft and Alan G. Sharpe.	Online
Websites	https://chem.libretexts.org/Courses/Athabasca_University/Chemistry_350	



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كل وحدة ائتمانية = ٢٥ ساعة



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 with 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.

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امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Academic English I		Module Delivery	
Module Type	Support		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UM116			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level	UGI	Semester of Delivery		
Administering Department		Electrical Engineering Dept.	College	Engineering
Module Leader	Hayder Naser Al-Lami		e-mail	hayderallami@uomisan.edu.iq
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification	
Module Tutor		Name (if available)	e-mail	E-mail
Peer Reviewer Name		Name	e-mail	E-mail
Scientific Committee Approval Date		21/09/2025	Version Number	1.0

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



Module Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	To enable the learner to communicate effectively and appropriately in real-life situations. To use English effectively for study purposes across the curriculum. To develop and integrate the use of the four language skills, i.e. reading, listening, speaking and writing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Heighten awareness of correct English grammar usage across all language skills. Improve speaking ability in English. Review the grammatical forms of English and their use in specific communicative contexts, including class activities, homework, reading and writing. Improve reading fluency skills. Read university texts and expand vocabulary. Achieve these outcomes through focused reading skills work and exams, discussion of longer articles, and summary writing including the drafting process.
Indicative Contents المحتويات الإرشادية	Introduction to the English language and basic greetings. Vocabulary building: commonly used academic words, phrases and expressions. Grammar essentials: nouns, verbs, adjectives, adverbs, tenses and sentence structure. Reading comprehension: strategies for understanding and improving reading of texts. Writing skills: sentence construction, punctuation, paragraph development and short essay writing. Speaking skills: basic conversation practice. Everyday communication: practical English for social and functional situations.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Sessions combine explicit grammar instruction with communicative practice: vocabulary and grammar points are taught first, then immediately used in reading, writing and speaking tasks so language stays functional rather than abstract. A closing block of conversation practice and a graded presentation gives every student a low-stakes opportunity to use spoken English before the final exam.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1



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Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50
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Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	2 and 6	All
	Assignments	1	15% (15)	10	All
	Presentation	1	10% (10)	11	All
	Report	-	-	-	-
Summative assessment	Midterm Exam	2hr	15% (15)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic English essentials
Week 2	Vocabulary enrichment and dictionary use
Week 3	English grammar
Week 4	English grammar
Week 5	English grammar
Week 6	Reading comprehension
Week 7	Mid-term exam
Week 8	Writing paragraph
Week 9	Writing paragraph
Week 10	Reading and writing
Week 11	Basic conversation practice
Week 12	Basic conversation practice



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Week 13	Reading practice
Week 14	Presentation
Week 15	Presentation
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Oxford English for Electrical and Mechanical Engineering, Student's Book.	
Recommended Texts	Basic English Language Skills, Oxbridge Academy; Headway Student's Book.	
Websites	https://www.ted.com/talks ; https://www.perfect-english-grammar.com ; https://www.merriam-webster.com	



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
بكالوريوس في الهندسة الكهربائية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Workshop Technology		Module Delivery		
Module Type	Support		☐ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	ENG123				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		UGI			Semester of Delivery
Administering Department		Electrical Engineering Dept.	College	Engineering	
Module Leader	Mushtaq Abdul Kareem Hussein		e-mail	mushtaqkareem@ uomisan.edu.iq	
Module Leader’s Academic Title		lecturer	Module Leader’s Qualification		Ph.D
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Nabeel Najem Bahlool	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	Practical Skill Development: develop practical skills among students, including hands-on experience in machining, fitting, welding, carpentry, sheet metal work and electrical work. Understanding Workshop Tools and Equipment: familiarize students with different tools, machines and equipment commonly used in workshops, their purpose, operation and maintenance. Workshop Safety: educate students about workshop safety practices, including proper use of PPE, handling hazardous materials, and following safety protocols. Material Selection and Handling: selection and handling of materials such as metals, wood, plastics and composites. Workshop Processes: introduce machining, casting, forging, welding, soldering, brazing and fabrication. Measurement and Quality Control: accurate measurement, dimensional accuracy, tolerance and inspection methods. Project Work: practical assignments applying theoretical knowledge and skills. Industry Relevance: bridge the gap between theoretical knowledge and industry practices.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Develop practical skills related to workshop processes and proficiency in using tools, machines and equipment commonly found in workshops. Have a solid understanding of different workshop processes and techniques, including machining, casting, forging, welding, soldering, brazing and fabrication. Be aware of workshop safety practices and demonstrate the ability to work safely in a workshop environment. Be knowledgeable about various materials used in workshops and their properties and appropriate handling techniques. Be proficient in accurate measurement using different tools and techniques, understanding tolerance and inspection methods. Analyze workshop-related problems and apply appropriate problem-solving techniques. Plan and execute workshop projects, applying theoretical knowledge and practical skills to meet specified requirements and timelines. Demonstrate effective teamwork and communication skills in a workshop setting. Relate theoretical concepts to real-world industrial applications. Demonstrate ethical behavior, professionalism and respect for standards and regulations governing workshop practices.
Indicative Contents	Introduction to Workshop Technology: overview of workshop practices and their significance in industry; workshop safety measures; introduction to common tools, machines and equipment.



المحتويات الإرشادية	Hand Tools and their Uses: identification, selection and proper use of hand tools; techniques for handling, maintaining and storing hand tools. Measuring and Marking Tools: rulers, calipers, micrometers, gauges and levels; principles of accurate measurement and marking. Workshop Processes: machining (lathe work, drilling, milling, grinding, shaping), casting, welding and joining, sheet metal work, carpentry, and an introduction to electrical work. Workshop Safety and Environmental Considerations: safety guidelines, handling and disposal of hazardous materials, fire safety measures and environmental sustainability practices. Quality Control and Inspection: principles of quality control, inspection techniques, tolerance, surface finish and dimensional accuracy. Workshop Projects and Exercises: practical projects, project planning, execution and documentation, collaborative teamwork exercises. Industry Practices and Career Orientation: industries and career opportunities related to workshop technology, industry standards, codes and regulations, work ethics and professionalism.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Workshop courses are taught using a demonstrate-then-practice model that is standard in practical engineering training: a technique is first demonstrated under safety guidance, after which students practice it themselves in small, supervised groups that rotate across stations to ensure equitable access to equipment. Occupational safety procedures are integrated into every practical activity rather than taught separately, and students are assessed mainly through practical tasks and small workshop projects rather than written exams alone.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	48	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	3.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	27	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75		



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كل وحدة ائتمانية = ٢٥ ساعة



Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	
Week 12	
Week 13	
Week 14	
Week 15	



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Week 16	Preparatory week before the final Exam
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Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Workshop Technology and Safety
Week 2	Workshop practices, tools, machines and equipment
Week 3	Safety guidelines and procedures in the workshop environment
Week 4	Demonstration and practice of proper use of personal protective equipment
Week 5	Fire safety measures and emergency protocols
Week 6	Hand tools and measurement: identification, selection and use
Week 7	Measurement techniques using rulers, calipers and micrometers

Learning and Teaching Resources مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	Course handout (Arabic), Department of Electrical Engineering, University of Misan, 2023-2024.	
Recommended Texts	Course handout (Arabic), Department of Electrical Engineering, University of Misan, 2023-2024.	
Websites		



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Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
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امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Fundamentals of Electrical Engineering II			Module Delivery	
Module Type	Core			☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	EL121				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		UGI	Semester of Delivery		Two
Administering Department		Electrical Engineering Dept.	College	Engineering	
Module Leader	Dr. Ali Abdul Karim Mohsen Ali		e-mail	aliabdalkreem@uomisan.edu.iq	
Module Leader’s Academic Title		lecturer	Module Leader’s Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Fundamentals of Electrical Engineering I	Semester	One
Co-requisites module	None	Semester	



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	- To develop problem solving skills and understanding of alternating waveforms. - To understand the meaning of time-varying voltage or current. - To deal with sinusoidal current and phasors. - To introduce the concept of impedance and admittance of the circuit. - To understand Kirchhoff's current and voltage laws problems. - To perform Mesh and Nodal analysis. - To apply Thevenin's, Norton's, superposition, and maximum power transfer theorems to find different electric quantities.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Describe sinusoidal AC voltage characteristics and definitions. - Introduce the general format of sinusoidal voltage and current. - Explain the phasor relation. - Understand the terms average value and effective (RMS) value. - Explain the response of R, L and C elements to sinusoidal voltage and current. - Determine the average power and power factor. - Solve series, parallel and series-parallel AC circuits. - Explain mesh analysis in AC circuits with and without current sources. - Explain nodal analysis in AC circuits with and without current sources. - Perform Star-Delta and Delta-Star conversion. - Introduce source conversion and superposition theorem for networks with two or more sources. - Understand Thevenin's and Norton's theorems to provide equivalent circuits. - Use Thevenin's and Norton's theorems to find maximum power transfer to the load. - Explain substitution, reciprocal and Millman's theorems. - Determine AC power, the power triangle, and total P, Q and S. - Understand power factor correction.
Indicative Contents المحتويات الإرشادية	Part A - Circuits Analysis Definition of AC sinusoidal waveforms, phase relation, response of elements to sinusoidal voltage or current, series circuit, parallel circuit, Kirchhoff's laws, mesh analysis, nodal analysis. [40 hrs] Part B - Circuits Theorems Superposition theorem, Thevenin theorem, Norton theorem, maximum power transfer theorem, Millman theorem, substitution theorem, and reciprocal theorem. [20 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم



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Strategies الإستراتيجيات	Building directly on Fundamentals I, the module re-uses the same mesh/nodal/theorem toolkit but applied to sinusoidal quantities, so lectures explicitly contrast AC and DC behavior at each step. A laboratory using the oscilloscope lets students observe phase shift and frequency response directly, and the final third of the course culminates in three-phase power analysis, tying the semester's circuit-theory work to a practical power-systems topic.		
Student Workload (SWL) الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

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

Delivery Plan (Theoretical Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic concepts of AC circuits: definition, general format for sinusoidal voltage or current, phase relations



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Week 2	Average value, effective value, response of basic R, L and C elements to a sinusoidal voltage or current
Week 3	Series AC circuits, Kirchhoff's voltage law and voltage divider
Week 4	Parallel resistance, Kirchhoff's current law and current divider, equivalent circuits
Week 5	Series-parallel network, ladder network, Star-delta connection
Week 6	Methods of analysis: Mesh Analysis
Week 7	Methods of analysis: Mesh Analysis with special case
Week 8	Review + MID EXAM
Week 9	Methods of analysis: Nodal Analysis
Week 10	Methods of analysis: Nodal Analysis with special case
Week 11	Circuit theorems: superposition theorem, source transformation
Week 12	Circuit theorems: Thevenin theorem
Week 13	Circuit theorem: Norton's theorem
Week 14	Circuit theorem: Maximum power transfer theorem
Week 15	Substitution theorem, reciprocal theorem and Millman's theorem, power triangle
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction: oscilloscope instrument and use to display alternating waveform and measure frequency, voltage and phase shift
Week 2	Response of pure R, L and C elements to sinusoidal voltage
Week 3	Frequency response of series R-C circuit
Week 4	Frequency response of parallel R-L circuit
Week 5	Phase measurement by Lissajous pattern
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
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كل وحدة ائتمانية = ٢٥ ساعة



Required Texts	Charles K. Alexander and Matthew N.O. Sadiku, "Fundamentals of Electric Circuits"	Yes
Recommended Texts	Boylestad, "Introductory Circuit Analysis"	Yes
Websites		

Grading Scheme مخطط الدرجات				
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امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Mathematics II		Module Delivery		
Module Type	Basic Science		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EE122				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGI			Semester of Delivery
Administering Department		Electrical Engineering Dept.	College	Engineering	
Module Leader	Dr. Sinan Imad Sabri		e-mail	sisabri@uomisan.edu.iq	
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Mathematics I (EE112)	Semester	One
Co-requisites module	None	Semester	



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	Mathematics II aims to introduce students to the concept of integration and its importance to electrical engineering. Students will learn various integration methods, applications of definite integrals, and numerical integration, in addition to transcendental functions, complex numbers and polar coordinates. The module objectives are: Introduce students to the concept of integration and how to solve related problems. Identify different integration techniques and use them correctly to find the integrals of different functions. Understand effective methods of using integrals in problems related to electrical engineering applications. Understand how to deal with complex numbers and use them with all associated mathematical operations. Familiarize students with the concepts of polar coordinates.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Understand the concept of integration and its importance in engineering applications. Demonstrate proficiency in performing basic integration operations. Apply integration techniques, including substitution, integration by parts, partial fractions, and trigonometric substitutions, to solve engineering problems. Analyze and interpret the geometric and physical significance of definite integrals, such as computing areas and volumes. Utilize numerical integration techniques such as the trapezoidal rule and Simpson's rule. Perform arithmetic operations with complex numbers and find complex conjugates. Convert equations between rectangular and polar forms.
Indicative Contents المحتويات الإرشادية	Indefinite Integrals: rules for indefinite integrals; integration of trigonometric functions; solving initial value problems with indefinite integrals; definite integrals and rules for definite integrals. Techniques of Integration: basic integration formulas (by substitution); integration by parts; tabular integration; trigonometric integrals; definite integrals of odd and even functions; integration by trigonometric substitutions; integrating rational functions by partial fractions; numerical integration (trapezoidal rule and Simpson's rule). Application of Integrals: area under a curve; area between two curves; volume of solids of revolution; length of curves. Transcendental Functions: inverse functions; logarithmic functions. Complex Numbers: complex numbers and operations; graphical representation; polar form of a complex number. Polar Coordinates: definition of polar coordinates; polar equations and graphs; polar and Cartesian coordinates; graphing polar coordinate equations.



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Following the same guided problem-solving approach as Mathematics I, each integration technique (substitution, parts, partial fractions, trigonometric substitution) is taught through worked examples before students apply it independently in assignments and quizzes. The course closes with complex numbers and polar coordinates, deliberately timed to prepare students for the phasor analysis used in Fundamentals of Electrical Engineering II running in the same semester.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4 and 6	LO #1,#2,#3,#4,#5
	Assignments	4	20% (20)	3,5,7,15	LO #1,#2,#3,#4,#5,#6,#12,#13,#14
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	13	#9, #10, #11
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Integration: indefinite integrals, rules for indefinite integrals, integration of trigonometric functions
Week 2	Solving initial value problems with indefinite integrals, definite integrals, rules for definite integrals
Week 3	Assignment + Techniques of Integration, basic integration formulas by substitution, integration by parts
Week 4	Quiz + Tabular integration, trigonometric integrals, definite integrals of odd and even functions
Week 5	Assignment + Integration by trigonometric substitutions
Week 6	Quiz + Integrating rational functions by partial fractions
Week 7	Assignment + Integration by substitution and integrating of the roots
Week 8	Mid Term + Numerical integration: trapezoidal rule and Simpson's rule
Week 9	Application of Integrals: area under a curve and area between two curves
Week 10	Volume of solids of revolution
Week 11	Length of plane curves and area of surface of revolution
Week 12	Transcendental Functions: inverse functions and logarithmic functions
Week 13	Report + Complex Numbers, operations, graphical representation, polar form
Week 14	Polar Coordinates: definition, polar equations and graphs, polar and Cartesian coordinates
Week 15	Assignment + Review and solve related problems
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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



Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	George B. Thomas, Jr., "Calculus", 14th edition, Cengage Publisher Services, 2018.	
Recommended Texts	Anthony Croft, Robert Davison, Martin Hargreaves and James Flint, "Engineering Mathematics, A Foundation for Electronic, Electrical, Communications and Systems Engineers", Pearson Education, 2017.	
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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
بكالوريوس في الهندسة الكهربائية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Electronic 1		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	EE123			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level		UGI		
Administering Department		Electrical Engineering Dept.	College	Engineering
Module Leader	Anwer Jabbar Hasan		e-mail	anwer.jabbar@uomisan.edu.iq
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification	M.Sc.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name		Name	e-mail	E-mail
Scientific Committee Approval Date		21/09/2025	Version Number	1.0

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	Understand the process of rectification to establish a DC level from a sinusoidal AC input. Be able to predict the output response of clipper and clamper diode configurations. Become familiar with the basic construction and operation of the Bipolar Junction Transistor. Be able to apply the proper biasing to ensure operation in the active region. Recognize and explain the characteristics of an npn or pnp transistor. Be able to determine the DC levels for a variety of important BJT configurations. Understand how to measure the important voltage levels of a BJT transistor configuration to determine whether the network is operating properly. Become aware of the saturation and cutoff conditions of a BJT network and the expected voltage and current levels. Become familiar with the construction and operating characteristics of JFET and MOSFET devices. Be able to perform a DC analysis of JFET, MOSFET and MESFET networks.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Recognize types of diodes, explain basic terms related to diodes and tell the operating principle of diodes. Recognize types and construction of diodes; explain ideal diode, equivalent circuit and DC characteristics. Tell the operating principles of diodes and Zener diodes. Analyze different diode circuits. Recognize half-wave, full-wave and bridge rectifier circuits and explain their operation. Recognize clipping and clamping circuits and analyze these circuits. Analyze and measure parameters in basic diode circuits. Tell the structure and operation of transistors and recognize different types of transistors. Recognize different configurations of transistor circuits and compare these circuits. Analyze transistor DC biasing. Explain the operation of transistor DC biasing circuits.
Indicative Contents المحتويات الإرشادية	Diode circuits: diode operation and i-v characteristics, regions of operation, models and limitations, tunnel, Zener, varicap, LED, photo, laser and microwave diodes, single- and multi-diode circuits, rectifiers, clipping and clamping, diode logic (AND/OR functions). Bipolar transistors and logic families: NPN and PNP transistor operation, i-v characteristics, regions of operation, models and limitations, transfer characteristic of BJT with load resistor, biasing for logic and amplifier applications, logic level definitions. MOS transistors and biasing: field-effect transistor operation, i-v characteristics of NMOS, regions of operation, models and limitations, enhancement and depletion-



	mode devices, PMOS devices, transfer characteristic of FET with load resistor, biasing for logic and amplifier applications.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	The course proceeds device by device diodes, then BJTs, then FETs with each device's i-v characteristics and DC biasing analyzed before its circuit applications (rectifiers, clippers, logic gates, amplifier biasing) are introduced. Homework problems and on-site assignments require students to analyze specific biasing circuits by hand, building the DC-analysis fluency needed for the amplifier design work that follows in Electronics II.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (10)	5, 9	All
	Homework	5	10% (10)	12	All
	Assignment on site	2	5% (10)	4, 11	-
	Report	1	10% (10)	10	All
Summative assessment	Midterm Exam	2hr	10% (10)	8	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Diode operation and i-v characteristics, regions of operation, models and limitations
Week 2	Tunnel, Zener, Varicap, LED, photo, laser and microwave diodes, single diode circuits
Week 3	Rectifiers, clipping and clamping
Week 4	Electronic gates, diode logic (AND and OR functions)
Week 5	BJTs: basic construction, active region operation, Common Base (CB) configuration
Week 6	Transistor amplification action, Common Emitter (CE) and Common Collector (CC) configurations
Week 7	DC biasing circuits of BJTs: standard biasing circuits
Week 8	Mid-term exam
Week 9	Other biasing circuits, bias stabilization
Week 10	BJT switching circuits
Week 11	FETs: basic definitions, Junction Field-Effect Transistor (JFET)
Week 12	DC biasing circuits of JFETs
Week 13	MOSFETs: depletion-type MOSFET
Week 14	Enhancement-type MOSFET
Week 15	MOSFET biasing
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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



Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Robert L. Boylestad and Louis Nashelsky, "Electronic Devices and Circuit Theory", 9th Edition, Pearson Education.	
Recommended Texts	Millman J. and Halkias C., "Integrated Electronics", TMH, 2007.	
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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أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Computer Programming II		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL124				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UGI			Semester of Delivery
Administering Department		Electrical Engineering Dept.	College	Engineering	
Module Leader	Yasir Ali Khalid		e-mail	Yasseralnaimi6@uomisan.edu.iq	
Module Leader's Academic Title		Asst. Lecturer	Module Leader's Qualification		
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Computer Programming I (UM114)	Semester	One
Co-requisites module	None	Semester	



Module Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	Thorough treatment of problem-solving skills independent of the C++ language. Develop students' understanding of the syntax and semantics of selection and decision-making statements. Introduce students to the concept of one-dimensional arrays. Develop skills in declaring, initializing and accessing elements in a 2D array. Introduce the concept of function parameters and return values. Extend students' knowledge of arrays by introducing multidimensional arrays. Introduce the concept of pointers and references in programming. Introduce students to the concept of strings and their manipulation in programming.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Understand the fundamentals, essential ideas and concepts for success in C++ programming. Write a computer program and understand how the computer executes it. Understand the concept of strings and their manipulation in programming. Apply skills in declaring, initializing and manipulating one-dimensional arrays. Extend knowledge of 1D arrays by applying more advanced operations and algorithms. Understand the concept of two-dimensional arrays and apply advanced operations and algorithms. Understand the concept of function parameters and return values. Understand the concept of multidimensional arrays and their applications. Understand the concept of pointers and references in programming.
Indicative Contents المحتويات الإرشادية	Introduction, the rules of programming languages, working with data, creating and naming variables. Using variables and operators, choosing and using data types, applying data types, creating constants, exploring language differences. Managing program flow, making choices and conditions, creating complex conditions, creating loops. Creating functions, returning values and using parameters, using recursion. Creating and using composite data types. Arrays and collections, introducing object-oriented programming, making things modular.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الاستراتيجيات	The module builds directly on Computer Programming I but specializes entirely in C++: each theoretical module (data types, control structures, classes, exceptions, OOP) is paired with a dedicated lab session where students write and run working C++ code demonstrating that exact concept. Two in-semester quizzes on core syntax keep
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students current before the cumulative work of building small object-oriented programs later in the course.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.3
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Computer Programming 1: control flow / selection statements #1
Week 2	Computer Programming 2: control flow / selection statements #2
Week 3	Computer Programming 3: looping #1 / decision making statements #1
Week 4	Computer Programming 4: looping #2 / decision making statements #2
Week 5	Computer Programming 5: nested looping



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كل وحدة ائتمانية = ٢٥ ساعة



Week 6	Computer Programming 6: one-dimensional array
Week 7	Computer Programming 7: two-dimensional array
Week 8	Mid Term Exam
Week 9	Computer Programming 8: functions and return values
Week 10	Computer Programming 9: function with array
Week 11	Computer Programming 10: pointers and references, pointer with an array
Week 12	Computer Programming 11: strings, string functions
Week 13	Quiz and discussion
Week 14	Computer Programming 12: structures
Week 15	Preparatory week before the final Exam
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Experiment No.1: selection statements (control flow), exercises, weekly evaluation
Week 2	
Week 3	Experiment No.2: decision making statements (looping), exercises, weekly evaluation
Week 4	
Week 5	Experiment No.3: decision making statements (nested loops), exercises, weekly evaluation
Week 6	
Week 7	Experiment No.4: 1D array and 2D array, exercises, weekly evaluation

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Braunschweig, D. and Busbee, K. L. (2018). Programming Fundamentals - A Modular Structured Approach, 2nd Edition.	Yes
Recommended Texts		
Websites		



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
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كل وحدة ائتمانية = ٢٥ ساعة



Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
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	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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Fail Group (0 - 49)	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F - Fail	راسب	(0-44)	Considerable amount of work required

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امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Mechanical Engineering		Module Delivery	
Module Type	Basic Science		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	EE125			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level		UGI		
Administering Department		Electrical Engineering Dept.	College	Engineering
Module Leader	Hayder Naser Al-Lami		e-mail	hayderallami@uomisan.edu.iq
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification	M.Sc.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name		Name	e-mail	E-mail
Scientific Committee Approval Date		21/09/2025	Version Number	1.0

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



Module Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	Apply the principles of mechanics to practical engineering problems. Identify an appropriate structural system for studying a given problem and isolate it from its environment. Teach safety rules and regulations on-site in an industrial environment and proper use of working tools, instruments and machines. Introduce basic workshop practices, production, labor and time requirements of workshop operations. Develop a simple mathematical model for engineering problems and carry out static analysis. Carry out kinematic and kinetic analyses for particles and systems of particles.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Understand how the world, both natural and man-made, works. Understand physical principles such as forces, motion and equilibrium. Have a good knowledge of safety rules on-site in an industrial environment and increase knowledge of working tools, instruments and machines. Present a general guide for solving problems. Analyze systems of force. Understand the concept of a free body diagram and equilibrium equation. Present specific applications of frictional force analysis. Study and classify the kinematics and kinetics of particles and rigid bodies. Know the basics of thermodynamics. Know the basics of strength of materials.
Indicative Contents المحتويات الإرشادية	Statics: force system, force components, moment of a force, equilibrium, free body diagram, centroids and centre of gravity, centroids of area. Dynamics: kinetics and kinematics of particles, rectilinear motion, curvilinear motion. Workshop Skills: training programs in five workshops - occupational safety and health, welding, measurement, drilling and turning.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Theory lectures on statics and dynamics (force systems, equilibrium, centroids, kinematics/kinetics) run in parallel with a five-station workshop rotation (safety, welding, measurement, drilling, turning), so students immediately connect mechanical-engineering theory to hands-on practice. Visual examples and worked equilibrium problems build the free-body-diagram skills that recur throughout the semester.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
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كل وحدة ائتمانية = ٢٥ ساعة



Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعياً	2.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1.1
Total SWL (hr/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)	3, 6	All
	Homework	1	10% (10)	8	All
	Assignment on site	2	10% (10)	2, 4	-
	Report	1	10% (10)	6	All
Summative assessment	Midterm Exam	2hr	10% (10)	7	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to mechanics: basic concepts, scalars and vectors, Newton's laws, SI units, problem solving in statics
Week 2	Force systems: rectangular components, moment, couple, resultants
Week 3	Force systems: rectangular components, moment, couple, resultants (cont.)
Week 4	Equilibrium: free-body diagram
Week 5	Equilibrium: free-body diagram (cont.)
Week 6	Centroids and centre of gravity
Week 7	Mid-term exam



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Week 8	Centroids of area
Week 9	Kinematics of particles and rigid bodies
Week 10	Kinematics of particles and rigid bodies (cont.)
Week 11	Kinetics of particles and rigid bodies (force and acceleration)
Week 12	Kinetics of particles and rigid bodies (force and acceleration) (cont.)
Week 13	Kinetics of particles and rigid bodies (force and acceleration) (cont.)
Week 14	Kinetics of particles and rigid bodies (force and acceleration) (cont.)
Week 15	Kinetics of particles and rigid bodies (force and acceleration) (cont.)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	1. "Engineering Mechanics - Statics and Dynamics", R.C. Hibbeler, 14th edition. 2. "Engineering Mechanics - Statics and Dynamics", J.L. Meriam and L.G. Kraige, 8th edition.	
Recommended Texts	1. "Engineering Mechanics - Statics and Dynamics", R.C. Hibbeler, 14th edition. 2. "Engineering Mechanics - Statics and Dynamics", J.L. Meriam and L.G. Kraige, 8th edition.	
Websites		



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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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering Drawing		Module Delivery	
Module Type	Basic Science		☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	EE115			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level		UGI		
Administering Department		Electrical Engineering Dept.	College	Engineering
Module Leader	Mushtaq Abdul Kareem Hussein		e-mail	eng.haider992@gmail.com
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification	Ph.D
Module Tutor	Haider Abdulkareem Raheem		e-mail	eng.haider992@gmail.com
Peer Reviewer Name		Name	e-mail	E-mail
Scientific Committee Approval Date		21/09/2025	Version Number	1.0

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



Module Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	Acquaint students with the fundamentals of drawing. Introduce the basics and principles of technical drawings. Enhance communication of engineering drawings and product design. Develop students' visualization skills for geometric objects. Develop a knowledge of both manual and computer-generated engineering drawing. Create, edit and print a variety of technical drawings using a CAD system.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Understand and read engineering drawings clearly. Communicate effectively in a modern technical environment. Enhance imagination of geometric shapes. Construct and present quality engineering drawings in a well-drafted manner. Present correct lettering, figures and dimensions to a defined style and standard. Produce detailed electrical engineering drawings using AutoCAD.
Indicative Contents المحتويات الإرشادية	Part A - Sketching: paper size, lettering and title blocks; engineering operations; graphic geometry; orthographic projection; isometric and oblique projection; multi-view orthographic projection in first and third angle projection. [20 hrs] Part B - Computer Aided Drafting: introduction to basic CAD concepts using AutoCAD; file management; the 2D drawing environment; coordinate systems; drawing units; keyboard entry; function keys; hatch, text and dimensioning routines; editing and drawing commands; layers, linetypes and lineweights; blocks; isometric drawings in 2D AutoCAD; polar/circular arrays; dynamic blocks; enhancing drawings with text, symbols and blocks; the Design Centre; dimension styles for viewport scales. [20 hrs] Part C - Practical CAD Drawing Exercises: foundation detail; AutoCAD 2D practice drawing; AutoCAD 3D geometric layout and sections; AutoCAD single-line diagram drawing; electrical panel CAD drawing. [5 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Instruction moves from manual sketching fundamentals (lettering, projections, isometric views) to computer-aided drafting in AutoCAD, so students first internalise projection principles by hand before automating them. Drawing-hall exercises are marked weekly with oral and written feedback, and homework is reviewed the following lecture, giving students a fast correction cycle before the final exam.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem)	48	Structured SWL (hr/w)	3.2
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الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعياً	
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	3.5
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	10	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	1	20% (20)	Continuous	All
	Report	0	0% (0)	---	---
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction, graphic instruments and their use, lettering
Week 2	Engineering operations
Week 3	Graphic geometry
Week 4	Multi-view orthographic projection in first and third angle projection
Week 5	Multi-view orthographic projection in first and third angle projection (cont.)
Week 6	Multi-view orthographic projection in first and third angle projection (cont.)
Week 7	Mid-term + dimensions
Week 8	Third view
Week 9	Isometric drawing and sketching



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Week 10	Isometric drawing and sketching (cont.)
Week 11	Isometric drawing and sketching (cont.)
Week 12	Oblique drawing
Week 13	Oblique drawing (cont.)
Week 14	Section of isometric drawing, sectional view
Week 15	Section of isometric drawing, sectional view (cont.)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	The use of CAD in engineering drawing, menu bar and toolbars, drawing ellipse and rectangle
Week 2	Drawing line, polyline, ray, circle, point, arc, etc.
Week 3	CAD electrical/mechanical special features
Week 4	The use of various layers
Week 5	Drawing electrical symbols on simple architectural plans
Week 6	3D drawing, rendering
Week 7	Orthogonal projections and sectional views

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Abdul-Rasul Al Khafaf, "Engineering Drawing", Baghdad, 1990.	Yes
Recommended Texts	K. Venkata Reddy, "Textbook of Engineering Drawing", 2nd Edition, BS Publications, 2008.	No, only via website below
Websites	https://archive.org/details/TextbookOfEngineeringDrawing_201802	



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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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امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Democracy and Human Rights		Module Delivery	
Module Type	Support		☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UM126			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level		UGI		
Administering Department		Electrical Engineering Dept.	College	Engineering
Module Leader	Jebur Khalaf Issa		e-mail	jabralmalky@uomisan.edu.iq
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification	Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name		None	e-mail	None
Scientific Committee Approval Date		21/09/2025	Version Number	1.0

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	Familiarize students with the concepts and foundations of democracy and clarify the importance of democratic governance in achieving justice and protecting human rights. Encourage students to participate actively in political and social life, whether through elections, work in NGOs, or contributing to solving social problems. Familiarize students with the concept of human rights and ensuring their protection, highlighting the importance of combating discrimination, oppression and injustice, and promoting equality among individuals regardless of cultural, religious or gender background. Provide students with basic legal knowledge and an understanding of legal procedures related to protecting human rights and combating their violation. Develop students' critical and analytical thinking abilities regarding political and social issues related to democracy and human rights.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Gain a comprehensive understanding of the principles of democracy and their importance in achieving justice and sustainable development. Acquire basic knowledge of international covenants and agreements related to human rights, and recognize their own rights and the rights of others. Learn critical and analytical thinking regarding issues of democracy and human rights and how to evaluate evidence and positions related to these issues. Learn how to actively participate in political and social life, whether through voting, participating in peaceful demonstrations, or working in NGOs. Learn the values of coexistence and mutual respect among individuals regardless of cultural, religious and gender differences, and gain the ability to empathize and interact positively with others. Learn how to contribute to achieving social change and combating discrimination and oppression, whether locally or globally. Recognize the legal procedures related to protecting human rights and related legal matters, and gain the ability to apply legal knowledge in daily life.
Indicative Contents المحتويات الإرشادية	Concepts of democracy: definition and basic principles; types and models of democracy; the importance of democracy in achieving justice and human rights. [7 hrs] Concepts of human rights: definition and international legal foundations; common human rights violations worldwide; the importance of protecting human rights and combating discrimination and injustice. [7 hrs] International human rights: international documents related to human rights such as declarations and covenants; international oversight and enforcement mechanisms. [7 hrs] Democratic governance: democratic entitlements such as elections and civic participation; the role of democratic institutions such as parliament, government and the judiciary; transparent governance, accountability and anti-corruption. [7 hrs]



	Contemporary challenges to democracy and human rights: technology and digital human rights; social, economic and environmental challenges and their impact on democracy and human rights. [7 hrs] Peaceful coexistence and tolerance: values of diversity, pluralism and mutual respect; resolving conflicts peacefully and non-violently. [7 hrs] Practices and case studies: study and analysis of real cases of human rights violations; successful democratic models and analysis of experiences from different parts of the world. [7 hrs]
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Group discussions to encourage critical thinking and the exchange of views on democracy and human rights issues; case studies of real violations or successful democratic experiences; student presentations on concepts and challenges; educational games and interactive activities such as election simulations or parliamentary sessions; individual research and reports on specific issues; field visits and community engagement with human-rights organizations; and the use of educational technology such as online forums and social media to exchange ideas.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (hr/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)	4, 11	LO #1,2,3
	Assignments	2	10% (10)	5, 12	LO #4, 5
	Projects / Lab.	-	-	-	-
	Report	1	10% (10)	12	LO #5, 6



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Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Historical roots of human rights in ancient civilizations and in Islam
Week 2	Concept and history of democracy, forms and images of democracy
Week 3	Relationship between human rights and democracy
Week 4	Characteristics and advantages of the democratic system
Week 5	Main components of democracy
Week 6	Contemporary democracy, central characteristics of contemporary democracy
Week 7	Civil society and democracy
Week 8	Constitution and democracy
Week 9	Principles of the democratic constitution
Week 10	Conditions for establishing constitutional democracy
Week 11	Guarantees that ensure the democratic system
Week 12	Guarantees that ensure public rights and freedoms
Week 13	Rights and elections, the importance of elections
Week 14	Real examples of human rights and democracy violations, genocide, suppression of peaceful demonstrations
Week 15	Exam
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	



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Week 3	
Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources		
مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	Riyadh Aziz Hadi, "Democracy: A Study in its Concepts, Dimensions and Development", 2nd edition, Al-Ghufran Library for Printing and Publishing, Baghdad, Iraq, 2012.	Yes
Recommended Texts		No
Websites		

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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كل وحدة ائتمانية = ٢٥ ساعة



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Arabic Language I		Module Delivery	
Module Type	Support		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UM123			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level		UGI		
Administering Department		Electrical Engineering Dept.	College	Engineering
Module Leader	Aya Hamed		e-mail	Aya.hamed@uomisan.edu.iq
Module Leader's Academic Title			Module Leader's Qualification	M.Sc.
Module Tutor	Aya Hamed		e-mail	Aya.hamed@uomisan.edu.iq
Peer Reviewer Name		Murtada Abass	e-mail	murtadaa@uomisan.edu.iq
Scientific Committee Approval Date		21/09/2025	Version Number	1

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	Teach students to write the Arabic language in a style free of spelling errors, and enable them to write administrative orders proficiently and in a simple style.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Teach students to write Arabic free of orthographic (imla'i) errors. 2. Enable students to compose administrative and official correspondence with proficiency. 3. Develop a clear, correct and straightforward writing style.
Indicative Contents المحتويات الإرشادية	Arabic speech and its parts (noun, verb, and letter) Writing the tied Arabic taa' and how to distinguish it from the haa' and the open taa' Original and secondary grammatical (i'raab) markers and the difference between them Punctuation marks Key punctuation marks (comma, semicolon, full stop, colon, question mark) Key punctuation marks (exclamation mark, quotation marks, parentheses, ellipsis, dash) The official letter (its importance and how to write it) The handwritten request (steps of preparing a handwritten request and their order) Writing the letters dhad and dhaa and how to distinguish between them Numbers (1-1,000,000): writing numbers in a controlled, error-free script The two hamzas (wasl and qat'): definition and position of hamzat al-wasl Hamzat al-qat': definition, position and how it is written The soft alif (maqsura and mamduda) Alif al-tafriq and ways of distinguishing it Mid-semester exam (al-madd)



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Direct lecturing on orthographic and grammatical rules (ta marbuta vs ha, i'rab markers, punctuation, hamza forms) is paired immediately with guided in-class writing exercises where errors are corrected on the spot. Practical drafting of official letters and handwritten requests under instructor supervision, plus peer review of written samples, gives students repeated, low-stakes practice applying the rules to real documents before the exams.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (hr/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	-	10% (10)	-	-
	Assignments	-	10% (10)	-	-
	Seminar	-	10% (10)	-	-
	Report	-	10% (10)	-	-
Summative assessment	Midterm Exam	1.5hr	20% (20)	7	-
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

Material Covered



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
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كل وحدة ائتمانية = ٢٥ ساعة



Week 1	Arabic speech and its parts (noun, verb, and letter)
Week 2	Writing the tied Arabic taa' and how to distinguish it from the haa' and the open taa'
Week 3	Original and secondary grammatical (i'raab) markers and the difference between them
Week 4	Punctuation marks
Week 5	Key punctuation marks (comma, semicolon, full stop, colon, question mark)
Week 6	Key punctuation marks (exclamation mark, quotation marks, parentheses, ellipsis, dash)
Week 7	The official letter (its importance and how to write it)
Week 8	The handwritten request (steps of preparing a handwritten request and their order)
Week 9	Writing the letters dhad and dhaa and how to distinguish between them
Week 10	Numbers (1-1,000,000): writing numbers in a controlled, error-free script
Week 11	The two hamzas (wasl and qat'): definition and position of hamzat al-wasl
Week 12	Hamzat al-qat': definition, position and how it is written
Week 13	The soft alif (maqsura and mamduda)
Week 14	Alif al-tafriq and ways of distinguishing it
Week 15	Mid-semester exam (al-madd)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts		No



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
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كل وحدة ائتمانية = ٢٥ ساعة



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 with 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.				
ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.				



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Electrical Circuit I		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	EL211			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level		UGII		
Administering Department		Electrical Eng. Dept.	College	Engineering
Module Leader	Zeina Nazar Abdulrazaq		e-mail	zeinanazar@uomisan.edu.iq
Module Leader’s Academic Title		Assist. Lecturer	Module Leader’s Qualification	M.Sc.
Module Tutor	Al-hussein M. Jumaah Alturfi		e-mail	alhussein.m@uomisan.edu.iq
Peer Reviewer Name		Name	e-mail	E-mail
Scientific Committee Approval Date		21/09/2025	Version Number	1.0

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Provide an explanation of the concept of the Laplace transform. 2. Distinguish between the functions of Laplace transform and inverse Laplace transform. 3. Determine the Laplace transform of standard functions. 4. Understand what a transfer function is and how it is used. 5. Determine the system poles and zeros; understand the natural response of the system. 6. Understand and use circuit element models in the s-domain and perform circuit analysis in the s-domain. 7. Explain transient conditions in R-L and R-C series/parallel circuits. 8. Define the two-port network parameters (Z, Y, h, ABCD) and their applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	9. Analyze electrical network parameters for different applications. 10. Apply the Laplace transform to linear circuits and systems. 11. Calculate dynamic analysis of RLC circuits in the frequency domain (current, voltage and power). 12. Develop Laplace-transformed networks for steady state and transient analysis. 13. Determine the elements required for network synthesis methods. 14. Calculate two-port network parameters (Z, Y, ABCD, h) for a given electrical network. 15. Relate different two-port network parameters and simplify complex (cascade, parallel) networks. 16. Find the various driving-point and transfer functions of a two-port network.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A: S-domain Circuit Analysis Definition of the Laplace Transform, properties of the Laplace Transform, the Inverse Laplace Transform, impedance and admittance in the s-domain, circuit analysis in the s-domain. [15 hrs] Part B: Transfer Function Definition of the transfer function, poles and zeros of transfer functions, natural response and the s-plane. Part C: The Transient Circuits RC, RL, RLC circuits in series and parallel and their complete response in time and s-domain. [15 hrs] Part D: Two-Port Networks



	Two-port networks, y-z-h and ABCD parameters, parameter relationships, cascaded two-ports, series and parallel connections of two-ports.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Instruction moves systematically from the Laplace-transform toolbox to its application: s-domain circuit elements and impedance are introduced first, then transfer functions and pole-zero analysis, then transient response of RLC circuits, and finally two-port network parameters. Interactive tutorials give students repeated practice converting a physical circuit into its s-domain equivalent before solving it, which is the core skill the course builds toward.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	4,8,10,12	LO #1,#2,#10,#11
	Assignments	2	10% (10)	11	LO #3,#4,#6,#7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5,#8,#10
Summative assessment	Midterm Exam	1.5hr	10% (10)	7	LO #1-#7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		



Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Laplace Transform, selected function Laplace transforms, properties of Laplace Transform and pairs
Week 2	Laplace Inverse, Circuit Elements in S Domain
Week 3	Electrical Circuit Analysis Using Laplace Transform
Week 4	Introduction to Transfer Function, System Poles and Zeros, Electrical Circuit in Transfer Function
Week 5	S-Plane, Natural Response
Week 6	Introduction to Transient Circuits, Transient analysis of R-C circuit
Week 7	Transient analysis of R-C circuit, Transient analysis of R-L-C circuit
Week 8	Transient Analysis Using Laplace Transform
Week 9	Mid-term Exam
Week 10	Introduction to Two-Port Networks, input impedance, output impedance, voltage/current/power gain
Week 11	Admittance parameters, Impedance parameters
Week 12	Hybrid parameters, Transmission parameters
Week 13	Conditions for Reciprocity and Symmetry, Interrelationships between Two-Port Parameters
Week 14	Interconnection of Two-Port Networks
Week 15	Two-Port Network Functions, Some Special Two-Port Networks
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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



Week 7

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Electric Circuits, James W. Nilsson, Susan A. Riedel, Pearson; Circuit Analysis: Theory and Practice, Allan H. Robbins & Wilhelm C. Miller	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

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ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



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أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Electrical Machine I		Module Delivery		
Module Type	C		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL212				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UGII			Semester of Delivery
Administering Department		Electrical Eng. Dept.	College	Engineering	
Module Leader	Hammam Hussein		e-mail	humam.hm@uomisan.edu.iq	
Module Leader’s Academic Title		Assist. Lecturer	Module Leader’s Qualification		M.Sc.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

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



Module Objectives, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the fundamental principles governing the operation of electrical machines: transformers, motors, and generators. 2. Develop the ability to analyze and design electrical machines by studying their construction, characteristics, and performance parameters. 3. Analyze the performance parameters of electrical machines such as torque, power, efficiency, and voltage regulation. 4. Understand control mechanisms and operational aspects of electrical machines, including speed control methods. 5. Comprehend the integration and coordination of electrical machines within power generation, transmission, and industrial systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	6. Understand working principles of DC generators, including armature, field winding, brushes, and commutator. 7. Distinguish between separately excited, shunt-wound, series-wound, and compound-wound DC generators. 8. Understand efficiency of a DC generator and identify types of losses (copper, iron, mechanical). 9. Understand armature reaction and the commutation process. 10. Apply the EMF equation to solve different generator circuit problems. 11. Analyze DC generator characteristics: open-circuit, magnetization, and load characteristics. 12. Understand parallel operation of DC generators and determine output to the load. 13. Analyze DC motor parameters: back EMF, torque, speed, and horsepower. 14. Understand methods of controlling DC motors, such as armature voltage control and field weakening. 15. Understand methods and techniques of braking of DC motors, and apply test-machine calculations.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Magnetization and Introduction to DC Machines</u> Working principle of DC machines; calculation of energy, power, and torque; construction of DC machines. <u>DC Generator</u> Simple loop generator, construction and components, commutation function, armature windings (Lap/Wave), excitation connections, E.M.F. equation, induced EMF, losses and efficiency, maximum efficiency. <u>Armature Reaction and Commutation</u>



	Armature reaction, demagnetizing/cross-magnetizing conductors, compensating windings, methods of improving commutation, characteristics of DC generators, parallel operation of shunt generators. DC Motor Motor principle, back e.m.f., voltage equation, conditions for maximum power, motor characteristics, torque, characteristics of shunt/series/compound motors, starting and braking, losses and efficiency. Control Methods and Testing Factors controlling motor speed, speed control of shunt and series motors; Swinburne's Test and Hopkinson's Test.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	The module builds DC-machine theory in construction order: generator construction and EMF equation first, then armature reaction and commutation, then motor operation and speed control, and finally standard machine tests (Swinburne's, Hopkinson's). Each theoretical block is followed immediately by characteristic-curve analysis so students connect equations to measurable machine behavior before the corresponding lab session.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem)	63	Structured SWL (hr/w)	4.2
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (hr/sem)	37	Unstructured SWL (hr/w)	2.5
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (hr/sem)	100		
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6,11	All
	Homework	2	10% (10)	5,13	All
	Report	1	10% (10)	8	All



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
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كل وحدة ائتمانية = ٢٥ ساعة



	Assignment	1	10% (10)	15	All
Summative assessment	Midterm Exam	1 hr	10% (10)	8	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction, Construction of DC Machines
Week 2	Type of Generator, Armature Winding, EMF Equation
Week 3	Total Losses, Distribution of Power, Efficiency
Week 4	Armature Reaction, Compensating Windings, Commutation
Week 5	Commutation, Generator Characteristics
Week 6	O.C.C. characteristics, Voltage Build-up
Week 7	Series Generator Characteristics, Voltage regulation, Paralleling DC Generators
Week 8	Mid Term Exam
Week 9	DC Motor, Back EMF
Week 10	Speed, Torque, Characteristics
Week 11	Losses, Control method
Week 12	Speed Control of Shunt Motors
Week 13	Speed Control of Series Motors
Week 14	Starting, Braking
Week 15	Testing of DC Machines
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	
Week 2	
Week 3	



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
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كل وحدة ائتمانية = ٢٥ ساعة



Week 4	
Week 5	
Week 6	
Week 7	

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Electrical Technology, B.L. Theraja, Volume-II (AC & DC Machines)	Yes
Recommended Texts	Principles of Electrical Machines, V. K. Mehta, Rohit Mehta	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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
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كل وحدة ائتمانية = ٢٥ ساعة



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Mathematics III		Module Delivery		
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	ENG201				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UGII			Semester of Delivery
Administering Department		Electrical Eng. Dept.	College	Engineering	
Module Leader	Dr. Ali Abdul Karim Mohsen Ali		e-mail	Hayder.a.kareem@uomisan.edu.iq	
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification		Ph.D
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	EE122	Semester	2
Co-requisites module	None	Semester	



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Vectors and Geometry of Space: scalars/vectors, vector arithmetic, norms, dot/cross products, equations of lines and planes in space. 2. Vector-valued functions: limits, continuity, derivatives, parametric representation, curvature, motion along a curve. 3. Partial Derivatives: functions of two/more variables, chain rule, directional derivatives and gradients, maxima/minima, Lagrange multipliers. 4. Multiple integrals: double integrals, areas/volumes, polar coordinates, surface integrals, triple integrals.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	5. Determine vector addition, subtraction and multiplication. 6. Understand applications of vectors such as force, velocity and acceleration. 7. Understand partial differential, partial derivative and directional derivative concepts. 8. Calculate gradient, divergence and derivative and understand their applications. 9. Calculate linearization of functions and determine maxima, minima and saddle points. 10. Determine areas and volumes of functions using multiple integration methods.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Vectors and Geometry of Space</u> Scalars/vectors, vector arithmetic, norm and normalizing of vectors, dot/cross product, equations of lines in space, planes in 3-space. <u>Vector-valued Functions</u> Limits and continuity, derivatives, curve equations in space, parametric representation, curvature, motion along a curve. <u>Partial Derivatives (Differentiations)</u> Functions of two/more variables, partial derivatives, the chain rule, directional derivatives and gradients, tangent planes, maxima/minima, Lagrange multipliers. <u>Multiple Integrals</u> Double integrals, areas and volumes, polar coordinates, parametric surfaces, surface area/integrals, evaluation of volume and triple integrals.



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Following the guided problem-solving approach used in Mathematics I/II, each topic (vectors, vector functions, partial derivatives, multiple integrals) is built through worked examples in lecture before students apply it in tutorials, quizzes and assignments. The course is deliberately timed alongside Electrical Circuit I so the vector and derivative tools introduced here reinforce the s-domain and phasor techniques being learned concurrently.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
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Week 1	Vectors and Geometry of Space: scalars and vectors, component of a vector, rules of vector arithmetic, norm and normalizing of vectors
Week 2	Vectors and Geometry of Space: Dot product, Cross product
Week 3	Vectors and Geometry of Space: Product of three or more vectors
Week 4	Vectors and Geometry of Space: Equations of lines in space, planes in 3-space
Week 5	Vector-valued Functions: Limits and continuity, derivatives, forms of a curve equation in space
Week 6	Vector-valued Functions: parametric representation, unit tangent and normal vectors
Week 7	Vector-valued Functions: Curvature, radius of curvature, motion along a curve, velocity, acceleration and speed
Week 8	Mid-term exam
Week 9	Partial Derivatives: Function of two or more variables, limits and continuity, partial derivatives
Week 10	Partial Derivatives: partial derivatives of functions of two/more variables
Week 11	Partial Derivatives: chain rule, directional derivatives and gradients
Week 12	Partial Derivatives: maxima and minima of functions of two variables, Lagrange multipliers
Week 13	Multiple Integrals: Double integral, areas and volumes, polar coordinates
Week 14	Multiple Integrals: Parametric surfaces, surface area, surface integrals
Week 15	Multiple Integrals: Evaluation of volume and triple integral
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources



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كل وحدة ائتمانية = ٢٥ ساعة



مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Thomas, G. B., Weir, M. D., Hass, J., Heil, C., & Behn, A. (2016). Thomas' Calculus Early Transcendentals. Pearson.	Yes
Recommended Texts		No
Websites		

Grading Scheme

مخطط الدرجات

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

Note: Marks with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Electronics II		Module Delivery		
Module Type	C		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL213				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGII			Semester of Delivery
Administering Department		Electrical Eng. Dept.	College	Engineering	
Module Leader	Khaled Walid Nasser Saad		e-mail	Khalid.waleed@uomisan.edu.iq	
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification		M.Sc.
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

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



Module Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	1. Establish a background on amplifier design, specifically MOSFET-based amplifiers used in discrete and integrated circuits. 2. Introduce and analyze useful integrated-circuit elements based on these two transistors. 3. Cover differential and multistage amplifiers. 4. Explain other two-terminal devices such as Schottky diodes and power diodes. 5. Describe PnPn and other devices and their operation.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	6. Identify main circuit elements and draw electronic circuit diagrams for standard components. 7. Explain the properties and operation of BJTs and analyze polarization, current/voltage/power values. 8. Understand amplifier configurations for both BJT and FET. 9. Explain properties and structure of JFETs, D-MOSFETs and E-MOSFETs. 10. Analyze both BJT and FET circuits in AC analysis: voltage gain, current gain, input/output impedance. 11. Identify and analyze differential and multistage amplifiers. 12. Describe other two-terminal devices and PnPn devices (Diac, GTO, Triac).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A: FET Analogue Electronics JFET and MOSFET (depletion and enhancement types); the MOSFET as a key device in digital IC design. Part B: Differential and Multistage Amplifiers Voltage gain of multistage amplifiers, use of the dB unit, total gain of cascaded amplifiers, equivalent circuits. Part C: Other Two-Terminal Devices Circuit diagrams and operation of other two-terminal devices. Part D: PnPn Devices Circuit diagrams and operation of PnPn devices (Diac, GTO, Triac).

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The course progresses from single-device analysis (JFET/MOSFET biasing) to circuit-level design (differential and multistage amplifiers) and finally to specialty devices (Schottky, power diodes, PNPN family). A dedicated lab component lets students test
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كل وحدة ائتمانية = ٢٥ ساعة



الإستراتيجيات	diode and transistor characteristics on real hardware in parallel with the multistage-amplifier theory being covered in lecture.		
Student Workload (SWL)			
الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem)	63	Structured SWL (hr/w)	4.2
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (hr/sem)	62	Unstructured SWL (hr/w)	4.2
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (hr/sem)	125		
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	20% (20)	4,7,9	LO #1,#2,#10,#11
	Assignments	3	5% (5)	3,6,11	LO #3,#4,#6,#7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	5% (5)	14	LO #5,#8,#10
Summative assessment	Midterm Exam	2 hrs	10% (10)	11	LO #1-#7
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction of amplification with transistors
Week 2	FETs: Basic Definitions, Junction Field-Effect Transistor (JFET)
Week 3	DC Biasing Circuits of JFETs
Week 4	MOSFETs: DEPLETION-TYPE MOSFET
Week 5	ENHANCEMENT-TYPE MOSFET



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كل وحدة ائتمانية = ٢٥ ساعة



Week 6	MOSFET Biasing
Week 7	Differential Amplifiers
Week 8	Multistage Amplifiers
Week 9	Multistage Amplifiers
Week 10	Multistage Amplifiers
Week 11	Mid-term exam
Week 12	Other Two Terminal Devices
Week 13	Other Two Terminal Devices
Week 14	Other Two Terminal Devices
Week 15	PnPn Devices and Others
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Diode characteristics
Week 2	Zener diode characteristics
Week 3	P-N junction diode as half-wave rectifier
Week 4	P-N junction diode as Full-wave rectifier
Week 5	P-N junction diode as full-wave bridge rectifier
Week 6	Clipping and clamping circuits
Week 7	

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory, 9th Edition, Pearson/PHI, 2007.	Yes
Recommended Texts	Millman & Halkias, Integrated Electronics, TMH, 2007; Salivahanan et al., Electronic Devices and Circuits, 2nd Ed., TMH, 2007; David A. Bell, Electronic Devices & Circuits, 4th Ed., PHI, 2007.	No



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كل وحدة ائتمانية = ٢٥ ساعة



Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering
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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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Electromagnetic Fields I		Module Delivery		
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL214				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		UGII			Semester of Delivery
Administering Department		Electrical Eng. Dept.	College	Engineering	
Module Leader	AL- Hussein Mohammed jumah		e-mail	al_hussein.m@uomisan.edu.iq	
Module Leader’s Academic Title		Assist. Lecturer	Module Leader’s Qualification		Ms.C
Module Tutor	None		e-mail		
Peer Reviewer Name		None	e-mail		
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

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



Module Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	1. Understand the concepts of Electrostatics and their applications. 2. Apply vector calculus to understand the behavior of static electric fields. 3. Set up computational models for electromagnetic problems: select methods, make approximations, assess results. 4. Analyze how energy is stored and transported in an electrostatic field. 5. Understand the effect of materials on electric and magnetic fields. 6. Describe and analyze electromagnetic wave propagation in free space. 7. Understand principles of propagation of uniform plane waves.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	8. Describe and understand the principle of electrostatic fields. 9. Understand the Cartesian, cylindrical and spherical coordinate systems and transformations between them. 10. Discuss the application of Coulomb's law and electric field intensity. 11. Discuss the application of Gauss's Law and Maxwell's First Equation, and the divergence theorem. 12. Explain electrostatics in material space: current, current density and conductors. 13. Identify Laplace's Equations and their applications. 14. Identify the concepts of Magnetostatics and Electromagnetic Fields/waves and their propagation.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Coordinate Systems and Vector Algebra</u> Cartesian coordinate system, vector components and unit vectors, vector algebra, dot/cross product, cylindrical and spherical coordinate systems, transformation between coordinate systems. <u>Electrostatics</u> Coulomb's law, electric field intensity, field of n point charges, field of a line/sheet/volume of charge, electric flux density, Gauss's law and its applications, the divergence theorem. <u>Energy and Potential</u> Energy expended in moving a point charge, potential difference and potential, potential field of a point charge and of a system of charges, potential gradient, the dipole, energy density in the electrostatic field.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم



Strategies الإستراتيجيات	The module builds field theory from coordinate systems upward: vector algebra and coordinate transformations are covered first, then Coulomb's and Gauss's laws, then potential and energy concepts. Each law is paired with a worked application (point charges, charge sheets, the divergence theorem) so the abstract vector calculus is immediately grounded in a concrete field-computation example.		
Student Workload (SWL) الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

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

Delivery Plan (Theoretical Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	The Cartesian coordinate system, vector components and unit vectors, vector field, vector algebra, dot product, cross product
Week 2	Circular cylindrical coordinate system, spherical coordinate system



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كل وحدة ائتمانية = ٢٥ ساعة



Week 3	Transformation between coordinate systems
Week 4	Coulomb's law, electric field intensity, field of n point charges
Week 5	Field due to a continuous charge distribution; field of a line of charge
Week 6	Field of a sheet of charge, Field of a volume of charge
Week 7	Electric flux density, Gauss's law
Week 8	Applications of Gauss's law
Week 9	Differential volume element, the divergence and Maxwell's first equation
Week 10	The divergence theorem
Week 11	Energy expended in moving a point charge
Week 12	Potential difference and potential
Week 13	The potential field of a point charge, the potential field of a system of charges
Week 14	Potential gradient, the dipole
Week 15	The dipole, energy density in electrostatic field
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Sadiku, Elements of Electromagnetics, 6th Ed., Oxford Univ. Press, 2015; Hayt & Buck, Engineering Electromagnetics, 6th	Yes



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كل وحدة ائتمانية = ٢٥ ساعة



	Ed., McGraw-Hill, 2001; Edminister & Nahvi, Electromagnetics, 4th Ed., McGraw-Hill, 2014.	
Recommended Texts	Sadiku, Elements of Electromagnetics, 6th Ed.; Hayt & Buck, Engineering Electromagnetics, 6th Ed.	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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	C - Good	جيد	70 - 79	Sound work with notable errors
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Fail Group (0 - 49)	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F - Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks with 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. ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.				



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Computer Programming III		Module Delivery		
Module Type	C		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL215				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UGII			Semester of Delivery
Administering Department		Electrical Eng. Dept.	College	Engineering	
Module Leader	Assist. Lect. Ahmed Majed Althahabi		e-mail	ahmedmajed@uomisan.edu.iq	
Module Leader's Academic Title		Assistant Lecturer	Module Leader's Qualification		Assist. Lect.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	EL215 (Programming Fundamentals)	Semester	3
Co-requisites module	None	Semester	



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Impart knowledge of MATLAB software to enhance programming skills for research and development. 2. Provide a working introduction to the MATLAB technical computing environment. 3. Introduce students to the use of MATLAB as a high-level programming language for scientific problem solving. 4. Develop the ability to design script files with interactive input/output, repetition, decision-making, and matrix analysis. 5. Gain practical skills on programming using MATLAB, and industry-standard modeling using MATLAB/Simulink.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	6. Undertake arithmetic on scalars, vectors and matrices. 7. Design MATLAB scripts with interactive input and output. 8. Utilize arithmetic expression repetitions, decision-making statements, and matrix operations. 9. Create 2D and 3D plots of mathematical functions and data. 10. Write MATLAB functions and scripts to solve engineering problems in various fields. 11. Evaluate advanced modelling and analysis techniques for practical design problems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Fundamentals of Programming Introduction to programming concepts, significance of programming languages, problem solving techniques, algorithm design. Variables and Expressions Variable types and characteristics, declaring variables, assigning values, manipulating expressions and operators. Statements and Control Flow Program logic through statements, conditional constructs for decision-making and controlling execution. Functions and Modularization Parameters, arguments, reusable code through function abstraction, return values, function design. Recursion and Iteration Recursion techniques, loops, control statements for efficient program flow.



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Each theoretical topic (variables, matrices, control structures, plotting, numerical methods) is paired with a corresponding hands-on lab experiment, so students write and run MATLAB code the same week a concept is introduced in lecture. A hands-on session near the end of the semester has the whole class jointly build a MATLAB script solving an assigned engineering problem, consolidating the semester's individual skills into one applied exercise.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
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كل وحدة ائتمانية = ٢٥ ساعة



Week 1	MATLAB basics - The MATLAB environment, basic computer programming
Week 2	MATLAB basics - Variables and constants, operators and simple calculations
Week 3	MATLAB basics - Formulas and functions, MATLAB toolboxes
Week 4	MATLAB Matrices and Vectors - Matrix and linear algebra review
Week 5	MATLAB Matrices and Vectors - Matrix operations and functions
Week 6	MATLAB programming - Algorithms and structures, scripts and functions (m-files)
Week 7	MATLAB programming - Simple sequential algorithms, control structures (if...then, loops)
Week 8	Mid Term Exam
Week 9	MATLAB programming - Nested loops, breaks, repetition structures
Week 10	MATLAB programming - Reading/writing data, file handling, personalized functions
Week 11	MATLAB graphic functions
Week 12	MATLAB Numerical simulations - numerical methods and simulations
Week 13	Random number generation, Monte Carlo methods
Week 14	Hands-on session - developing MATLAB scripts to solve an assigned problem
Week 15	Review and solving related problems
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to MATLAB, starting/quitting, desktop tools, basic commands
Week 2	Working with matrices, entering matrices, subscripts, basic matrix functions
Week 3	Expressions, variables, numbers, arithmetic operators, functions
Week 4	Relational and logical operations, bitwise operation, logical functions
Week 5	Plotting functions, multiple plots, axis limits/labels, input/output of variables
Week 6	Flow control (if, else, switch, for, while, nested loops)
Week 7	MATLAB Simulink basics: starting Simulink, building/connecting/running systems

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
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كل وحدة ائتمانية = ٢٥ ساعة



Required Texts	Baez-Lopez & Baez Villegas, MATLAB Handbook with Applications; Introduction to MATLAB for Engineering Students, David Houcque, Northwestern University.	Yes
Recommended Texts	Quarteroni & Saleri & Gervasio, Scientific Computing with MATLAB and Octave.	No
Websites	http://www.mathworks.in/matlabcentral/	

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 with 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.				
ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.				



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Digital Techniques I		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL216				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UGII			Semester of Delivery
Administering Department		Electrical Eng. Dept.	College	Engineering	
Module Leader	Sarah Kareem Salem		e-mail	Sarahalthahabi@uomisan.edu.iq	
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification		Ms.C
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	None	Semester	
Co-requisites module	EL226	Semester	



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Develop problem-solving skills and understanding of Digital Systems through application of techniques. 2. Understand Digital signals and their difference from Analogue signals. 3. Cover the basic concept of Boolean Algebra. 4. Establish the basic concepts of Digital Combinational Circuit Design.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	5. Explain digital number systems. 6. Explain logic circuits. 7. Introduce methods for simplifying Boolean expressions. 8. Introduce basic postulates of Boolean algebra and correlate Boolean expressions.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Digital Techniques Digital systems, digital signals, analogue systems/signals, examples. [3 hrs] Number Systems Binary, octal, decimal and hexadecimal numbers, base conversion, arithmetic operations, complements, binary codes, BCD, Excess-3, Gray codes. [12 hrs] Logic Gates AND, OR, NOT, NAND, NOR, XOR, XNOR; implementation of logic functions using gates, NAND-NOR and multi-level/multi-output implementations. [12 hrs] Boolean Algebra Basic definitions, theorems, properties, Boolean functions. [6 hrs] Minimization Techniques Boolean postulates/laws, De-Morgan's Theorem, Principle of Duality, Minterm/Maxterm, SOP/POS, Karnaugh maps, don't-care conditions. [12 hrs]

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies الإستراتيجيات	The course proceeds from number systems to logic gates to Boolean algebra to minimization techniques, with each stage building the vocabulary needed for the next: students cannot minimize a Boolean expression until they can build its truth table from gates, and cannot build gate implementations until they are fluent in number-system conversions. Frequent short quizzes at each stage confirm this foundation before the next layer is added.
Student Workload (SWL)	



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الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	64	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.2
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	36	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2.4
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Digital Techniques: digital systems, digital signals, analogue systems/signals, examples
Week 2	System of Numbers: general number formula, binary and octal numbers
Week 3	Decimal and hexadecimal numbers
Week 4	Numbers Base Conversion: arithmetic operations in different number systems
Week 5	Complements, binary codes, BCD, Excess-3, Gray codes
Week 6	Logic Gates: AND, OR, NOT, NAND and NOR



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Week 7	Exclusive-OR and Exclusive-NOR implementations of logic functions using gates
Week 8	NAND-NOR implementations, multi-level gate implementations
Week 9	Multi-output gate implementations
Week 10	Boolean Algebra: basic definitions, basic theorem and properties
Week 11	Boolean functions
Week 12	Minimization Techniques: Boolean postulates and laws, De-Morgan's Theorem, Principle of Duality
Week 13	Boolean expression, minimization of Boolean expressions, Minterm/Maxterm
Week 14	Sum of Products (SOP), Product of Sums (POS), Karnaugh diagram
Week 15	Karnaugh map: AND-OR implementation, don't care
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Thomas L. Floyd, Digital Fundamentals, 9th Edition	Yes
Recommended Texts		No
Websites		



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كل وحدة ائتمانية = ٢٥ ساعة



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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Academic English II		Module Delivery	
Module Type	S		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UM202			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level		UGII		
Administering Department		Department of Electrical engineering	College	Engineering
Module Leader	Hayder Naser Al-Lami		e-mail	hayderallami@uomisan.edu.iq
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification	M.Sc.
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name		Name	e-mail	E-mail
Scientific Committee Approval Date		21/09/2025	Version Number	1.0

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Improve academic writing skills (paragraphs to essays to reports). 2. Develop skills for writing structured academic essays. 3. Practice summarizing, paraphrasing, and citing sources. 4. Enhance critical reading and response writing. 5. Expand vocabulary in academic and technical contexts. 6. Practice delivering formal presentations and participating in discussions.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	7. Write structured academic essays (argumentative, descriptive, compare-contrast) with appropriate organization and grammar. 8. Compose short academic reports demonstrating understanding of purpose, audience, and structure. 9. Summarize and paraphrase academic texts accurately while avoiding plagiarism. 10. Apply academic vocabulary and formal tone in writing and speaking tasks. 11. Read and analyze academic texts with improved comprehension and critical thinking. 12. Use referencing and citation techniques (basic APA or MLA). 13. Deliver clear, well-organized presentations, and engage in academic discussions and debates.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Review of Basic Grammar and Paragraph Writing; Essay Writing - structure and types (argumentative, descriptive, etc.); Academic Vocabulary and Formal Writing Style; Summarizing and Paraphrasing Techniques; Reading and Analyzing Academic Texts; Report Writing Basics; Referencing and Citation (APA/MLA); Listening and Academic Note-Taking; Presentation Skills; Academic Discussions and Debates.

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies الإستراتيجيات	Encouraging students for learning by illustrating the importance of the English language in their studies and future career. Motivate the spirit of competition between the students. Use attractive visual examples to draw students' focus on the details. Increasing the exercises at the points of weakness.



	Maintain the ray of hope for the weak individuals through the stable opportunity to override failure.		
Student Workload (SWL) الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (hr/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)	2,5	All
	Assignments	2	10% (10)	4,6	All
	Presentation	1	10% (10)	7	All
	Homeworks	1	10% (10)	8	-
Summative assessment	Midterm Exam	2hr	10% (10)	9	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Review of Academic English I (Grammar & Paragraph Writing)
Week 2	Sentence Variety and Cohesion
Week 3	Introduction to Essay Writing (Structure: Introduction, Body, Conclusion)
Week 4	Writing Descriptive and Narrative Essays
Week 5	Writing Argumentative and Opinion Essays



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Week 6	Report Writing Basics (structure, purpose, examples)
Week 7	Writing Cause-and-Effect and Compare-Contrast Essays
Week 8	Summarizing and Paraphrasing Techniques
Week 9	Mid-term exam
Week 10	Quoting and Citing Sources (basic referencing skills)
Week 11	Reading and Responding to Academic Texts
Week 12	Writing a Short Research Report or Project Summary
Week 13	Presentation Skills (Structure, Visuals, Language)
Week 14	Presentation
Week 15	Review and Exam Preparation
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Oxford English for Electrical and Mechanical Engineering Student's Book; Bailey, S. Academic Writing: A Handbook for International Students (5th Ed.)	Yes
Recommended Texts	Basic English Language Skills, Oxbridge Academy; Headway Student's Book	No
Websites	https://www.ted.com/talks ; https://www.perfect-english-grammar.com	



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كل وحدة ائتمانية = ٢٥ ساعة



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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Electrical Circuit II		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	EL221			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level		UGII		
Administering Department		Electrical Eng. Dept.	College	Engineering
Module Leader	Name: Zeina Nizar Abdul Razzaq		e-mail	zeinanazar@uomisan.edu.iq
Module Leader’s Academic Title		Assist. Lecturer	Module Leader’s Qualification	Ms. C
Module Tutor	Al-hussein M. Jumaah Alturfi		e-mail	alhussein.m@uomisan.edu.iq
Peer Reviewer Name		Name	e-mail	E-mail
Scientific Committee Approval Date		21/09/2025	Version Number	1.0

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand mutual inductance between coupled coils and relate induced EMF to rate of change of magnetic flux. 2. Understand mutually coupled circuits, linear transformers, ideal transformers and autotransformers. 3. Explain the basic function of filter circuits; distinguish passive/active filters; classify passive filters. 4. Analyze constant-K (proto-type) filters and design different filter types. 5. Understand the concept of resonance in series and parallel RLC circuits, quality factor (Q), and bandwidth. 6. Comprehensively understand single-phase and 3-phase systems for various configurations and loads.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	7. Define mutual inductance and coupling coefficient; explain the dot convention rule. 8. Determine mutual inductance of inductors in series and parallel. 9. Solve for voltages and currents of an ideal transformer using primary/secondary referral techniques. 10. Derive the transfer function and cutoff frequency of passive filters and understand their characteristics. 11. Understand resonance in series/parallel RLC circuits, quality factor, bandwidth and half-power frequencies. 12. Analyze single-phase three-wire systems and balanced/unbalanced 3-phase systems (star/delta). 13. Calculate power in 3-phase circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A: Coupling Circuits Magnetic coupling, coefficient of coupling, equivalent circuits, linear/ideal transformers, autotransformer. [15 hrs] Part B: Filters Constant-k filters, low-pass and high-pass, modern filter design, network transformations and all-pass filters. Part C: Resonance in AC Circuits Resonance in series RLC circuit, quality factor (Q), bandwidth and half-power frequencies, resonance in parallel RLC circuit. Part D: Poly-phase Circuits Single-phase three-wire system, 3-phase balanced/unbalanced systems with star/delta connections, power in 3-phase circuits.



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	The module covers four largely independent circuit topics in sequence (coupled circuits/transformers, filters, resonance, polyphase systems), each introduced with its governing equations before worked numerical examples. Because each part builds on the phasor and s-domain skills from Electrical Circuit I rather than on each other, lectures explicitly recap the relevant prior tool (e.g. impedance, transfer function) at the start of each new part.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.2
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	3,7,10,12	LO #1,#2,#10,#11
	Assignments	2	10% (10)	11	LO #3,#4,#6,#7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5,#8,#10
Summative assessment	Midterm Exam	1.5hr	10% (10)	7	LO #1-#7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
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كل وحدة ائتمانية = ٢٥ ساعة



Week 1	Self-Inductance, Coupled Inductor, Mutual Inductance
Week 2	Mutual Inductance between Two Coupled Inductors, Dot Convention, coefficient of coupling, Inductances in series and Parallel
Week 3	Linear Transformer, Ideal Transformer
Week 4	Equivalent circuit's linear, ideal transformers, autotransformer
Week 5	Classification of Filters, Characteristic of Filters
Week 6	Constant-k Filter, modern filter design
Week 7	Network transformations and all pass filters
Week 8	Mid-term
Week 9	Introduction to Resonance in AC Circuits, Applications of Resonance
Week 10	Resonance in Series RLC Circuit
Week 11	Quality Factor (Q), Bandwidth and Half-Power Frequencies
Week 12	Resonance in Parallel RLC Circuit
Week 13	Single-phase three wire system
Week 14	3-phase balance and unbalance systems with star and delta connections
Week 15	Power in 3-phase circuits
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم



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	Text	Available in the Library?
Required Texts	Electric Circuits, James W. Nilsson, Susan A. Riedel, Pearson; Circuit Analysis: Theory and Practice, Allan H. Robbins & Wilhelm C. Miller; Modern Electronics Instrumentation and Measurement Techniques, Albert D. Helfrick & William D. Cooper.	Yes
Recommended Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education; A Course in Electrical and Electronics Measurement and Instrumentation, A.K. Sawhney, 2nd Ed.	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 with 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. ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.				



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كل وحدة ائتمانية = ٢٥ ساعة



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Electrical Machine II		Module Delivery		
Module Type	C		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL222				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGII			Semester of Delivery
Administering Department		Electrical Eng. Dept.	College	Engineering	
Module Leader	Shahad Mohammed Radhi		e-mail	enghre.2202@uomisan.edu.iq	
Module Leader's Academic Title		Assist. Lecturer	Module Leader's Qualification		M.Sc.
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date		01/06/2023	Version Number		1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electrical Machine I	Semester	3
Co-requisites module	None	Semester	



Module Objectives, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand fundamental principles of transformers: working principle, primary/secondary windings, core materials. 2. Learn types of transformers: step-up, step-down, autotransformers, three-phase transformers. 3. Analyze electrical parameters of transformers: voltage ratios, power ratings, voltage regulation, efficiency. 4. Learn transformer configurations and connections (delta-delta, delta-wye, wye-wye). 5. Understand distribution transformers and calculate all-day efficiency.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	6. Understand transformer construction, magnetic circuits, electromagnetism and operation. 7. Comprehend efficiency aspects: power transfer, losses, and voltage regulation. 8. Understand performance parameters: voltage regulation, impedance, voltage drop, power factor. 9. Analyze the ideal transformer, practical transformer on load, and phasor diagrams. 10. Analyze magnetic leakage and winding resistance with approximate equivalent circuit. 11. Calculate regulation, percentage impedance, reactance, resistance and approximate voltage drop. 12. Understand open-circuit and short-circuit tests and calculate constant parameters and total losses. 13. Analyze the auto-transformer's copper saving. 14. Analyze parallel operation of single-phase transformers and conditions for satisfactory operation. 15. Analyze three-phase transformer connections and calculate kVA rating, ratio, efficiency, and regulation.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Principle of Working of a Transformer</u> Faraday's/Lenz's laws, mutual induction, construction types, E.M.F. equation, transformation ratio. <u>Ideal and Practical Transformer</u> Phasor diagrams, transformer on load, primary current and iron loss, functionality under resistive/inductive/capacitive loads. <u>Equivalent Circuit</u>



	Leakage reactance and winding resistance, exact/approximate circuits, voltage regulation, per-unit impedance. Losses, Efficiency and Testing Iron and copper losses, maximum efficiency condition, open-circuit test, short-circuit test. Autotransformer and Parallel Operation Copper saving in autotransformers, conditions and benefits of parallel transformer connections. Three-Phase Transformers Banks of single-phase transformers, connections and benefits, losses/voltage drop/regulation per phase.
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Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies	Teaching combines traditional lecturing with a flipped-classroom element for the transformer-testing chapters: students review test procedures (open-circuit, short-circuit) before class so lecture time is spent on calculating losses and efficiency from real test data. Regular formative quizzes and a review session before each exam consolidate the equivalent-circuit and phasor-diagram skills that carry through every topic in the module.		
الإستراتيجيات			
Student Workload (SWL)			
الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem)	78	Structured SWL (hr/w)	5.1
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (hr/sem)	47	Unstructured SWL (hr/w)	3.1
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (hr/sem)	125		
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6,11	All
	Homework	1	10% (10)	12	All



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كل وحدة ائتمانية = ٢٥ ساعة



	Lab	1	10% (10)	14	All
	Assignment	1	10% (10)	15	All
Summative assessment	Midterm Exam	1 hr	10% (10)	8	All
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Principle of working of a transformer, transformer type and construction, transformer action, Faraday's and Lenz's laws
Week 2	E.M.F. Equation, voltage/current ratio, power rating equations, volt per turn
Week 3	Ideal transformer, practical transformer on no load, phasor diagram
Week 4	Transformer on load, phasor diagram
Week 5	Equivalent circuit, leakage reactance, equivalent resistances/reactances/impedances phasor diagrams
Week 6	Approximate voltage drops, percentage regulation
Week 7	Total losses, efficiency (eddy current and hysteresis loss)
Week 8	Mid Term Exam
Week 9	Transformer Test: Open circuit test, Short circuit test
Week 10	Regulation and efficiency calculation using short/open circuit tests, maximum efficiency
Week 11	All-day efficiency
Week 12	Auto transformers and their types
Week 13	Transformer polarity, parallel operation of transformers
Week 14	Three-phase transformer
Week 15	Connection of three-phase transformers
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
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كل وحدة ائتمانية = ٢٥ ساعة



Week 1	Exploring the Essentials of DC Machine Lab
Week 2	No-load Characteristics (O.C.C.) of Separately Excited DC Generator
Week 3	Study the Conditions for Build-up of a DC Shunt Generator
Week 4	Study of Load Characteristics of DC Shunt Generator
Week 5	Speed Control of Separately Excited DC Motor
Week 6	Load Characteristics of Long Shunt DC Compound Motor
Week 7	Swinburne's Test

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Electrical Technology, B.L. Theraja, Volume-II (AC & DC Machines)	Yes
Recommended Texts	Principles of Electrical Machines, V. K. Mehta, Rohit Mehta	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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ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



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كل وحدة ائتمانية = ٢٥ ساعة



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Mathematics IV		Module Delivery		
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	ENG202				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UGII			Semester of Delivery
Administering Department		Electrical Eng. Dept.	College	Engineering	
Module Leader	Ali Abdul Karim Mohsen Ali		e-mail	aliabdalkreem@uomisan.edu.iq	
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification		PHD
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		01/06/2023	Version Number		1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	ENG201 (Mathematics III)	Semester	3
Co-requisites module	None	Semester	

Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives	



أهداف المادة الدراسية	1. First-order ODEs: concept of solution, IVP/BVP, linear/nonlinear ODEs, general solutions. 2. Second and higher-order ODEs: homogeneous/non-homogeneous linear ODEs, Euler-Cauchy equations, D-operator. 3. Fourier Analysis: periodic functions, Euler formulas, even/odd functions, half-range and complex Fourier series. 4. Sequences and series: convergence tests, power series, Taylor and Maclaurin series.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	5. Understand homogeneous/nonhomogeneous, linear/nonlinear equations. 6. Derive and calculate differential equations, including Bernoulli's equation. 7. Solve first, second and higher-order ODEs using various methods. 8. Calculate second-order differential equations and understand their applications in electronic circuits. 9. Understand Fourier series and Euler formulas. 10. Determine and approximate the sum of certain infinite series, and analyze error. 11. Find Geometric, Power, Taylor and Maclaurin series representations for functions.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A: Differential Equations - First Order ODEs Concept of solution, IVP/BVP, linear/nonlinear ODEs, separable/exact ODEs, integrating factors, Bernoulli equation. Second and Higher Order ODEs Homogeneous linear ODEs (superposition), Euler-Cauchy equations, D-operator, undetermined coefficients, variation of parameters. Part B: Fourier Analysis Periodic/non-periodic functions, Euler formulas, even/odd functions, half-range expansions, complex Fourier series, applications in electric circuits. Part C: Sequences and Series Convergence/divergence tests, geometric series, integral/comparison/ratio/root tests, alternating series, power series, Taylor and Maclaurin series.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Building directly on Mathematics III, the module moves from ODE solution techniques to Fourier analysis to series, with each new topic motivated by its use in electrical engineering (e.g. Fourier series applications in electric circuits are explicitly worked
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	through). As in Mathematics I-III, worked examples in lecture precede independent practice in tutorials, quizzes and assignments.		
Student Workload (SWL) الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20% (20)	4,10	All
	Assignments	2	20% (20)	5,11	All
	Report			10	All
Summative assessment	Midterm Exam	2hr	10% (10)	8	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	First order ODE: introduction to DEs, concept of solution, general/particular solutions, IVP/BVP, linear/nonlinear ODEs
Week 2	First order ODE: separable ODEs, equations reduction to separable form
Week 3	First order ODE: exact ODEs, reduction to exact form (integrating factors)
Week 4	First order ODE: linear ODEs, reduction to linear form (Bernoulli equation)



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أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



Week 5	Second/Higher Order ODEs: introduction, homogeneous linear ODEs of second order, initial value problem
Week 6	Homogeneous linear ODEs with constant coefficients, Euler-Cauchy equations, D-operator
Week 7	Methods of solving non-homogeneous linear ODEs: undetermined coefficients, variation of parameters
Week 8	Mid-term exam
Week 9	Fourier Analysis: introduction, periodic/non-periodic functions, Euler formulas, even/odd functions
Week 10	Half range expansion (Fourier sine/cosine), complex Fourier series, applications in electric circuits
Week 11	Sequences and series: convergence/divergence test, geometric series and partial sum
Week 12	Integral, comparison, ratio and root tests
Week 13	Alternating series, power series, applications of power series
Week 14	Taylor and Maclaurin series
Week 15	Taylor and Maclaurin series (continued)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Kreyszig, E. (2010). Advanced Engineering Mathematics. John Wiley & Sons.	Yes



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Recommended Texts	Thomas, G. B., Weir, M. D., Hass, J., Heil, C., & Behn, A. (2016). Thomas' Calculus Early Transcendentals. Pearson.	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 with 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. ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.				



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Electronics III		Module Delivery		
Module Type	C		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL223				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UGII			Semester of Delivery
Administering Department		Electrical Eng. Dept.	College	Engineering	
Module Leader	Khaled Walid Nasser Saad		e-mail	Khalid.waleed@uomisan.edu.iq	
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification		M.Sc.
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date		21/.9/2025	Version Number		1.0

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



Module Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	1. Establish a background on frequency response of BJT single-stage and multistage amplifiers. 2. Understand the effect of internal/external capacitance on voltage gain and phase shift. 3. Calculate upper and lower frequencies for single-stage and multistage amplifiers. 4. Define feedback amplifiers and their types. 5. Explain power amplifiers of various types.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	6. Observe amplitude and frequency responses of common amplification circuits. 7. Explain characteristics of low-frequency and high-frequency analogue electronic circuits. 8. Design low- and high-frequency analogue circuits using electronic mathematical models. 9. Analyze feedback circuits and their basic structure, properties and working principles. 10. Design and analyze oscillator and power amplifier electronic circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A: Frequency Response Modes/classes of amplifier operation, gain calculation (single/multistage), bandwidth, gain-frequency curves, RC-network operational amplifier characteristics. Part B: Feedback Amplifiers Positive vs. negative feedback; benefits of negative feedback: higher input impedance, lower output impedance, stabilized gain, improved frequency response, reduced noise, more linear operation. Part C: Power Amplifiers Classification into types A, B, AB, C (analog) and D (switching), based on percentage of input cycle in the linear region.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	The course follows the amplifier signal path conceptually: frequency response of single then multistage amplifiers is covered first, then feedback amplifier theory (which explains why real designs use negative feedback), then power amplifier classes. A lab component running in parallel lets students test real transistor characteristics (gain,
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switching behaviour) that underlie the frequency-response calculations done in lecture.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (hr/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	3	20% (20)	4,7,9	LO #1,#2,#10,#11
	Assignments	3	5% (5)	3,6,11	LO #3,#4,#6,#7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	5% (5)	14	LO #5,#8,#10
Summative assessment	Midterm Exam	2 hrs	10% (10)	10	LO #1-#7
	Final Exam	3 hrs	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of Frequency Response in single stage amplifier
Week 2	Low Frequency Response
Week 3	Low Frequency Response
Week 4	High Frequency Response
Week 5	High Frequency Response



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Week 6	Frequency Response in multistage amplifier
Week 7	Frequency Response in multistage amplifier
Week 8	Feedback Amplifiers (type 1 and type 2)
Week 9	Feedback Amplifiers (type 3 and type 4)
Week 10	Mid-term Exam
Week 11	Power amplifiers
Week 12	Power amplifiers
Week 13	Power amplifiers
Week 14	Power amplifiers
Week 15	Power amplifiers
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Test a transistor (short) between terminals
Week 2	Test a transistor (open) between terminals
Week 3	ICBO/ICEO Test on a Test Transistor
Week 4	DC gain (HFE) of a Transistor
Week 5	Input characteristics of BJT transistor
Week 6	Transistor as switch
Week 7	

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Robert L. Boylestad and Louis Nashelsky, Electronic Devices and Circuit Theory, 9th Edition, Pearson/PHI, 2007.	Yes
Recommended Texts	Millman & Halkias, Integrated Electronics, TMH, 2007; Salivahanan et al., Electronic Devices and Circuits, 2nd Ed., TMH, 2007; David A. Bell, Electronic Devices & Circuits, 4th Ed., PHI, 2007.	No



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كل وحدة ائتمانية = ٢٥ ساعة



Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering
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Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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	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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Electromagnetic Fields II		Module Delivery		
Module Type	B		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL224				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		UGII			Semester of Delivery
Administering Department		Electrical Eng. Dept.	College	Engineering	
Module Leader	AL- hussein mohammed jumaah		e-mail	al_hussein.m@uomisan.edu.iq	
Module Leader's Academic Title		Assist. Lecturer	Module Leader's Qualification		Ms.C
Module Tutor	None		e-mail		
Peer Reviewer Name		None	e-mail		
Scientific Committee Approval Date			Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electromagnetic Fields I	Semester	3
Co-requisites module	None	Semester	



Module Objectives, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the concepts of Electrostatics/Magnetostatics and their applications. 2. Apply vector calculus to understand the behavior of static electric/magnetic fields. 3. Set up computational models for electromagnetic problems and assess results. 4. Analyze how energy is stored and transported in an electromagnetic field. 5. Understand the effect of materials on electric and magnetic fields. 6. Describe electromagnetic wave propagation in free space and understand time-varying field relations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	7. Describe current and current density, continuity of current, conductor properties and boundary conditions. 8. Recognize Poisson's and Laplace's equations and their applications. 9. Discuss capacitance and several capacitance examples. 10. Identify concepts of Magnetostatics: Boit-Savart law, Ampere's circuital law, magnetic flux density. 11. Distinguish, identify and solve for magnetic scalar/vector potentials. 12. Describe and understand Maxwell's equations in point and integral form. 13. Identify magnetic forces, materials and devices.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Electrostatics in Material Space</u> Current and current density, continuity of current, conductor properties and boundary conditions, dielectric materials, method of images, capacitance. <u>Poisson's and Laplace's Equations</u> Poisson's/Laplace's equations, the steady magnetic field, Boit-Savart law, Ampere's circuital law, the curl, Stokes theorem. <u>Magnetostatics</u> Magnetic flux and flux density, scalar/vector magnetic potentials, magnetic forces, force on moving charge/current elements, magnetic materials and inductance. <u>Maxwell's Equations</u> Steady magnetic field, Maxwell's equations in point form and integral form.



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	As a continuation of Electromagnetic Fields I, the module moves from current and conductor properties to capacitance and Laplace's equation, then to the steady magnetic field (Biot-Savart and Ampere's laws) and finally to Maxwell's equations in point and integral form. Each new field law is explicitly related back to its electrostatic counterpart from Fields I, reinforcing the parallel structure between electric and magnetic field theory.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Current and current density, continuity of current



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Week 2	Conductor properties and boundary conditions, dielectric materials and boundary conditions
Week 3	Method of images
Week 4	Capacitance, several capacitance examples
Week 5	Poisson's and Laplace's equations
Week 6	The steady magnetic field, Boit-Savart law
Week 7	Ampere's circuital law
Week 8	The curl
Week 9	Stokes theorem
Week 10	Magnetic flux and magnetic flux density, the scalar and vector magnetic potentials
Week 11	Magnetic forces: force on a moving charge, differential current element, between current elements, torque on a closed circuit
Week 12	Magnetic materials and inductance
Week 13	Steady Magnetic Field
Week 14	Steady Magnetic Field (continued)
Week 15	Maxwell's equations in point form, Maxwell's equations in integral form
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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



Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Sadiku, Elements of Electromagnetics, 6th Ed., Oxford Univ. Press, 2015; Hayt & Buck, Engineering Electromagnetics, 6th Ed., McGraw-Hill, 2001; Edminister & Nahvi, Electromagnetics, 4th Ed., McGraw-Hill, 2014.	Yes
Recommended Texts	Sadiku, Elements of Electromagnetics, 6th Ed.; Hayt & Buck, Engineering Electromagnetics, 6th 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

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ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



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أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Computer Programming IV		Module Delivery		
Module Type	C		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL225				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UGII			Semester of Delivery
Administering Department		Electrical Eng. Dept.	College	Engineering	
Module Leader	Assist. Lect. Ahmed Majed Althahabi		e-mail	ahmedmajed@uomisan.edu.iq	
Module Leader's Academic Title		Assistant Lecturer	Module Leader's Qualification		Assist. Lect.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09//2025	Version Number	1.0	

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Demonstrate Python data structures: Lists, Tuples, Sets and Dictionaries. 2. Understand Functions, Modules and Regular Expressions in Python Programming. 3. Build basic programs using variables, conditional logic, looping, and functions. 4. Work with user input to create interactive programs. 5. Introduce core programming basics and operators of the Python language.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	6. Understand basic principles of computers and binary computation. 7. Understand programming basics (operations, control structures, data types). 8. Understand basic concepts of scripting and its contributions. 9. Explore Python data structures: Lists, Tuples, Sets and Dictionaries. 10. Create applications using Functions, Modules and Regular Expressions. 11. Apply various data types and control structures. 12. Understand class inheritance, polymorphism, and object-oriented program design.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Module 1: Introduction</u> Relationship between computers and programs, basic principles of computers, file systems, using the Python interpreter, binary computation, input/output. <u>Module 2: Data Types and Control Structures</u> Operators, data types, variables, expressions and statements, assignment statements, strings, control structures (loops and decisions). <u>Module 3: Modularization and Classes</u> Standard modules, packages, defining classes, defining functions, function arguments (signature). <u>Module 4: Exceptions and Data Structures</u> Data structures (array, list, dictionary), error processing, exception raising and handling. <u>Module 5: Object-Oriented Design</u> Programming types, object-oriented programming and design, inheritance and polymorphism.



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Teaching combines think-pair-share activities, case-based learning and code-review sessions so students both write code independently and explain their reasoning to peers. Group projects and weekly programming homework keep students producing working Python code throughout the semester, while two quizzes check core syntax fluency before the object-oriented design unit that closes the course.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	37	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2.5
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction: Arrays (1D/2D), Functions (built-in and user-defined), function prototype, passing arguments, return statement, local/global variables



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
بكالوريوس في الهندسة الكهربائية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



Week 2	Value-returning vs void functions; functions with/without arguments and return values
Week 3	Module 2: File systems, using the Python interpreter, introduction to binary computation, input/output
Week 4	Data types and control structures, operators, variables, expressions and statements, assignment statements
Week 5	Strings and string operations, control structures: loops and decisions
Week 6	Quiz
Week 7	Module 3: Modularization and Classes, standard modules, packages
Week 8	Defining Classes
Week 9	Defining functions
Week 10	Error processing, exception raising and handling
Week 11	Module 5: Object-oriented design, programming types
Week 12	Object-oriented programming and design
Week 13	Inheritance and Polymorphism
Week 14	Quiz 2
Week 15	Module 6: Remaining materials
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Basics of Python Programming
Week 2	Fundamental data types in Python (int, float, complex, bool, string)
Week 3	Functions: id(), type(), range()
Week 4	Base conversion functions
Week 5	Type conversion functions
Week 6	Operators: arithmetic, relational, assignment, logical, bitwise, ternary, membership, identity
Week 7	Input/output functions, 'sep'/'end' attributes, control statements (if/while/for/break/continue/pass), string indexing and slicing

Learning and Teaching Resources

مصادر التعليم والتعلم



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	Text	Available in the Library?
Required Texts	Braunschweig, D. and Busbee, K. L. (2018). Programming Fundamentals - A Modular Structured Approach, 2nd Edition.	Yes
Recommended Texts		No
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F - Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks with 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. ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.				



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Digital Techniques II		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL226				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		UGII			Semester of Delivery
Administering Department		Electrical Eng. Dept.	College	Engineering	
Module Leader	Sarah Kareem Salem		e-mail	Sarahalthahabi@uomisan.edu.iq	
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification		Ms.C
Module Tutor			e-mail		
Peer Reviewer Name			e-mail		
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	EL216 (Digital Techniques I)	Semester	Three
Co-requisites module	None	Semester	



Module Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	1. Establish the basic concepts of Digital Combinational Circuits Design. 2. Understand basic Arithmetic and digital circuits. 3. Perform Logical and digital Circuits analysis. 4. Develop problem-solving skills and understanding of Digital Systems. 5. Establish basic design concepts of Digital Sequential machines and counters. 6. Understand basic digital memory circuits and types.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	7. Outline formal procedures for analysis and design of combinational circuits. 8. Explain digital systems and logic circuits. 9. Differentiate between combinational and sequential circuits through clocking and synchronization. 10. Design Latches and Flip-flops as simple sequential circuit examples. 11. Analyze and design Digital Counters as sequential machines. 12. Design and analyze Shift registers with various types. 13. Outline basic digital memory circuits, types, operation, capacity and organization.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Combinational Circuits Adders/subtractors (half and full), binary parallel adder, code conversion, parity logic, decoders, encoders, comparators, multiplexers/demultiplexers. [12 hrs] Sequential Logic Circuits Latches (SR, Gated SR, D-latch), flip-flops (R-S, J-K, Master-Slave, T and D). [12 hrs] Counters Mod-N counters, ripple counters, synchronous counters, ring/Johnson counters, asynchronous counters. [12 hrs] Shift Registers Basic principle, serial/parallel data transfer, shift left/right registers, universal shift register. [4 hrs] Memory Design Classification of memories: ROM, PROM, EPROM, EEPROM, RAM organization, read/write operation, memory cycle, decoding and expansion. [5 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Building directly on Digital Technique I, the module moves from combinational arithmetic circuits (adders, code converters) to sequential circuits (latches, flip-flops),
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الإستراتيجيات	then counters and shift registers, and finally memory design. Team-based quiz exercises train collaborative problem-solving, while each lab session implements the exact circuit type just covered in lecture using logic gates on breadboards.		
Student Workload (SWL)			
الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem)	33	Structured SWL (hr/w)	2.1
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (hr/sem)	17	Unstructured SWL (hr/w)	1.1
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (hr/sem)	50		
الحمل الدراسي الكلي للطالب خلال الفصل			

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

Delivery Plan (Theoretical Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Combinational Circuits: Adders Arithmetic Operations - half and full adders
Week 2	Subtractions and binary parallel address
Week 3	Code Conversion: even/odd parity logic, decoders, encoders
Week 4	Comparators, multiplexers and demultiplexers



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Week 5	Sequential logic circuits: Latches - SR latch, Gated SR Latch, D-latch
Week 6	D-latch with enable, Flip-flops: latches
Week 7	Flip-flops, R-S and J-K flip flop
Week 8	Master Slave flip flop, J-K flip flop, T and D flip flop
Week 9	Counters: Mode N Counters, ripple counters
Week 10	Synchronous counters, ring/Johnson counters
Week 11	Asynchronous counters, Mod-N or divide-by-N counter
Week 12	Shift registers: basic principle, serial and parallel data transfer
Week 13	Shift left/right registers, universal shift register
Week 14	Memory design: classification of memories, ROM, PROM, EPROM, EEPROM, EAPROM, RAM
Week 15	RAM organization, write/read operation, memory cycle, timing waveforms, memory decoding and expansion
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Design and implementation of Adder and Subtractor using logic gates
Week 2	Design and implementation of 4-bit binary Adder/Subtractor and BCD adder
Week 3	Design and implementation of 2-bit and 8-bit Magnitude Comparator using logic gates
Week 4	Design and implementation of 16-bit odd/even parity checker generator
Week 5	Design and implementation of Multiplexer and De-multiplexer using logic gates
Week 6	Design and implementation of encoder and decoder using logic gates
Week 7	Realization of RS-JK & D flip-flops using Universal logic gates

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Thomas L. Floyd, Digital Fundamentals, 8th Edition, Pearson Education, 2003	Yes
Recommended Texts	M. Morris Mano, Digital Design, 3rd Edition, Prentice Hall of India, 2003	No
Websites		



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كل وحدة ائتمانية = ٢٥ ساعة



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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امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Arabic Language II		Module Delivery		
Module Type	Support		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	UM203				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		UGII			Semester of Delivery
Administering Department		Electrical Eng. Dept.	College	Engineering	
Module Leader	Aya Hamed		e-mail	Aya.hamed@uomisan.edu.iq	
Module Leader’s Academic Title		Assist. Lecturer	Module Leader’s Qualification		M.Sc.
Module Tutor	Aya Hamed		e-mail	Aya.hamed@uomisan.edu.iq	
Peer Reviewer Name		Murtada Abass	e-mail	murtadaa@uomisan.edu.iq	
Scientific Committee Approval Date		21/09/2025	Version Number	2	

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



Module Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	1. Teach students to write Arabic in a style free of spelling errors. 2. Enable students to draft administrative correspondence proficiently and in a simple style. 3. Write Arabic administrative correspondence accurately and confidently, avoiding common spelling errors. 4. Apply principles of eloquence (Bayan and Badi') and linguistic refinement in formal Arabic writing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Teach students to write Arabic free of orthographic (imla'i) errors. 2. Enable students to compose administrative correspondence and official orders with proficiency and in a simple style. 3. Introduce key concepts of Arabic rhetoric (bayan and badi') relevant to refined written expression. 4. Build appreciation of the linguistic precision of Qur'anic expression as a model for word choice. 5. Correct common grammatical errors in verb mood (nasb and jazm) in singular and plural forms.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Common spelling errors in computerized writing, spelling economy, purpose clauses in administrative language, word separation/joining rules, common orthographic illusions, prepositions in administrative letters, errors in the use of 'waw' in official correspondence, principles of rhetoric (simile, metaphor, metonymy), rhetorical embellishments (Saj', quotation, Jinas), linguistic eloquence in the Holy Qur'an, semantic significance of mention/omission and of precedence/delay, verb mood (indicative/jussive).

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الاستراتيجيات	Instruction moves from correcting common orthographic errors in administrative writing (spelling in computerized text, word separation/connection rules) to more advanced rhetorical and linguistic topics (simile, metaphor, rhyme, Qur'anic word choice) and closes with verb-mood grammar. Each session pairs a short lecture on the rule with guided in-class correction of example sentences, so students practice recognizing and fixing the exact error types they will encounter in official writing.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا



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كل وحدة ائتمانية = ٢٥ ساعة



Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعياً	2.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعياً	1.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes		10% (10)		
	Assignments		10% (10)		
	Report		10% (10)		
	Seminar		10% (10)		
Summative assessment	Midterm Exam	1.5hr	20% (20)	7	
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Spelling errors that occur in computerized writing
Week 2	Spelling economy in computerized writing
Week 3	The purpose clause in administrative language
Week 4	Separation and joining between words: what must be separated, joined, or either
Week 5	Common orthographic illusions
Week 6	Prepositions in administrative correspondence
Week 7	Errors in the use of the letter 'waw' in administrative correspondence
Week 8	Principles of eloquence (Bayan): simile, metaphor, metonymy



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Week 9	Principles of eloquence (Badi'): verbal embellishments - Saj', quotation, Jinas
Week 10	Principles of eloquence (Badi'): Tawriya, Tibaq, Muqabala
Week 11	Linguistic inimitability of the Holy Qur'an: distinguishing synonymous expressions
Week 12	The significance of mention and omission
Week 13	The significance of precedence and delay
Week 14	Indicative and jussive moods of verbs (singular and plural)
Week 15	Mid-semester examination review
Week 16	Preparatory week before the final Exam

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

Learning and Teaching Resources مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts		Yes
Recommended Texts		No
Websites		



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كل وحدة ائتمانية = ٢٥ ساعة



Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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Fail Group (0 - 49)	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F - Fail	راسب	(0-44)	Considerable amount of work required

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امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Baath Crimes		Module Delivery	
Module Type	Basic		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	MNS120			
ECTS Credits	2			
SWL (hr/sem)	50			
Module Level		UGII		
Administering Department		Electrical Eng. Dept.	College	Engineering
Module Leader	Jebur Khalaf Issa		e-mail	jabralkmalky@uomisan.edu.iq
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification	Ph.D
Module Tutor	Name (if available)		e-mail	E-mail
Peer Reviewer Name		Name	e-mail	E-mail
Scientific Committee Approval Date		21/09/2025	Version Number	1.0

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



Module Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	1. Introduce students to a range of crimes committed by the former Ba'ath party against the Iraqi people across its various components. 2. Build student awareness to reject all forms of injustice and authoritarianism and to advocate for civil and political rights.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	3. Recognize the crimes 1. Introduce students to the crimes committed by the former Ba'ath regime against the Iraqi people across its various components. 4. 2. Build student awareness to reject all forms of injustice and authoritarianism under such regimes. 5. 3. Encourage students to demand civil and political rights. 6. 4. Familiarize students with the legal classification of mass-grave crimes and the rulings of the Iraqi Higher Criminal Court.of the Ba'ath regime under the Iraqi Criminal Court law.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Concept and classification of crimes; the position of the Iraqi Higher Criminal Court Law of 2005 on Ba'ath regime violations and its key rulings; legal characterization of mass-grave crimes; types of international crimes; the regime's psychological, social, religious and human-rights violations; its political and military violations; its environmental violations in Iraq (war pollution, destruction of cities/villages, draining of marshes and orchards); legal and religious characterization of the mass-grave crime.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Learning is delivered through lectures combined with guided discussion and dialogue: each session presents a category of Ba'ath-era violation (political, social, environmental, religious) supported by documented rulings of the Iraqi Higher Criminal Court, and students then discuss the legal and human-rights dimensions of the case. This discussion-based format is intended to build critical awareness rather than simple memorization of dates and events.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (hr/sem)	17	Unstructured SWL (hr/w)	



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الحمل الدراسي غير المنتظم للطلاب خلال الفصل		الحمل الدراسي غير المنتظم للطلاب أسبوعيا	
Total SWL (hr/sem)	50		
الحمل الدراسي الكلي للطلاب خلال الفصل			

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

Delivery Plan (Theoretical Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Concept and definition of crimes and their classifications; linguistic and terminological definition of crime
Week 2	Position of the Iraqi Higher Criminal Court Law of 2005 on Ba'ath regime violations and its key rulings
Week 3	Legal characterization of mass-grave crimes during Ba'ath regime rule
Week 4	Types of international crimes
Week 5	The Ba'ath regime's role in psychological violations and their consequences
Week 6	The Ba'ath regime's role in social violations and their consequences
Week 7	The Ba'ath regime's position on religion and religious institutions
Week 8	The Ba'ath regime's role in violating human-rights laws
Week 9	Mid-semester examination
Week 10	The Ba'ath regime's political and military violations



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كل وحدة ائتمانية = ٢٥ ساعة



Week 11	The Ba'ath regime's environmental violations in Iraq: war pollution
Week 12	The Ba'ath regime's environmental violations in Iraq: destruction of cities and villages
Week 13	The Ba'ath regime's environmental violations in Iraq: draining of marshes and orchards
Week 14	Legal and religious characterization of the mass-grave crime
Week 15	Final examination
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Crimes of the Ba'ath Regime in Iraq	Yes
Recommended Texts	Archive of the Political Prisoners Foundation	No
Websites	Reliable documentary sources online	



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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية

MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية



Module Information					
معلومات المادة الدراسية					
Module Title	Electrical Machines III		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL311				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGIII			Semester of Delivery
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Rabea Hadi Hassan		e-mail	rabia.h.h@uomisan.edu.iq	
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification		Ph.D
Module Tutor	Mohammed H. Lazim		e-mail	Mohammed.hasan@uomisan.edu.iq	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electrical Machines I & II, Electrical Circuit I & II, Fundamental of EE I & II.	Semester	1,2,3,4
Co-requisites module	None	Semester	

Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the basic principles of induction machines, including electromagnetism, magnetic fields, and the interaction between stator and rotor.



	- Describe the construction of induction machines, such as 3-phase induction motor, 1-phase induction motor and induction generator, and their equivalent circuits. - Analyze the performance characteristics of induction machines, including torque-speed characteristics, starting, braking, and speed control of motors. - Calculate and design induction machine parameters, such as equivalent-circuit resistances and reactances from no-load and blocked-rotor tests, winding arrangements, number of poles, magnetic flux and electromagnetic forces, power factor and efficiency. - Understand the speed-control techniques of induction machines, including slip, rotor-resistance control, voltage control, and AC drives (VFD). - Analyse and troubleshoot induction-machine faults such as unbalanced voltages, rotor faults, stator faults, and bearing failures. - Apply knowledge of induction machines to practical applications such as motor selection, sizing, and protection. - Develop laboratory skills in performance testing, efficiency measurement, and fault diagnosis of induction machines. - Communicate effectively the findings related to induction machines through written reports and oral presentations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Understand the basic principles of induction machines, including construction of poly-phase and single-phase induction motors and induction generators, and rotating magnetic field theory. - Determine the electrical parameters of the equivalent circuit of induction machines, including resistances and reactances of stator and rotor from no-load and blocked-rotor tests. - Calculate losses, power factor, output power and torque from the equivalent-circuit parameters. - Learn the speed-torque characteristics of induction machines and how to maximize starting or maximum torque. - Learn the starting methods of poly-phase induction motors (star-delta, soft starting, DOL) and identify the appropriate method for a given application. - Know the techniques to control the speed of induction motors and the application of each technique, including VFD. - Know the methods used to brake induction machines (plugging, regenerative) and their applications. - Learn induction generators: construction, working principle, types, speed-power characteristics and applications. - Learn the various types of single-phase induction motors, their advantages, disadvantages and appropriate applications. - Analyze the revolving-field theory of single-phase induction motors (double revolving field and symmetrical components), and their characteristics and windings. - Understand the circle diagram and use it to analyse, operate and calculate the desired parameters of a single-phase induction motor at any operating point.
Indicative Contents	Indicative content includes the following.



المحتويات الإرشادية	Induction Motors – Salient constructional features of squirrel-cage and slip-ring 3-phase induction motors; principle of operation; slip and its significance; rotor resistance, inductance, emf and current; power-flow diagram; factors determining torque; torque-slip curve; effect of rotor resistance on the torque-slip relationship; starting methods (DOL, star-delta, auto-transformer); causes of low power factor; no-load and blocked-rotor tests and efficiency; speed control (conventional and thyristorised). Polyphase Induction Motors – Basic theory and construction of squirrel-cage and wound-rotor motors; equivalent circuit; measurement of equivalent-circuit parameters; machine equations; speed/torque curves; circle diagram; starting performance; speed control; single-phase induction motor; deep-bar effect. Single-Phase AC Motors – Shaded-pole, universal and reluctance machines with applications; construction, characteristics and applications of split-phase, capacitor-start/run, shaded-pole, reluctance-start, AC series (universal) and reluctance motors.
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Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies	Interactive lectures use animated multimedia to visualize rotating magnetic fields, supported by group discussion and worked examples using real industrial numbers. A dedicated lab component (name-plate tests, starting methods, speed control, torque-slip tests) lets students verify every major theoretical result on real 3-phase and 1-phase induction machines, while case studies and computer simulations connect the material to industrial practice.		
الإستراتيجيات			
Student Workload (SWL)			
الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem)	78	Structured SWL (hr/w)	5
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (hr/sem)	47	Unstructured SWL (hr/w)	3
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (hr/sem)	125		
الحمل الدراسي الكلي للطالب خلال الفصل			



Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Construction and principal operation of 3-Phase Induction Motors, production of rotating magnetic field
Week 2	Equivalent circuit of 3-Phase Induction Motors, No-load test, and blocked rotor test.
Week 3	Power stages, efficiency, and losses of 3 phase induction motor
Week 4	Torque-speed characteristics, starting and maximum torque
Week 5	Starting of 3-phase induction motor: Variable resistance in stator, auto-transformer method, star-delta method, and soft starting methods.
Week 6	Speed control of 3-phase induction motor, braking of 3-phase induction motor
Week 7	Induction generator. Working principle, construction
Week 8	Types of induction generator, applications, characteristics of slip-torque and the output power
Week 9	Single phase induction motors: Construction and working principle
Week 10	Production of rotating magnetic field, double field theory, symmetrical theory.
Week 11	Torque speed characteristics, starting methods of 1 phase induction motor
Week 12	Types of single-phase induction motor, Application of 1 phase induction motor
Week 13	General equivalent circuit, no-load test, and blocked rotor test, phasor diagram of 1 phase induction motor



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Week 14	Power stages, losses, separation the mechanical and iron losses, and efficiency
Week 15	Speed control of 1 phase induction motor, circle diagram of 1 phase induction motor
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Name plate, classifications of insulations, Polarity test of stator windings, Connections of stator windings, Running and reversing the direction of rotation of 3 phase induction motor
Week 2	Starting of 3 phase induction motor, soft starting, Autotransformer, and star delta test
Week 3	Speed control of 3 phase induction motor voltage control method, VFD method
Week 4	Single phase induction motors: starting, running, and reversing
Week 5	No load and blocked rotor test and finding the efficiency of 1 phase induction motor
Week 6	Torque-slip test of 1 phase induction motor.
Week 7	Induction generator, working principle, characteristics of speed-power.

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Theraja B.L., Theraja A.K., A Textbook of Electrical Technology, S. Chand, New Delhi, India.	Yes
Recommended Texts	Principles of Electrical Machines, V.K. Mehta, Rohit Mehta, S. Chand, India.	No
Websites		



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كل وحدة ائتمانية = ٢٥ ساعة



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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امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Power System I		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL312				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UGIII			Semester of Delivery
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Dr. Ahmed Raisan Hussein		e-mail	Alhusseinahmed70@uomisan.edu.iq	
Module Leader’s Academic Title		Assistant Professor	Module Leader’s Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		01/06/2025	Version Number		1.0

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

Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives	1. Understand the importance of electrical power systems.



أهداف المادة الدراسية	- Understand the principal work of electrical power systems. - Understand the parameters of electrical power systems. - Enhance the performance of electrical power systems. - Develop the skills required to develop electrical power systems. - Analyse the high-voltage power transmission line.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Recognize how power-generating plants work. - List the parameters of high-voltage transmission lines. - Analyse the issue of sag in power transmission lines. - Discuss the mechanical design of transmission lines. - Describe the electrical characteristics of overhead transmission lines. - Define corona.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Sources of Electrical Energy – Structure of power system and its elements, major sources of primary energy, power stations (steam, hydro, gas turbines, nuclear, M.H.D. generation), renewable energy sources (solar, wind and others), AC and DC single- and 3-phase transmission, development of electric power in Iraq. [25 hrs] Economical Aspects of Power Systems – Economics of generation, load curves, choice of size and number of generator units, effect of system voltage on transmission efficiency, choice of transmission voltage, conductor size and Kelvin's law, power-factor improvement, most economical power factor, tariffs. [25 hrs] Mechanical Design of Transmission Lines – Conductor materials, line supports, sag and its calculation, effect of wind and ice, insulators, voltage distribution over an insulator string, string efficiency and its improvement. [30 hrs] Corona – Phenomenon, disruptive critical voltage, visual critical voltage, corona losses, factors and conditions affecting corona losses. [15 hrs] Underground Cables – Conductor and insulating materials, sheathing and armouring materials, types of cables, insulation resistance, stress and capacitance, inter-sheaths, capacitance grading, power factor in cables, capacitance in three-core cables, thermal characteristics, comparison between overhead lines and underground cables. [30 hrs]



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	The module progresses from generation sources through economic aspects of power systems to the mechanical design of transmission lines and underground cables, with each topic introduced through lecture and reinforced by interactive tutorials on real numerical examples (sag calculation, string efficiency, corona losses). Encouraging active participation in exercises builds the critical-thinking skills needed for later power-system design.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	37	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	2.5
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	-	10% (10)	6 and 11	LO #1, #2 and #10, #11
	Assignments	-	10% (10)	5 and 13	LO #3, #4 and #6, #7
	Report	-	10% (10)	14	LO #5, #8 and #10
	Midterm Exam	1	10% (10)	9	LO #1 - #7
Summative assessment	Final Exam	3 hr / 1	50% (50)	16	All
	Final Exam				
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Structure of power system and its elements, major sources of primary energy



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Week 2	Power stations, steam, hydro, gas turbines, nuclear, M.H.D generation
Week 3	Renewable energy sources, solar energy, wind generators, other renewable sources
Week 4	AC and DC single and 3-phase transmission, development of electric power in Iraq
Week 5	Economics of generation, load curves, choice of size and number of generator units
Week 6	Effect of system voltage on transmission efficiency of power supply system
Week 7	Mid-term + choice of transmission voltage
Week 8	Conductor materials, line supports, sag
Week 9	Calculation of sag, effect of wind and ice
Week 10	Insulators, voltage distribution over an insulator string
Week 11	String efficiency, improving string efficiency
Week 12	Phenomenon, disruptive critical voltage, visual critical voltage, corona losses, factors and conditions affecting corona losses.
Week 13	Conductor materials, insulating materials, sheathing and armouring materials, types of cables
Week 14	Insulation resistance, stress and capacitance, use of inter-sheaths, capacitance grading, power factor in cables
Week 15	Capacitance in three-core cables, thermal characteristics, comparison between overhead lines and underground cables
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources



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كل وحدة ائتمانية = ٢٥ ساعة



مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	V. K. Mehta and Rohit, Principles of Power System, S. Chand, 2005.	
Recommended Texts	Stevenson W.D., Power Systems: Analysis and Design, McGraw-Hill, 1994; Hadi Saadat, Power System Analysis, Tata McGraw-Hill, 2002; T.K. Nagsarkar, Power System Analysis, Oxford University Press, 2014.	
Websites		

Grading Scheme مخطط الدرجات				
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
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كل وحدة ائتمانية = ٢٥ ساعة



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Communication I		Module Delivery	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	EL313			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level		UGIII		
Administering Department		Electrical Engineering Dep.	College	Engineering
Module Leader	Dr. Thaar Abdalraheem Kareem		e-mail	thaar_kareem@uomisan.edu.iq
Module Leader's Academic Title		Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Thaar Abdalraheem Kareem		e-mail	thaar_kareem@uomisan.edu.iq
Peer Reviewer Name		Name	e-mail	E-mail
Scientific Committee Approval Date		-21/09/2025	Version Number	1.0

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



Module Objectives, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية

Module Objectives أهداف المادة الدراسية	1. Understand the fundamental concepts and principles of signal analysis. 2. Understand signal and system classifications. 3. Analyze and design various analog modulation techniques such as AM, FM, and PM. 4. Comprehend the characteristics of different analog communication channels and their impact on system performance. 5. Explore the concept of noise in analog communication systems and its effects on signal quality. 6. Learn about various techniques for improving signal-to-noise ratio.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify signal-analysis techniques using Fourier series and Fourier transform. 2. Discuss the communication-system components. 3. Summarize what is meant by modulation and why modulation is used. 4. Explain various types of analog modulation such as AM, FM, and PM. 5. Describe the process of modulation and demodulation of various analog modulation types using circuits and blocks. 6. Evaluate the performance of analog communication systems using metrics such as signal-to-noise ratio (SNR) and bandwidth efficiency.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Communication System Elements (Signal Analysis) – Signal classification of periodic and non-periodic signals, Fourier series and Fourier transform, classification of systems, power spectral density, correlations. [15 hrs] Noise – Types, power calculation, thermal white Gaussian noise (AWGN), band-limited noise (base-band and band-pass), noise through linear systems. [15 hrs] Linear Modulation – AM/DSB-LC, AM/DSB-SC, AM/SSB-SC, AM/VSB, noise in AM systems, frequency division multiplexing (FDM), commercial receivers (TRF and super-heterodyne). [15 hrs] Angle Modulation – NBFM, NBPM, WBPM, noise in angle-modulation systems. [15 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Class lectures deliver core knowledge of signal analysis and modulation theory, followed immediately by interactive tutorials where students solve assignments to
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كل وحدة ائتمانية = ٢٥ ساعة



الإستراتيجيات	reinforce the concepts. Visual teaching creates mental images and block diagrams of modulation/demodulation circuits to help students internalize otherwise abstract frequency-domain concepts.		
Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem)	63	Structured SWL (hr/w)	4.1
الحمل الدراسي المنتظم للطلاب خلال الفصل		الحمل الدراسي المنتظم للطلاب أسبوعيا	
Unstructured SWL (hr/sem)	37	Unstructured SWL (hr/w)	2.5
الحمل الدراسي غير المنتظم للطلاب خلال الفصل		الحمل الدراسي غير المنتظم للطلاب أسبوعيا	
Total SWL (hr/sem)	100		
الحمل الدراسي الكلي للطلاب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	1	10% (10)	Continuous	All
	Class work	2	10% (10)	7 and 14	LO #5, #8 and #10
Summative assessment	Midterm Exam	-	10% (10)	7	LO #1 - #7
	Final Exam	-	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Signal classification of periodic and non-periodic signal
Week 2	Fourier series and Fourier transform
Week 3	Classification of system, power spectral density, correlations
Week 4	Noise: Types, power calculation, thermal white Gaussian noise (AWGN)



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كل وحدة ائتمانية = ٢٥ ساعة



Week 5	BAND-LIMITED noise (base band and band pass), Noise through linear systems
Week 6	AM/DSB-LC, AM/DSB-SC
Week 7	AM/SSB-SC, AM/VSB, Noise in AM System
Week 8	Midterm exam
Week 9	Modulation and demodulation of various types of AM
Week 10	Angle modulation: Frequency modulation (FM)
Week 11	NBFM, NBPM, WBPM
Week 12	Modulation and demodulation of FM
Week 13	Phase modulation (PM)
Week 14	Modulation and demodulation of PM
Week 15	Noise in angle modulation
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Communication Systems, Simon Haykin.	Available
Recommended Texts	Communication Systems, A.B. Carson.	
Websites		



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كل وحدة ائتمانية = ٢٥ ساعة



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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Engineering Analysis		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL314				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UGIII			Semester of Delivery
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Mohammed Alyasiri		e-mail	Mohammedhasson30@uomisan.edu.iq	
Module Leader’s Academic Title		Assistant Lecturer	Module Leader’s Qualification		-
Module Tutor	Mohammed Alyasiri		e-mail	Mohammedhasson30@uomisan.edu.iq	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		-21/09/2025	Version Number		1.0

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	10. Understand the principles and techniques of engineering analysis. 11. Develop skills in applying mathematical and computational methods to solve engineering problems. 12. Develop problem-solving skills and understanding of Fourier series and Fourier transform. 13. Understand the Z-Transform. 14. Learn how to analyze complex-variable problems. 15. Develop a strong foundation for solving differential equations using power series.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize frequency-domain analysis using the Fourier transform. 2. Apply the Z-Transform and inverse Z-Transform. 3. Analyse discrete-time systems and their applications. 4. Discuss functions of a complex variable and analytic functions. 5. Evaluate mapping and integration in the complex plane. 6. Perform the solution of differential equations using power series.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Fourier Series and Fourier Transform – Fourier series representation of periodic signals, trigonometric Fourier series, even and odd signals, complex Fourier series, amplitude and phase spectra, Parseval's theorem, Fourier transform for non-periodic signals, Fourier spectra, sine and cosine transforms, properties of the Fourier transform, correlation functions, power spectrum and autocorrelation. The Z-Transform – Analysis of discrete-time signals, sampler mathematical model, elementary discrete-time systems, response of LTI systems (convolution sum), system properties, the discrete Z-Transform, region of convergence, properties of Z-transforms, inverse Z-Transform. Complex Variable Theory – Differentiation of a complex function, analytic-function theorems, Cauchy's theorem, Cauchy's integral formula, Taylor's and Laurent series, the residue theorem. Solution of Differential Equations Using Power Series – Legendre's equation and polynomials; Bessel functions of the first and second orders and their properties.



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Class lectures and tutorials introduce each mathematical tool (Fourier analysis, Z-transform, complex-variable theory, power-series solutions) with active learning implemented through collaborative group work on exercises, assignments and a project, mirroring the problem-solving approach used in the department's other mathematics-heavy courses.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	48	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	3.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	52	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.5
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6 and 11	LO #1, #2 and #10, #11
	Project	-	10% (10)	Continuous	All
	Assignments	1	10% (10)	5 and 13	LO #3, #4 and #6, #7
	Report	1	10% (10)	14	LO #5, #8 and #10
Summative assessment	Midterm Exam	1	10% (10)	9	LO #1 - #7
	Final Exam	3 hr / 1	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction, Fourier series representation of periodic signals, trigonometric Fourier series.



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Week 2	Even and odd signals, complex Fourier series, amplitude and phase spectra of a periodic signal
Week 3	Parseval's theorem, Fourier transform for non-periodic signal, Fourier spectra, Fourier sine and cosine transform
Week 4	Some special functions and their transform, properties of the Fourier transform
Week 5	Convolution theorem, linear time-invariant system, application
Week 6	Correlation function, properties of correlation function, power spectrum of periodic signal and autocorrelation
Week 7	Analysis of discrete-time signals, sampler mathematical model, some elementary discrete time
Week 8	Midterm exam and related rates
Week 9	Response of LTI systems (the convolution sum), system properties
Week 10	The discrete Z-Transform, Region of convergence
Week 11	Properties of Z-transforms, The inverse Z-Transform
Week 12	Differentiation of a complex function, Analytic functions theorem, Cauchy's theorem
Week 13	Cauchy's integral formula, Taylor's and Laurent series, the residue theorem
Week 14	Legendre's equation, Legendre's polynomials
Week 15	Bessel functions of the first and second orders, Bessel function properties.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
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كل وحدة ائتمانية = ٢٥ ساعة



Required Texts	Advanced Engineering Mathematics, Erwin Kreyszig.	
Recommended Texts	Schaum's Outline Series, Advanced Mathematics for Engineering and Scientists.	
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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امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Electronics IV		Module Delivery	
Module Type	Core		☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	EL315			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level		UGIII		
Administering Department		Electrical Engineering Dep.	College	Engineering
Module Leader	Assist. Lec. Ruqaya Majeed Kareem		e-mail	enghre.2203@uomisan.edu.iq
Module Leader's Academic Title		Assist. Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor			e-mail	
Peer Reviewer Name		Name	e-mail	E-mail
Scientific Committee Approval Date		21/09/2025	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electronics I	Semester	Three
Co-requisites module	Electronics I	Semester	Four

Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives	- Understand the principles and applications of operational amplifiers. - Gain knowledge about the ideal Op-Amp and basic Op-Amp configurations.



أهداف المادة الدراسية	- Learn how to perform ideal Op-Amp circuit analysis. - Get familiarized with Op-Amp specifications, including DC-offset and frequency parameters. - Develop an understanding of gain-bandwidth, slew rate, and maximum signal frequency. - Understand the concept of negative feedback in amplifiers and the ideal feedback topologies. - Gain knowledge of impedance in feedback amplifiers and practical feedback amplifiers (voltage, transconductance, transresistance) implemented with Op-Amp, FET and BJT. - Learn the principles and applications of active filters, including transmission, types and specifications. - Gain insight into Butterworth and Chebyshev filters. - Understand and design active low-pass, high-pass, band-pass and band-stop filters.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Describe the function and operation of operational amplifiers. - Distinguish between inverting, non-inverting, and voltage-follower Op-Amp configurations. - Perform circuit analysis on ideal Op-Amp systems. - Understand and calculate DC-offset and frequency parameters of Op-Amps. - Analyze amplifier specifications including gain-bandwidth, slew rate, and maximum signal frequency. - Explain the concept and significance of negative feedback in amplifiers and apply the ideal feedback topologies. - Understand and calculate input and output impedances in feedback amplifiers, and design practical feedback amplifiers. - Define and apply the concept of active filters, including transmission, types and specifications. - Design and implement Butterworth and Chebyshev filters. Create and analyze active low-pass, high-pass, band-pass, and band-stop filter circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Operational Amplifier – Amplifier fundamentals, the ideal Op-Amp, basic Op-Amp configurations, ideal Op-Amp circuit analysis, Op-Amp specifications - DC-offset parameters, Op-Amp specifications - frequency parameters. [18 hrs] Feedback Amplifier – Negative feedback, ideal feedback topologies, impedance in feedback amplifiers, practical feedback amplifiers. [18 hrs] Active Filter – Introduction, filter transmission, types and specifications, Butterworth and Chebyshev filters, active low-pass, high-pass, band-pass and band-stop filters. [15 hrs]



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Traditional lectures deliver fundamentals of Op-Amps, feedback amplifiers and active filters, immediately reinforced by interactive Q&A sessions and hands-on lab work with real Op-Amp and filter circuits. Group projects and assignments apply lecture and lab concepts together, while guest lectures and online resources connect the module to industry practice.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.5
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

Material Covered



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Week 1	Ch.1 Operational Amplifier: Introduction; Amplifier Fundamentals; the Ideal Op-Amp; Basic Op-Amp Configurations (Inverting, Non-inverting, Voltage Follower)
Week 2	Ideal Op-Amp Circuit Analysis: Summing Amplifier; Difference Amplifier (Input Signal Modes, CMRR)
Week 3	The Integrator Amplifier; The Differentiator Amplifier
Week 4	Op-Amp Specifications - DC Offset Parameters: Offset Currents and Voltages
Week 5	Op-Amp Specifications - Frequency Parameters: Gain-Bandwidth (3 dB Open-Loop / Closed-Loop Bandwidth), Slew Rate, Maximum Signal Frequency
Week 6	Ch.2 Feedback Amplifier: Negative Feedback (+ Quiz)
Week 7	Ideal Feedback Topologies: Voltage, Current, Transconductance, Transresistance Amplifiers
Week 8	Impedance in Feedback Amplifiers: input/output impedance for series and shunt mixing/sampling
Week 9	Practical Feedback Amplifiers: Voltage (Op-Amp, FET, BJT), Transconductance (BJT), Transresistance (Op-Amp, FET)
Week 10	Midterm Exam
Week 11	Ch.3 Active Filter: Introduction; Filter Transmission, Types and Specifications (Low-Pass, High-Pass, Band-Pass), Filter Transfer Function
Week 12	Butterworth and Chebyshev Filters: Natural Mode Identification, Damping Factor, Critical Frequency and Roll-Off Rate
Week 13	Active Low-Pass Filter (Single-Pole, Sallen-Key, Cascaded); Active High-Pass Filter (Single-Pole, Sallen-Key, Cascaded)
Week 14	Active Band-Pass Filter (Cascaded Low/High-Pass, Multiple-Feedback, State-Variable, Biquad); Active Band-Stop Filter (Multiple-Feedback)
Week 15	Quiz
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Experiment 1: OP-AMP CIRCUITS
Week 2	Experiment 2: OP-AMP APPLICATIONS
Week 3	Experiment 3: THE COMPARATOR
Week 4	Experiment 4: ACTIVE FILTERS
Week 5	Experiment 5: RC OSCILLATORS



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Week 6	Experiment 6: LC OSCILLATORS
Week 7	Exam

Learning and Teaching Resources		
مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	Robert L. Boylestad, Electronic Devices and Circuit Theory, 11th Ed., Pearson Education Limited, 2015.	Yes
Recommended Texts	Thomas L. Floyd, Electronic Devices, Electron Flow Version, 9th Ed., Pearson Education Limited, 2015.	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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
بكالوريوس في الهندسة الكهربائية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Control I			Module Delivery	
Module Type	Core			☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	EL316				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UGIII	Semester of Delivery		
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Sadeq Duair Aneed Al-Majidi		e-mail	sadeqalmajidi@uomisan.edu.iq	
Module Leader's Academic Title		Assist. Prof	Module Leader's Qualification		Ph.D
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the fundamental concepts of control theory. 2. Analyze linear control systems. 3. Design and evaluate control systems. 4. Apply control theory to practical systems. 5. Understand advanced control techniques. 6. Simulate and analyze control systems. 7. Evaluate stability and performance. 8. Solve control-system design problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Introduction and review: understand control-system engineering, its history, evolution and design elements, with illustrative examples. 2. Modeling in the frequency domain: find the Laplace/inverse-Laplace transform and transfer functions for electrical, translational-mechanical, rotational-mechanical and electromechanical systems; linearize nonlinear systems. 3. Reduction of multiple subsystems: reduce block diagrams to a single transfer function, convert to signal-flow graphs, apply Mason's rule, and represent systems in state space (cascade, parallel, controller/observer canonical forms). 4. Time response: use poles and zeros to determine system time response; describe first- and second-order system response, damping ratio, natural frequency, settling/peak time, overshoot and rise time; describe effects of nonlinearities. 5. Steady-state errors: find steady-state error for unity- and non-unity-feedback systems and disturbance inputs; design gain to meet a steady-state error specification; find error sensitivity to parameter changes. 6. Stability analysis: construct and interpret the Routh table, including special cases, to determine system stability in the transfer-function and state-space representations. 7. Root-locus techniques: define and sketch the root locus, find gains and sensitivities along the locus, and use it to meet transient-response specifications, including for positive-feedback systems. 8. Design via root locus: design cascade and feedback compensators using the root locus to improve steady-state error and/or transient response, and realize the compensators physically.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction and Review – Systems, plant, linear dynamical systems, open-loop and closed-loop (feedback) systems. Modeling in the Frequency Domain – Laplace transform and inverse Laplace transform of time functions; solving differential equations using the transfer function; linearizing a nonlinear system to find the transfer function. Reduction of Multiple Subsystems – Block diagrams, signal-flow graphs, Mason's rule.



	Time Response – Poles and zeros; first- and second-order system response; damping ratio and natural frequency; settling time, peak time, percent overshoot and rise time for underdamped systems; effects of nonlinearities. Steady-State Errors – Steady-state error for unity-feedback systems; steady-state error performance; error for disturbance and non-unity-feedback inputs; error sensitivity to parameter changes. Stability Analysis – The basic Routh table; special cases where the first element of a row, or an entire row, is zero. Root Locus Techniques – Definition and properties of the root locus; sketching the root locus; gains and root sensitivity; root locus for positive-feedback systems; using the root locus for transient-response design. Design via Root Locus – Improving steady-state error via cascade compensation; improving transient response via cascade compensation; improving both via feedback compensation; physical realization of compensators.
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Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies	The module combines active-learning discussions and case studies with technology-supported simulations to make abstract transfer-function and root-locus concepts concrete. Complex topics (block-diagram reduction, stability analysis, root-locus design) are broken into smaller steps with formative quizzes and assignments along the way, and regular reflection sessions let students identify and address gaps before the exams.		
الإستراتيجيات			
Student Workload (SWL)			
الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem)	48	Structured SWL (hr/w)	3
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (hr/sem)	52	Unstructured SWL (hr/w)	3.7
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (hr/sem)	100		
الحمل الدراسي الكلي للطالب خلال الفصل			



Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	INTRODUCTION: Brief History of Automatic Control; System Configurations and Analysis; Difference Between Closed- and Open-Loop; Applications of control systems
Week 2	MODELING IN THE FREQUENCY DOMAIN: Laplace Transform Review; The Transfer Function; Electrical Network and Translational Mechanical System Transfer Functions
Week 3	MODELING IN THE FREQUENCY DOMAIN: Rotational Mechanical and Electromechanical System Transfer Functions; Electric Circuit Analogs; Nonlinearities; Linearization
Week 4	REDUCTION OF MULTIPLE SUBSYSTEMS: Block Diagrams; Analysis and Design of Feedback Systems; Signal-Flow Graphs; Mason's Rule
Week 5	TIME RESPONSE: Poles, Zeros, and System Response; First-Order Systems; Second-Order and Underdamped Second-Order Systems; Delay/Rise/Peak/Settling time, Overshoot
Week 6	TIME RESPONSE (cont.): System Response with Additional Poles and Zeros; Effects of Nonlinearities upon Time Response
Week 7	Mid Term Exam



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Week 8	STEADY-STATE ERRORS: Introduction; Steady-State Error for Unity Feedback Systems; Static Error Constants and System Type
Week 9	STEADY-STATE ERRORS (cont.): Error Specifications, Disturbances, Nonunity Feedback Systems, Sensitivity
Week 10	STABILITY: Introduction; Routh-Hurwitz Criterion
Week 11	STABILITY: Routh-Hurwitz Criterion - Special Cases
Week 12	ROOT LOCUS TECHNIQUES: Introduction; Defining and Properties of the Root Locus; Sketching and Refining the Sketch
Week 13	ROOT LOCUS TECHNIQUES: Transient Response Design via Gain Adjustment; Generalized Root Locus; Positive-Feedback Systems; Pole Sensitivity
Week 14	DESIGN VIA ROOT LOCUS: Introduction; Improving Steady-State; Improving Transient Response via Cascade Compensation
Week 15	DESIGN VIA ROOT LOCUS: Improving Steady-State Error and Transient Response; Feedback Compensation; Physical Realization of Compensation
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Control Systems Engineering, Norman S. Nise; Modern Control Engineering, 5th Ed., K. Ogata.	Yes



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كل وحدة ائتمانية = ٢٥ ساعة



Recommended Texts	Modern Control Systems, Richard C. Dorf & Robert H. Bishop.	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 with 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.				
ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.				



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Wave Propagation		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL317				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		UGIII			Semester of Delivery
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Ali Adnan Mohammed		e-mail	Eng.a.moc@gmail.com	
Module Leader's Academic Title		Assistant Lecturer	Module Leader's Qualification		M.Sc.
Module Tutor	Ali Adnan Mohammed		e-mail	Eng.a.moc@gmail.com	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		-	Version Number		1.0

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Describe mathematically the electric and magnetic fields of TEM waves. 2. Describe the polarization properties of an EM wave. 3. Relate the propagation parameters of a wave to the constitutive parameters of the medium. 4. Characterize the flow of current in conductors and use it to calculate the resistance of a coaxial cable. 5. Calculate the rate of power carried by an EM wave in both lossless and lossy media. 6. Characterize the reflection and transmission behavior of plane waves incident upon plane boundaries, for normal and oblique incidence. 7. Study wave polarization and distinguish between linear, elliptical and circular types. 8. Understand the various modes of RF wave propagation and the related national/international standards. 9. Identify and classify propagation modes, such as TE and TM modes. 10. Investigate link-budget calculations and apply the Friis transmission formula and Radar equations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe mathematically the electric and magnetic fields of TEM waves. 2. Relate the propagation parameters of a wave to the constitutive parameters of the medium. 3. Characterize the flow of current in conductors and use it to calculate the resistance of a coaxial cable. 4. Calculate the rate of power carried by an EM wave in both lossless and lossy media. 5. Characterize the reflection and transmission behavior of plane waves incident upon plane boundaries, for normal and oblique incidence. 6. Describe the polarization properties of an EM wave and distinguish between linear, elliptical and circular polarization. 7. Understand the various modes of RF wave propagation and recognize the application and usage of related national/international standards. 8. Identify and classify different propagation modes, such as TE and TM modes. 9. Investigate path-loss calculations, apply the Friis transmission formula, and understand Radar equations and radar cross-section. Indicative Contents المحتويات الإرشادية
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Electromagnetic Wave Propagation – EM wave fundamentals; time-harmonic fields and Maxwell's equations; wave equations and their free-space solution; physical interpretation of gradient, divergence and curl; complex permittivity; general plane-wave solutions. [6 hrs]



	Characteristics of Propagation Medium – Propagation in lossless and conducting media; conductors and dielectrics; wave propagation in good dielectrics and good conductors; depth of penetration; surface impedance; electromagnetic power density and the Poynting vector. [6 hrs] Wave Polarization of EMWs – Linear, circular (LHC/RHC) and elliptical polarization. [6 hrs] Reflection and Refraction of EMWs – Plane-wave reflection from a media interface (general, lossless, good-conductor, perfect-conductor and perfect-dielectric media); normal incidence. [6 hrs] Transmission Line – Transmission-line parameters and equations; input impedance, SWR and power; the Smith chart; applications of transmission lines; microstrip transmission lines. [9 hrs] Rectangular Waveguides – TM and TE modes; propagation in the guide; power transmission and attenuation; waveguide current and mode excitation; waveguide resonators. [6 hrs] Path Losses and Friis Transmission Formula – Equivalent isotropic radiated power; free-space transmission (path losses); feeder losses; fixed atmospheric and ionospheric losses; the Friis transmission formula. [6 hrs]
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Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies	The module builds wave theory from Maxwell's equations through propagation-medium characteristics, polarization, reflection/refraction, transmission lines and waveguides, to link-budget calculations, with each stage adding one physical layer to the model. Interactive tutorials work through real link-budget and Smith-chart problems so students connect the abstract field equations to practical RF link design.		
الإستراتيجيات			
Student Workload (SWL)			
الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem)	33	Structured SWL (hr/w)	2.1
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	



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كل وحدة ائتمانية = ٢٥ ساعة



Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعياً	1.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50		

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

Delivery Plan (Theoretical Weekly Syllabus) المنهاج الأسبوعي النظري	
	Material Covered
Week 1	A review of Time-varying Electromagnetic Fields and Maxwell's Equations with an Introduction to The Electromagnetic Wave (EMW) Theory.
Week 2	The Uniform Plane EMWs in General
Week 3	Plane EMW Propagation in Lossy Dielectrics, Lossless Dielectrics, Free Space, and in Good Conductors
Week 4	Electromagnetic Power Density and the Poynting Vector
Week 5	Wave Polarization of EMWs
Week 6	Reflection of a EMW at Normal Incidence
Week 7	Midterm Exam
Week 8	Transmission Line Parameters, Transmission Line Equations.



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Week 9	Input Impedance, SWR, and Power.
Week 10	The Smith Chart
Week 11	Rectangular Waveguides
Week 12	Transverse Magnetic (TM) Modes, Transverse Electric (TE) Modes.
Week 13	Propagation in the Guide, Power Transmission and Attenuation
Week 14	Path Loss and Link-Budget Calculations
Week 15	Friis Transmission Formula
Week 16	Preparatory week before the final Exam

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

Learning and Teaching Resources مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	Sadiku, Matthew N. O., Elements of Electromagnetics, 7th Ed., Oxford, 2018.	
Recommended Texts	Fawwaz T. Ulaby and Umberto Ravaioli, Fundamentals of Applied Electromagnetics, 8th Ed., Pearson, 2023; A. Saakian, Radio Wave Propagation Fundamentals, 2nd Ed., Artech House, 2020.	
Websites		



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كل وحدة ائتمانية = ٢٥ ساعة



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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امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Computer Architecture		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL318				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		UGIII			Semester of Delivery
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Huda Ismail Olewi		e-mail	hudaismail@uomisan.edu.iq	
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification		MSc.
Module Tutor	Huda Ismail Olewi		e-mail	hudaismail@uomisan.edu.iq	
Peer Reviewer Name		Huda Ismail Olewi	e-mail	hudaismail@uomisan.edu.iq	
Scientific Committee Approval Date		-	Version Number	1.0	

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the fundamental concepts of digital computers, including data representation, computer arithmetic, and the role of logic gates. 2. Analyze and design combinational and sequential logic circuits necessary for computer systems. 3. Comprehend how computer components (memory, I/O devices, processors) interact and are organized in various architectures. 4. Evaluate instruction set architectures (ISA), including addressing modes, instruction formats and types of instructions. 5. Understand the operation of data paths and control units and how they manage instruction execution. 6. Analyze and evaluate key performance metrics such as CPU performance, memory hierarchy, and pipelining.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the fundamental structure and operation of digital computers. 2. Identify and explain the function of the main components of computer systems (CPU, Memory, I/O). 3. Design and analyze combinational and sequential logic circuits. 4. Understand instruction set architectures and their role in processor design. 5. Analyze data-path and control-unit operations in computer architecture. 6. Evaluate computer performance using metrics such as speed, throughput, and efficiency.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction and Overview – General definition and purpose of digital arithmetic; introduction to computer architecture; CPU organization and its parts; performance factors; reasons for binary arithmetic; fixed-point number representation systems (non-negative and signed integers); sign detection. Algorithms and Design of Common Fixed-Point Arithmetic Operations – Design of two-operand addition/subtraction (CRA, CLA); data compression; multi-operand addition (CSA); sequential multiplier; recoding (Booth recoding); division algorithms (restoring and non-restoring). Design of High-Speed CPU Components – Combinational shifters (barrel shifters); general-purpose registers (GPR); timers; tri-state buffers; arithmetic and logic unit (ALU). Real Number Representations – IEEE-754 floating-point representation and format (sign, exponent, magnitude); exceptions and special values; single- and double-precision formats; dynamic range; integer-to-real conversion. Floating-Point Algorithms and Implementation – FP addition/subtraction, multiplication, multiply-add fused (MAF) unit, division.



	Memory System Hierarchy – Role of the memory system; high-speed memories and locality of reference; cache memory (organization, mapping techniques, replacement algorithms, write policies); main memory types (SRAM, DRAM) and performance (latency, cycle time, bandwidth).
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Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies الإستراتيجيات	Lectures and explanations deliver theoretical concepts supported by practical examples; interactive discussions enhance understanding of complex architectural concepts; problem-solving activities apply logic design, circuit analysis and performance evaluation; collaborative group assignments promote teamwork in designing parts of a computer system; and individual/group presentations develop technical communication skills.		
	كمثال: الاستراتيجية الرئيسية التي سيتم اتباعها في تدريس هذه الوحدة (المادة الدراسية) هي تشجيع الطلبة على المشاركة في التمارين، مع صقل مهارات التفكير النقدي لديهم وتوسيعها في الوقت نفسه. سيتحقق ذلك من خلال الفصول الدراسية، والدروس التفاعلية، ودراسة أنواع من التجارب البسيطة التي تتضمن بعض أنشطة المحاكاة التي تهم الطلبة.		
Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا			
Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	48	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	3.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	27	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.8
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75		

Module Evaluation تقييم المادة الدراسية				
	Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome



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كل وحدة ائتمانية = ٢٥ ساعة



Formative assessment	Quizzes	2	10% (10)	4 and 11	LO #1, #2 and #4, #5
	Assignments	2	10% (10)	5 and 13	LO #1, #3, #4 and #5
	Report	1	10% (10)	14	LO #2 and #6
	Midterm Exam	1	10% (10)	6	LO #1, #2 and #3
Summative assessment	Final Exam	3 hr / 1	50% (50)	16	All
	Final Exam				
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Chapter 1: Introduction & Overview
Week 2	Chapter 2: Algorithms and Design of the Common Fixed-Point Arithmetic Operations
Week 3	Chapter 2 (cont.)
Week 4	Chapter 2 (cont.)
Week 5	Chapter 2 (cont.)
Week 6	Mid Term Exam
Week 7	Chapter 3: Design of High-Speed CPU Components
Week 8	Chapter 3 (continue)
Week 9	Chapter 3 (continue)
Week 10	Chapter 3 (continue)
Week 11	Chapter 4: Real Number Representations
Week 12	Chapter 4 (cont.)
Week 13	Chapter 5: Floating-Point Algorithms and Implementation
Week 14	Chapter 6: Memory System Hierarchy (cont.)
Week 15	Chapter 6: Memory System Hierarchy (cont.)
Week 16	Preparatory week before the final Exam

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



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كل وحدة ائتمانية = ٢٥ ساعة



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

Learning and Teaching Resources مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	M. Rafiquzzaman, Fundamentals of Digital Logic and Microcomputer Design.	
Recommended Texts	M. Morris Mano, Computer System Architecture, 3rd Ed., Prentice Hall.	
Websites	https://www.geeksforgeeks.org/computer-organization-and-architecture-tutorials/	



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كل وحدة ائتمانية = ٢٥ ساعة



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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Electrical Machines IV		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL321				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGIII			Semester of Delivery
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Rabea Hadi Hassan		e-mail	rabia.h.h@uomisan.edu.iq	
Module Leader’s Academic Title		Lecturer	Module Leader’s Qualification		Ph.D
Module Tutor	Mohammed H. Lazim		e-mail	Mohammed.hasan@uomisan.edu.iq	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electrical machines I, II & III, Electrical Circuit I & II, Fundamental of EE I & II.	Semester	1,2,3,4,5
Co-requisites module	None	Semester	



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the basic principles of synchronous machines, including synchronous speed, excitation, the relation between rotor speed and generated frequency, and rotor/armature interaction. 2. Describe the construction of synchronous machines (salient and non-salient pole types) and their equivalent circuits. 3. Analyze the performance characteristics of synchronous machines using linear and nonlinear methods. 4. Calculate the voltage regulation of large synchronous machines from no-load and blocked-rotor tests using the MMF, EMF and Potier-triangle methods (cylindrical rotor) and two-reactance method (salient rotor). 5. Derive equations to calculate developed power and maximum power of synchronous machines. 6. Understand parallel operation of synchronous generators, synchronization conditions, and methods of connecting an alternator to an infinite busbar. 7. Understand the effect of changing rotor excitation, load, and prime-mover speed on synchronizing current and power. 8. Learn the starting methods for synchronous motors. 9. Understand the applications of cylindrical and salient-rotor generators and of the synchronous motor as a synchronous condenser. 10. Understand hunting effects, their causes, and the role of damper windings in generator and motor modes. 11. Analyse and troubleshoot synchronous-machine faults such as unbalanced voltages, rotor faults, stator faults and bearing failures. 12. Develop laboratory skills in performance testing, efficiency measurement and fault diagnosis of synchronous machines. 13. Communicate effectively the findings related to synchronous machines through written reports and oral presentations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the basic principles of synchronous machines (generators and motors) and the rotating-magnetic-field theory. 2. Learn the various types of synchronous generators and the appropriate application of each. 3. Determine the electrical parameters of the equivalent circuit of synchronous machines, including synchronous reactance, leakage reactance, armature resistance, generated emf and internal emf. 4. Realize the effect of armature reaction on internal emf. 5. Analyze the operation of synchronous machines and determine voltage regulation from no-load and blocked-rotor tests using the synchronous-impedance, MMF and Potier-triangle methods.



	6. Calculate developed power, power factor, losses, and torque, and how to obtain maximum torque. 7. Learn parallel operation of synchronous generators and the conditions/methods to connect an alternator to an infinite busbar. 8. Learn the starting methods of synchronous motors. 9. Discuss the effect of excitation on the power factor of a synchronous motor. 10. Know the appropriate applications of synchronous machines. 11. Realize the hunting effect in synchronous machines.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Synchronous Generator – Main constructional features of commutator and brushless excitation systems; generation of three-phase emf; production of rotating magnetic field; distribution and coil-span factors and emf equation; armature reaction on unity, lag and lead power factor; independent operation supplying a load; voltage regulation by the synchronous-impedance method; conditions of parallel operation; synchronizing an alternator (synchroscope method) with the busbars. Synchronous Motor – Principle of operation of the synchronous machine as a motor, starting methods; effect of change in excitation; causes of hunting and its prevention; rating and cooling of synchronous machines; application of the synchronous motor as a synchronous condenser.

Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies	As in Electrical Machines III, interactive lectures with animated multimedia introduce each synchronous-machine concept, reinforced by laboratory work (excitation tests, generated-EMF tests, voltage-regulation and load tests, V-curve studies) that lets students verify theoretical predictions on real synchronous generators and motors. Case studies and computer simulations connect parallel-operation and hunting phenomena to real power-plant practice.		
الإستراتيجيات			
Student Workload (SWL)			
الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem)	78	Structured SWL (hr/w)	5.1
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (hr/sem)	47	Unstructured SWL (hr/w)	3.1
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (hr/sem)	150		
الحمل الدراسي الكلي للطالب خلال الفصل			



Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Synchronous Machines (Alternators): Working principle, construction, salient and non-salient pole types, relation between speed and frequency.
Week 2	Equivalent circuit, phasor diagram, generated E.M.F equation, factors affecting the generated E.M.F and armature reaction equation.
Week 3	Voltage regulation, linear and non-linear analysis, M.M.F method (general method).
Week 4	E.M.F. method (synchronous impedance method), determination of leakage and armature reactance, Potier triangle method.
Week 5	Power stages, efficiency, and losses of synchronous generator, maximum developed torque of cylindrical rotor.
Week 6	Theory of salient-pole machines (two-reactance and general methods), E.M.F. method, slip test.
Week 7	Mid-term + torque and power equations of a synchronous generator of salient pole rotor.
Week 8	Parallel operation of synchronous generators, conditions for paralleling an alternator with infinite busbars, synchronization, methods of synchronization.
Week 9	Performance of generator connected to infinite busbar.



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كل وحدة ائتمانية = ٢٥ ساعة



Week 10	Synchronizing current, synchronizing power and torque, effect of unequal voltage, distribution of load and V-curves of synchronous generator.
Week 11	Effect of change of field excitation, effect of change in mechanical input.
Week 12	Synchronous motors: construction and working principle, phasor diagram and equivalent circuit.
Week 13	Starting methods, power stages, torque developed, and the efficiency of synchronous motor.
Week 14	Effect of excitation on armature current and power factor, V-curves of synchronous motors.
Week 15	Hunting of synchronous motor and finally synchronous condenser.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Working principle test of synchronous generator, types of excitations, configurations of the armature windings, and the equivalent circuit.
Week 2	Generated e.m.f test and relation between the speed of a prime mover and the generated frequency of a synchronous generator.
Week 3	Voltage regulation test, study the effect of armature reaction at different loads on a synchronous generator.
Week 4	Load test and determination the efficiency at various loads.
Week 5	Working principle test of synchronous motor, starting test of synchronous motors.
Week 6	Power factor of the synchronous motor and study of V-curves of the synchronous motor.
Week 7	Synchronous motor as a synchronous condenser and the applications of synchronous motor.

Learning and Teaching Resources مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	Theraja B.L., Theraja A.K., A Textbook of Electrical Technology, S. Chand, New Delhi, India.	Yes
Recommended Texts	Principles of Electrical Machines, V.K. Mehta, Rohit Mehta, S. Chand, India.	No
Websites		



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كل وحدة ائتمانية = ٢٥ ساعة



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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Power System II			Module Delivery	
Module Type	Core			☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	EL322				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGIII	Semester of Delivery		
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Ahmed Raisan Hussein		e-mail	Alhusseinahmed70@uomisan.edu.iq	
Module Leader's Academic Title		Assit. Professor	Module Leader's Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Power System I	Semester	5
Co-requisites module	None	Semester	



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Study the main parameters of transmission lines. 2. Design the optimal transmission line. 3. Enhance the performance of transmission lines. 4. Understand the distribution system. 5. Study the types of the distribution system. 6. Recognize the types of control system used in the power system.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the major parameters of a high-voltage transmission line. 2. Discuss resistance, inductance and capacitance in the transmission line. 3. Analyse the types of transmission line. 4. Discuss the performance of a transmission line based on its length/area. 5. Describe the distribution system. 6. Recognize the major types of distribution system.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Transmission Line Parameters – Line resistance, line inductance, single-phase line with multi-conductors, bundling, line inductance of three-phase transmission systems, single-phase and three-phase capacitance. [25 hrs] Electrical Characteristics of Overhead Transmission Lines – Representation of short, medium and long lines, equivalent circuit of a long transmission line, power-factor flow through a transmission line, power-circle diagram, line regulation, reactive compensation. [25 hrs] Distribution System Configuration – Various distribution-system circuit components, representation and parameters of radial, ring, spike, spindle, and interconnected systems. [20 hrs] Electrical Design of Distribution Systems – Voltage level, selecting system components (transformers, cables, overhead lines, switching and protective gear), voltage-drop and power-loss calculations, economic considerations. [20 hrs] Distribution Inside Large Buildings – Single rising mains, individual floor supply, ring supply, double-feed and grouped supply, vertical and horizontal supply systems, main/sub-main/final distribution boards. [15 hrs] Industrial Power Distribution – Special features, equipment layout, cable trenches and trays, grounding, emergency power supply. [10 hrs]



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Continuing directly from Power System I, the module covers transmission-line parameters and electrical characteristics before moving to distribution-system configuration and design, and finally industrial power distribution. Interactive tutorials work through the same style of numerical examples (line inductance/capacitance, voltage-drop and power-loss calculations) used in the first course, extending them to distribution-level design.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	62	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	4.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري



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كل وحدة ائتمانية = ٢٥ ساعة



	Material Covered
Week 1	Line resistance, line inductance, single-phase line with multi-conductors, bundling
Week 2	Line inductance of three-phase transmission systems
Week 3	Single-phase and three-phase capacitance.
Week 4	Representation of lines, short, medium, long T.L.
Week 5	The equivalent circuit of a long transmission line
Week 6	Power factor flow through a transmission line
Week 7	Power circle diagram, line regulation, reactive compensation of transmission line
Week 8	Various distribution system circuit components
Week 9	Representation and parameters radial, ring, spike, spindle, and interconnected systems
Week 10	Voltage level, selecting various system components, transformers, cables, overhead lines
Week 11	Voltage drop & power loss calculations, economic considerations.
Week 12	Single rising mains, individual floor supply, ring supply, double feed and grouped supply
Week 13	Vertical and horizontal supply systems, main, sub main, and final distribution boards
Week 14	Special features, equipment layout, cable trenches, cable trays
Week 15	Grounding, emergency power supply
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
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كل وحدة ائتمانية = ٢٥ ساعة



	Text	Available in the Library?
Required Texts	V. K. Mehta and Rohit, Principles of Power System, S. Chand, 2005.	
Recommended Texts	Stevenson W.D., Power Systems: Analysis and Design, McGraw-Hill, 1994; Hadi Saadat, Power System Analysis, Tata McGraw-Hill, 2002; T.K. Nagsarkar, Power System Analysis, Oxford University Press, 2014.	
Websites		

Grading Scheme مخطط الدرجات				
Group	Grade	التقدير	Marks %	Definition
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks with 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. ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.				



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Communication II			Module Delivery	
Module Type	Core			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	EL323				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		UGIII	Semester of Delivery		
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Thaar Abdalraheem kareem		e-mail	thaar_kareem@uomisan.edu.iq	
Module Leader’s Academic Title		Assist. Professor	Module Leader’s Qualification		Ph.D.
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Communication I (EL313)		Semester 5
Co-requisites module	None		Semester



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Explore the concept of the sampling theorem. 2. Learn about various techniques of pulse modulation (PAM, PWM, PPM). 3. Understand signal-multiplexing techniques like FDM and TDM. 4. Study the theory behind demodulation techniques for recovering the original message signal from modulated signals. 5. Cover pulse code modulation (PCM), its types and applications. 6. Understand delta modulation (DM), its types and applications. 7. Perform signalling format and sinusoidal digital modulation. 8. Understand transmission-line concepts.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Discuss the Nyquist sampling theorem. 2. Analyze the process of sampling in time and frequency domains. 3. Summarize what is meant by pulse modulation. 4. Describe PAM, PWM and PPM. 5. Identify the generation and detection of pulse modulation. 6. Discuss signal formatting. 7. Explain sinusoidal digital modulation. 8. Identify the characteristics of transmission-line concepts.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Digital Communication – Nyquist sampling theorem, pulse modulation PAM, PWM, PPM, time division multiplexing (TDM). [10 hrs] Noise in Pulse Modulation – Pulse code modulation PCM/TDM, delta modulation (DM), quantization noise in PCM and DM. [15 hrs] Signalling and Digital Modulation – Signalling format (unipolar, bipolar, and split-phase Manchester), sinusoidal digital modulation ASK, PSK, FSK, noise in ASK/PSK/FSK (error probability using coherent matched-filter and noncoherent detection). [15 hrs] Transmission Line – Equivalent circuit, characteristic impedance, phase velocity, reflection coefficient, standing wave, quarter-wave transformer, Smith-chart calculation and stub matching. [15 hrs]



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Building directly on Communication I, the module moves from sampling and pulse modulation through digital signaling formats to transmission-line theory, with lab sessions (signal analysis, AM/FM modulation and demodulation) reinforcing the analog foundation before the digital-communication topics are introduced. Interactive tutorials work through noise and error-probability calculations for each digital modulation scheme covered.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (hr/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	-	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	-	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Lab.	-	10% (10)	Continuous	All
	Report	-	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	-	10% (10)	7	LO #1 - #7
	Final Exam	-	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
بكالوريوس في الهندسة الكهربائية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



	Material Covered
Week 1	Sampling theorem
Week 2	Pulse modulation PAM
Week 3	Pulse modulation PWM AND PPM
Week 4	Signal multiplexing TDM and FDM
Week 5	Pulse code modulation PCM
Week 6	Data modulation (DM)
Week 7	Midterm
Week 8	Signaling format (unipolar, bipolar, and split-phase Manchester)
Week 9	Quantization noise in PCM and DM
Week 10	Sinusoidal digital modulation ASK, PSK, FSK
Week 11	Noise in ASK, PSK, FSK
Week 12	Transmission line: Equivalent circuit
Week 13	Characteristic impedance, phase velocity
Week 14	Reflection coefficient, standing wave, quarter-wave transformer
Week 15	Smith chart calculation and stub matching.
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Signal analysis
Week 2	AM modulation
Week 3	AM demodulation
Week 4	FM modulation
Week 5	FM demodulation
Week 6	Analysis of sampling theorem
Week 7	

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
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جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
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كل وحدة ائتمانية = ٢٥ ساعة



Required Texts	Modern Digital and Analog Communication Systems, B.P. Lathi.	
Recommended Texts	Communication Systems, A. B. Carlson.	
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 with 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. ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.				



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Numerical Analysis II		Module Delivery		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar		
Module Code	EL324				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		UGIII			Semester of Delivery
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Mohammed Hassooni Jasim		e-mail	mohammedhasson30@uomisan.edu.iq	
Module Leader's Academic Title		Assistant Lecturer	Module Leader's Qualification		MSc.
Module Tutor	Murtadha Saeed Mohammed		e-mail	murtadha.saeed@uomisan.edu.iq	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the principles and techniques of Numerical Analysis II. 2. Develop skills in applying mathematical and computational methods to solve numerical engineering problems. 3. Develop problem-solving skills and understanding of the solution of nonlinear equations. 4. Understand the solving of sets of linear equations. 5. Learn how to analyze numerical-interpolation problems. 6. Develop a strong foundation for the solution of differential equations using numerical methods.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Design and optimize engineering systems, considering factors such as efficiency, safety, and sustainability. 2. Apply the finite-difference method, Lagrange's interpolation, and Newton's interpolation. 3. Analyze nonlinear equations and their applications. 4. Evaluate the accuracy, stability, and convergence of numerical methods used in engineering analysis. 5. Design and optimize engineering systems by integrating engineering principles with numerical-analysis methods. 6. Perform the solution of differential equations using numerical analysis. 7. Communicate numerical-analysis concepts and results effectively through written reports and presentations.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Numerical Solutions of Nonlinear Equations – Why numerical methods, solution of non-linear equations (roots finding): graphical method, bisection method, method of iteration, Newton's method, the secant method. [12 hrs] Numerical Solutions of Linear System Equations – Matrix notation, Gaussian elimination, evaluation of the inverse of a matrix, matrix-inverse method, LU factorization, Gauss-Seidel iteration, eigenvalues and eigenvectors, solving sets of nonlinear equations. [15 hrs] Numerical Differentiation & Interpolation – Finite-difference method (forward, backward, divided difference), polynomial interpolation (linear, quadratic, higher-degree, Lagrange's, Newton's), error in polynomial interpolation. [15 hrs] Numerical Integration – Derivatives from interpolating polynomials, trapezoidal and Simpson's rules for numerical integration. [10 hrs] Numerical Solutions of Ordinary Differential Equations – Euler method, modified Euler method, Runge-Kutta methods. [8 hrs]



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Class lectures and tutorials introduce each numerical method (root-finding, linear-system solution, interpolation, integration, ODE solvers) followed by collaborative group work on exercises and assignments, so students practice the same algorithm they just learned before moving to the next technique.
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Student Workload (SWL)

الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (hr/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (hr/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	-	10% (10)	5 and 10	LO #1, #2 and #10, #11
	Assignments	-	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	-	10% (10)	Continuous	All
	Report	-	10% (10)	13	LO #5, #8 and #10
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
بكالوريوس في الهندسة الكهربائية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



	Material Covered
Week 1	Introduction, Solution of non-linear equations (roots finding): graphical method, bisection method
Week 2	Solving Nonlinear Equation by method of iteration, Newton's method
Week 3	Solving Nonlinear Equation by the secant method
Week 4	Matrix notation, Gaussian elimination method
Week 5	Gauss-Seidel iteration method, Gauss-Jordan Elimination Method
Week 6	Evaluation of the inverse of a matrix, matrix inverse method, LU factorization method
Week 7	Mid-term + Eigenvalue and Eigenvectors. Methods of evaluation matrix function.
Week 8	Finite Difference Method: Forward difference
Week 9	Finite Difference Method: Backward & Divided difference
Week 10	Polynomial interpolation, linear interpolation, quadratic interpolation, higher degree interpolation (Lagrange's interpolation)
Week 11	Newton's Interpolation, error in polynomial interpolation.
Week 12	Derivatives from interpolating polynomials, trapezoidal rules for numerical integration
Week 13	Simpson's rules for numerical integration
Week 14	Initial value problems by Euler and modified Euler Method
Week 15	4th order Runge-Kutta Methods
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
بكالوريوس في الهندسة الكهربائية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	Advanced Engineering Mathematics, Erwin Kreyszig.	Available
Recommended Texts	Advanced Engineering Mathematics, Dennis G. Zill; Principles of Mathematical Analysis, Walter Rudin.	Available
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 with 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. ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.				



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Electronics V		Module Delivery		
Module Type	Core		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☒ Seminar		
Module Code	EL325				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		UGIII			Semester of Delivery
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Ruqaya Majeed Kareem		e-mail	enghre.2203@uomisan.edu.iq	
Module Leader’s Academic Title		Assist. Lecturer	Module Leader’s Qualification		M.Sc.
Module Tutor			e-mail		
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number		1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electronics II	Semester	Four
Co-requisites module	Electronics III	Semester	Five



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the principles and applications of oscillators in electronics. 2. Grasp feedback-oscillator concepts, including positive feedback and the conditions for oscillation. 3. Learn about RC and LC oscillators, including Wien-Bridge, Phase-Shift, Twin-T, Colpitts, Clapp, Hartley, Armstrong, and Crystal-Controlled Oscillators. 4. Acquire knowledge of relaxation oscillators and different waveform-generation techniques. 5. Gain a comprehensive understanding of voltage regulation, including line and load regulation. 6. Learn about linear series, linear shunt, and switching voltage regulators. 7. Study switching-regulator configurations: step-down, step-up, and voltage-inverter. 8. Understand multivibrators: monostable, astable, and bistable circuits. 9. Get familiarized with multivibrator circuits using gates and transistors. 10. Learn about the IC 555 timer and its monostable and astable operations.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain the basic concepts and operations of oscillators. 2. Describe the purpose and function of feedback oscillators. 3. Distinguish between different types of RC and LC oscillators and explain their operational principles. 4. Design and analyze circuits for different types of oscillators, including relaxation oscillators. 5. Describe the principles of voltage regulation, including line and load regulation. 6. Distinguish between series, shunt, and switching voltage regulators. 7. Design and analyze circuits for different voltage-regulator configurations. 8. Describe the principles of multivibrators and explain monostable, astable, and bistable operation. 9. Analyze and design multivibrator circuits using gates and transistors. 10. Explain the functioning of the IC 555 timer in different modes and design relevant circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Oscillators – The oscillator, feedback oscillator, RC oscillators, LC oscillators, relaxation oscillators. [15 Hours] Voltage Regulators – Voltage regulation, basic linear series regulators, basic linear shunt regulator, basic switching regulators. [15 Hours] Timing Circuits – Multivibrator, monostable/astable/bistable multivibrator circuits, Schmitt trigger, the IC 555 timer (monostable and astable operation). [12 Hours]



Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Lectures deliver fundamental oscillator, regulator and timing-circuit theory, followed by instructor demonstrations of each circuit type and online circuit-simulation tools that let students visualize waveforms before building the circuits themselves. Group projects, quizzes and discussion sessions reinforce the material throughout the semester.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	48	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	27	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.8
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Theoretical Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
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جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
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كل وحدة ائتمانية = ٢٥ ساعة



Week 1	1.1 The Oscillator; 1.2 Feedback Oscillator - Positive Feedback, Conditions for Oscillation
Week 2	1.3 RC Oscillators - Wien-Bridge, Phase-Shift, Twin-T Oscillator
Week 3	1.4 LC Oscillators - Colpitts, Clapp, Hartley, Armstrong, Crystal-Controlled Oscillator
Week 4	1.5 Relaxation Oscillators - Triangular-Wave, Sawtooth VCO, Square-Wave Oscillator
Week 5	Quiz
Week 6	Chapter Two: Voltage Regulators - 2.1 Voltage Regulation: Line and Load Regulation
Week 7	2.3 Basic Linear Shunt Regulators
Week 8	2.4 Basic Switching Regulators - Step-Down, Step-Up, Voltage-Inverter Configuration
Week 9	Midterm Exam
Week 10	Chapter Three: Timing Circuits - 3.1 Multivibrator: Monostable Multivibrator Circuits (NAND/NOT Gate)
Week 11	3.1.1.3 NOR Gate Monostable; 3.1.1.4 Monostable Multivibrator Using Transistors
Week 12	3.1.2 Astable Multivibrator Circuits (NAND Gate, NPN Transistors, Switching Times/Frequency); 3.1.3 Bistable Multivibrator - Schmitt Trigger
Week 13	3.2 The IC 555 Timer - 3.2.1 Monostable Operation
Week 14	3.2.2 Astable Operation
Week 15	Quiz
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources



جمهورية العراق - وزارة التعليم العالي والبحث العلمي
جامعة ميسان
بكالوريوس في الهندسة الكهربائية (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	Robert L. Boylestad, Electronic Devices and Circuit Theory, 11th Edition, Pearson Education Limited, 2015.	Yes
Recommended Texts	Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson Education Limited, 2015.	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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Control II			Module Delivery	
Module Type	Core			☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	EL326				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		UGIII	Semester of Delivery		
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Sadeq Duair Aneed Al-Majidi		e-mail	sadeqalmajidi@uomisan.edu.iq	
Module Leader’s Academic Title		Assist. Prof	Module Leader’s Qualification		Ph.D
Module Tutor	Name (if available)		e-mail	E-mail	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		21/09/2025	Version Number	1.0	

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



Module Objectives, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the fundamental concepts of control theory. 2. Analyze linear control systems. 3. Design and evaluate control systems. 4. Apply control theory to practical systems. 5. Understand advanced control techniques. 6. Simulate and analyze control systems. 7. Evaluate stability and performance. 8. Solve control-system design problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Frequency Response Techniques: define/plot frequency response, sketch Nyquist diagrams, use the Nyquist criterion, find gain/phase margins, relate open- and closed-loop responses, and find bandwidth and time-response parameters. 2. Design via Frequency Response: use frequency-response techniques to adjust gain and design cascade compensators for steady-state and transient specifications. 3. State-Space Analysis: find a state-space representation for a linear time-invariant system; model electrical/mechanical systems; convert between transfer function and state space; linearize a state-space representation. 4. Design via State Space: design state-feedback controllers and observers using pole placement; determine controllability and observability; design steady-state error characteristics in state space. 5. PID Control Design: apply Ziegler-Nichols tuning rules; design PID controllers via frequency-response and computational-optimization approaches; apply two-degrees-of-freedom control and zero-placement. 6. Robust Control Systems: appreciate robustness in control-system design; understand uncertainty models (additive, multiplicative, parameter); apply root-locus, frequency-response, ITAE, internal-model and pseudo-quantitative feedback methods.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Frequency Response Techniques – Bode plots, the Nyquist criterion, sketching and stability via the Nyquist diagram, gain/phase margin via Nyquist and Bode plots, relations between closed-loop transient and frequency responses, steady-state error from frequency response, systems with time delay. Design via Frequency Response – Transient response via gain adjustment, lag compensation, lead compensation, lag-lead compensation. State Space Analysis – Introduction, the general state-space representation, converting between transfer function and state space, linearization. Design via State Space – Controller design and controllability, observer design and observability, steady-state error design via integral control.



	PID Control Design – Ziegler-Nichols tuning rules, PID design with frequency-response and computational-optimization approaches, modifications of PID schemes, two-degrees-of-freedom control, zero-placement approach. Robust Control Systems – System sensitivity, analysis of robustness, systems with uncertain parameters, design of robust and robust-PID control systems, robust internal-model control, pseudo-quantitative feedback.
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Continuing the active-learning approach of Control I, the module moves from frequency-response techniques (Bode, Nyquist) through state-space modeling and design to PID tuning and robust control, with each topic built through discussion, case studies and simulation tools. Formative quizzes and reports check understanding at each stage before the module culminates in robust-control design examples.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	48	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	3.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	27	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.8
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6 and 12	LO #1-#6
	Assignments	4	10% (10)	3, 6, 9, 12	LO #1-#6
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #1-#6
	Midterm Exam	2hr	10% (10)	7	LO #1, #2, #3



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

Delivery Plan (Theoretical Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	FREQUENCY RESPONSE TECHNIQUES - Introduction, Asymptotic Approximations: Bode Plots, Introduction to the Nyquist Criterion, Sketching the Nyquist Diagram
Week 2	FREQUENCY RESPONSE TECHNIQUES - Gain Margin and Phase Margin via the Nyquist Diagram, Stability/Gain/Phase Margin via Bode Plots
Week 3	FREQUENCY RESPONSE TECHNIQUES - Stability via the Nyquist Diagram, Relations Between Closed/Open-Loop Responses, Steady-State Error from Frequency Response, Systems with Time Delay
Week 4	DESIGN VIA FREQUENCY RESPONSE - Transient Response via Gain Adjustment, Lag/Lead/Lag-Lead Compensation
Week 5	STATE SPACE ANALYSIS - Introduction, Some Observations, The General State-Space Representation, Applying the State-Space Representation
Week 6	STATE SPACE ANALYSIS - Converting a Transfer Function to State Space, Converting from State Space to a Transfer Function, Linearization
Week 7	Mid Term
Week 8	DESIGN VIA STATE SPACE - Introduction, Controller Design, Controllability, Alternative Approaches to Controller Design
Week 9	DESIGN VIA STATE SPACE - Observer Design, Observability, Alternative Approaches to Observer Design, Steady-State Error Design via Integral Control
Week 10	PID Control Design - Introduction, Ziegler-Nichols Rules for Tuning PID Controllers
Week 11	PID Control Design - Frequency-Response Approach, Computational Optimization Approach, Modifications of PID Control Schemes
Week 12	PID Control Design - Two-Degrees-of-Freedom Control, Zero-Placement Approach to Improve Response Characteristics



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Week 13	Robust Control Systems - Introduction, Robust Control Systems and System Sensitivity, Analysis of Robustness
Week 14	Robust Control Systems - Systems with Uncertain Parameters, Design of Robust Control Systems, Design of Robust PID-Controlled Systems
Week 15	Robust Control Systems - The Robust Internal Model Control System, Design Examples, The Pseudo-Quantitative Feedback System
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Control Systems Engineering, Norman S. Nise; Modern Control Engineering, 5th Edition, K. Ogata.	Yes
Recommended Texts	Modern Control Systems, Richard C. Dorf & Robert H. Bishop.	Yes
Websites		



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كل وحدة ائتمانية = ٢٥ ساعة



Grading Scheme

مخطط الدرجات

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

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امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Antennas			Module Delivery	
Module Type	Core			☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	EL327				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level		UGIII	Semester of Delivery		
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Ali Adnan Mohammed		e-mail	Eng.a.moc@gmail.com	
Module Leader's Academic Title		Assistant Lecturer	Module Leader's Qualification		M.Sc.
Module Tutor	Ali Adnan Mohammed		e-mail	Eng.a.moc@gmail.com	
Peer Reviewer Name		Name	e-mail	E-mail	
Scientific Committee Approval Date		-	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Wave Propagation (EL317)	Semester	4
Co-requisites module	None	Semester	



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Understand the basic principles and concepts of antennas, including radiation mechanisms, antenna parameters, and fundamental antenna types. 2. Learn about radiation patterns, antenna gain, directivity, beamwidth, and polarization for dipole, loop and patch antennas. 3. Understand the principles and design of antenna arrays, including array configurations, beamforming, and array-factor analysis. 4. Explore broadband and frequency-selective antennas such as log-periodic and microstrip antennas. 5. Study specialized antenna topics such as phased-array, smart, conformal, and microstrip patch antennas.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Characterize the radiation of an antenna in terms of radiation pattern, directivity, beamwidth, and radiation resistance. 2. Calculate the electric and magnetic fields radiated by dipole and loop antennas and their radiation characteristics. 3. Understand the operating principle of aperture antennas, including slot antennas, open waveguides, and horn antennas. 4. Formulate the array factor and total radiation pattern of N-element antenna arrays. 5. Select a particular class of antenna for given specifications, based on a sound understanding of operating principles and performance parameters.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Antennas – Definition, the radio spectrum, historical perspective, Hertz radio system, basic antenna types and radiation mechanism. [3 hr.] Fundamental Parameters of Antennas – Radiation pattern, beam solid angle, directivity, gain, input impedance, polarization, bandwidth, reciprocity, effective aperture and other antenna equivalent areas. [12 hr.] Wire Antennas – Short dipole, radiation resistance, directivity, finite-length dipole, half-wave dipole antenna, monopole antenna. [6 hr.] Small Loop Antenna – Small circular loop, radiated fields, small loop and infinitesimal magnetic dipole, power density and radiation resistance, near-field region, radiation intensity and directivity. [3 hr.] Aperture Antennas – Current sheets, apertures, slot antennas, open waveguide, horn antennas. [3 hr.] Array Antennas – Linear arrays, pattern multiplication, two-element array, uniform array antennas. [6 hr.]



	Reflector Antennas – Plane reflector, corner reflector, other corner reflectors, parabolic reflector, front-fed parabolic reflector. [3 hr.] Special Antennas – Monopole and dipole antennas, long-wire antenna, V antenna, rhombic antenna, Yagi-Uda array, turnstile, batwing, super-turnstile, helical, biconical, log-periodic dipole array, spiral antenna, microstrip patch antenna. [6 hr.]
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Learning and Teaching Strategies			
استراتيجيات التعلم والتعليم			
Strategies	The module builds antenna theory layer by layer: fundamental radiation parameters are introduced first, then applied to progressively more complex antenna types (wire, loop, aperture, array, reflector, and specialized antennas). Interactive tutorials encourage active participation in solving antenna-parameter problems, connecting each new antenna type back to the fundamental parameters covered at the start.		
الإستراتيجيات			
Student Workload (SWL)			
الحمل الدراسي للطالب محسوب ل ١٥ اسبوعا			
Structured SWL (hr/sem)	33	Structured SWL (hr/w)	2.1
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (hr/sem)	17	Unstructured SWL (hr/w)	1.1
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (hr/sem)	50		
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	15% (15)	5, 10	LO #1, 2 and LO #11
	Assignments	2	15% (15)	4, 15	LO #5, 6 and LO #8, 9
	Projects	-	-	-	-
	Report	1	10% (10)	15	LO #14 and 15
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO #1 to 7
	Final Exam	3hr	50% (50)	16	All



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Total assessment	100% (100 Marks)		
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Delivery Plan (Theoretical Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Antennas: Definition, The Radio Spectrum, Historical Perspective, Hertz Radio System, Basic Antenna Types and Radiation Mechanism.
Week 2	Fundamental Parameters of Antennas: Radiation Pattern, Beam Solid Angle, Directivity, Gain.
Week 3	Fundamental Parameters of Antennas: Input Impedance, Polarization, Bandwidth.
Week 4	Fundamental Parameters of Antennas: Antenna effective area, relationship between directivity and antenna effective area.
Week 5	Fundamental Parameters of Antennas: Relationship between directivity and antenna effective area, as well as other antenna equivalent areas.
Week 6	Wire Antennas: Short Dipole, Radiation Resistance, Directivity.
Week 7	Wire Antennas: Finite length dipole, Half-wave Dipole Antenna, Monopole Antenna.
Week 8	Midterm Exam
Week 9	Small Loop Antenna: Small circular loop, Radiated Fields, Small Loop and Infinitesimal Magnetic Dipole, Power Density and Radiation Resistance, Near-Field Region, Radiation Intensity and Directivity.
Week 10	Aperture Antennas: Current Sheets, Apertures, Slot Antennas, Open WG, Horn Antennas.
Week 11	Array Antennas: Linear Arrays, Pattern Multiplication, Two-element Array.
Week 12	Array Antennas: Uniform Array Antennas.
Week 13	Reflector Antennas: Plane reflector, Corner reflector, Other corner reflectors, Parabolic reflector.
Week 14	Special Antennas: Monopole and Dipole Antennas, Long Wire Antenna.
Week 15	Microstrip Patch Antenna.
Week 16	Preparatory week before the final Exam

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



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

Learning and Teaching Resources

مصادر التعليم والتعلم

	Text	Available in the Library?
Required Texts	Balanis, C., Antenna Theory: Analysis and Design, Wiley, 4th Ed., 2016.	
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

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كل وحدة ائتمانية = ٢٥ ساعة



امسح الكود للوصول إلى النسخة الإلكترونية



MODULE DESCRIPTION CATALOGUE

وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	Computer Networks			Module Delivery	
Module Type	Core			☒ Theory ☒ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	EL328				
ECTS Credits	4				
SWL (hr/sem)	100				
Module Level		UGIII	Semester of Delivery		
Administering Department		Electrical Engineering Dep.	College	Engineering	
Module Leader	Huda Ismail Olewi		e-mail	hudaismail@uomisan.edu.iq	
Module Leader's Academic Title		Lecturer	Module Leader's Qualification		MSc.
Module Tutor	Huda Ismail Olewi		e-mail	hudaismail@uomisan.edu.iq	
Peer Reviewer Name		Huda Ismail Olewi	e-mail	hudaismail@uomisan.edu.iq	
Scientific Committee Approval Date		-	Version Number	1.0	

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



Module Objectives, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ومخرجات تعلمها ومحتوياتها الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Fundamental Network Concepts: understand the purposes of computer networks, common applications, and basic communication models. 2. Network Types and Transmission Modes: distinguish between network types (LAN, MAN, WAN, PAN) and transmission modes (simplex, half-duplex, full-duplex). 3. Protocols and Standards: understand the role of protocols and standards in enabling communication between devices. 4. Communication Models: learn the OSI model layers and their functions, and relate them to the TCP/IP protocol suite. 5. Data Transport and Multiplexing: explore transport-layer protocols (TCP vs UDP), including segmentation, sequence/acknowledgment numbers, reliable communication, and multiplexing/demultiplexing. 6. Addressing and Network Layer: understand logical and physical addressing, IPv4 addressing, subnetting, network masks, and switching techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain networking concepts, communication models, and transmission modes. 2. Classify LAN, MAN, WAN, and PAN. 3. Describe protocols, standards, the OSI and TCP/IP models. 4. Understand, configure, and troubleshoot IP addressing, subnetting, and network masks. 5. Explain TCP and UDP protocols and their functions. 6. Apply multiplexing/demultiplexing and understand network-layer functions, switching, and the Internet Protocol.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Computer Networks – Applications of computer networks, network criteria, basic communication model, transmission modes, and classification of computer networks. Transmission Modes and Network Classification – Simplex, half-duplex, full-duplex; classification of computer networks: LAN, MAN, WAN, PAN. Protocols, Standards and Network Models – Protocols and standards in networking; the OSI model (physical, data-link, network, transport, session, presentation, application layers); the TCP/IP protocol suite. Addressing and Transport Layer – Addressing; transport-layer protocol; multiplexing and demultiplexing; connection-oriented transport (TCP), TCP segment structure, sequence/acknowledgment numbers, round-trip time; connectionless transport (UDP), UDP segment structure and checksum.



Network Layer – Switching, the Internet Protocol (IP), IPv4 addresses and address classes, netid and hostid, network masks and subnetting.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies الإستراتيجيات	Interactive lectures deliver theoretical networking concepts, immediately reinforced by practical labs and simulations using Cisco Packet Tracer to configure real network topologies, VLANs, and subnetting schemes. Group discussions, homework on protocol analysis and addressing, and team-based network-design projects give students a hands-on path from OSI-model theory to a working simulated network.
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا

Structured SWL (hr/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	63	Structured SWL (hr/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	4.1
Unstructured SWL (hr/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	37	Unstructured SWL (hr/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	3.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

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



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أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة ائتمانية
كل وحدة ائتمانية = ٢٥ ساعة



Total assessment	100% (100 Marks)		
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Delivery Plan (Theoretical Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to computer networks
Week 2	Network Criteria, Basic Communication Model, and Modes in Computer Networks, and Classification of Computer Network (Network Topology.)
Week 3	Classification of Computer Network (Network Architectures & Scale), Protocols and Standards in Networking
Week 4	Computer Network Model OSI Model, Physical Layer, Data Link Layer, and Network layer
Week 5	Computer Network Model OSI Model - Transport Layer, Session Layer, Presentation Layer, and Application Layer
Week 6	Mid Term Exam
Week 7	TCP/IP Protocol Suite, Addressing
Week 8	Transport Layer Protocol, Multiplexing and Demultiplexing
Week 9	Connection-Oriented Transport Protocol (TCP), TCP Segment Structure, Sequence Numbers and Acknowledgment Numbers, and Round-Trip Time and Propagation Time
Week 10	Connectionless Transport: User Datagram Protocol (UDP), UDP Segment Structure, UDP Checksum
Week 11	Network Layer, Switching, Circuit Switching and Packet Switching Networks, Internet Protocol (IP), IPv4 Addresses
Week 12	IPv4 address classes, IPv4 address types, Netid and Hostid
Week 13	Netid and Hostid (Cont.)
Week 14	Network Masks, Subnetting
Week 15	Subnetting (Cont.)
Week 16	Preparatory week before the final Exam

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



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Week 1	Introduction to Packet Tracer: Installation, Interface Overview, and Basic Device Configuration
Week 2	Design and Configuration of Two LANs Connected via Cisco Routers
Week 3	VLAN Configuration and Network Segmentation Using Cisco Packet Tracer
Week 4	Inter-VLAN Routing and Connectivity Testing
Week 5	TCP and UDP Communication Simulation
Week 6	IP Addressing, Subnetting, and Static Routing
Week 7	Term Exam

Learning and Teaching Resources مصادر التعليم والتعلم		
	Text	Available in the Library?
Required Texts	Kurose, J. F., & Ross, K. W., Computer Networking: A Top-Down Approach, 7th Edition, Pearson, 2017.	
Recommended Texts	Tanenbaum, A. S., & Wetherall, D. J., Computer Networks, 5th Edition, Prentice Hall, 2011.	
Websites		



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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 with 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.

ملاحظة: سيتم تقريب العلامات العشرية التي تزيد أو تقل عن ٠.٥ إلى العلامة الكاملة الأعلى أو الأدنى (على سبيل المثال، سيتم تقريب علامة ٥٤.٥ إلى ٥٥، بينما سيتم تقريب علامة ٥٤.٤ إلى ٥٤). لدى الجامعة سياسة لا تسمح بـ "حالات الرسوب القريبة من النجاح"، لذا فإن التعديل الوحيد للعلامات الممنوحة من قبل المصححين الأصليين سيكون التقريب التلقائي الموضح أعلاه.



امسح الكود للوصول إلى النسخة الإلكترونية