MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2">Basics of Electrical Engineering I</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Core</td><td rowspan="4">☒ Theory
☐ Lecture
☒ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">UoM221EE101</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">8</td></tr>
<tr><td>SWL (hr./sem)</td><td colspan="2" align="center">200</td></tr>
<tr><td>Module Level</td><td align="center">1</td><td>Semester of Delivery</td><td>1</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td>UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>اسم رئيس القسم</td><td>e-mail</td><td>البريد الالكتروني لرئيس القسم</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>لقبه العلمي</td><td>Module Leader's Qualification</td><td>الشهادة</td></tr>
<tr><td>Module Tutor</td><td>Dr. Omar Muwafaq Mahmood</td><td>e-mail</td><td>omer_alyousif@uomosul.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td>بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents
	أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of DC circuit theory through the application of techniques. 2. To understand voltage, current and power from a given DC circuit. 3. This course deals with the basic concept of DC electrical circuits. 4. This is the basic subject for all DC electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis. 7. To perform Thevenin and superposition theory.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Describe electrical voltage, current and power. 5. Define Ohm's law. 6. Identify the basic circuit passive and active elements and their applications. 7. Discuss the various properties of resistors. 8. Explain the two Kirchhoff's laws used in circuit analysis. 9. Explain the Analysis Methods used in Electrical Circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Circuit Components and values** DC circuits, Current and voltage definitions, Passive sign convention and circuit elements, Resistive networks, real and ideal elements, voltage and current sources. [9 hrs.] Lab. [6 hrs.] Revision problem and tutorial classes [6 hrs.] Quizzes [1 hr.] **Part B- Circuit reduction** combining sources, Combining resistive elements in series and parallel, delta and star transformation. [12 hrs.] Revision problem and tutorial classes [8 hrs.] Lab. [8 hrs.] Quizzes [1 hr.] **Part C- Circuit Theory** Kirchhoff's laws and Ohm's law. Introduction to mesh and nodal analysis, Introduction to Thevenin and Norton theory, maximum power transfer, introduction to superposition theory. [24 hrs.] Revision problem and tutorial classes [16 hrs.] Lab. [16 hrs.] Quizzes [1 hr.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	123	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	4,8,12	LO #1, 5, 8 and 9
	Assignments	10	5% (5)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
	Projects / Lab.	2	25% (25)	Continuous	All
	Report	0	0% (0)	----	----
Summative assessment	Midterm Exam	2 hr.	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic Concept & Units: Electricity & atomic structure of substance, current and current density, current flow, electric circuit, E.M. F& potential difference
Week 2	international system of unit, abbreviation for multiples & sub-multiples, quantities derived from SI units, units of force-energy-torque and power, relation between energy and heat, electric units, efficiency & percentage efficiency, electromechanical equivalent of element
Week 3	Ohm's law, resistivity & conductivity
Week 4	temperature affect, internal resistance of a source, open circuit & short circuit
Week 5	equivalent resistance: Series-parallel-circulating current method-floating source method & grouping of E.M.F. sources, double subscript
Week 6	power calculation in D.C circuit
Week 7	Kirchhoff's laws: KVL-KCL
Week 8	Mid-term Exam
Week 9	introduction to network theorems, types of source: independent and dependent voltage and current sources and their transformation
Week 10	Maxwell's circulating currents (mesh analysis)
Week 11	nodal analysis
Week 12	superposition theorem
Week 13	Thevenin's theorem and Norton's theorem
Week 14	maximum power transfer theorem
Week 15	millman theorem, substitution theorem and reciprocity theorem
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to lab. components
Week 2	Lab 2: Introduction to AVO meter (analog and digital)
Week 3	Lab 3: Introduction to resistance measurements (practical and color code)
Week 4	Lab 4: resistance temperature affect, internal resistance of a source, open circuit & short circuit
Week 5	Lab 5: ohm's Law
Week 6	Lab 6: series and parallel resistance
Week 7	Lab 7: resistance delta and star transformation
Week 8	Lab 8: Kirchhoff's Voltage Law
Week 9	Lab 9: Kirchhoff's Current Law
Week 10	Lab 10: implementation of Maxwell's circulating currents (mesh analysis)
Week 11	Lab 11: implementation of Nodal analysis
Week 12	Lab 12: implementation of Superposition theorem
Week 13	Lab 13: implementation of Thevenin's / Norton's Theorem
Week 14	Lab 14: implementation of maximum power transfer theorem
Week 15	Lab 15: DC power measurements (methods and instrumentations)

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Circuit Analysis 7th Edition by William Hayt , Jack Kemmerly , Steven Durbin	Yes
Recommended Texts	Schaum's Outline of Basic Circuit Analysis, Second Edition (Schaum's Outlines) 2nd Edition, by John O'Malley	No
Websites	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2017.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**Mathematics I**	Module Delivery	
Module Type	**Basic**	☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**EE102**		
ECTS Credits	**6**		
SWL (hr./sem)	**150**		
Module Level	1	**Semester of Delivery**	1
Administering Department	2 - (Electrical Engineering)	**College**	UoM2 - (Engineering)
Module Leader	اسم رئيس القسم	**e-mail**	البريد الالكتروني لرئيس القسم
Module Leader's Acad. Title	لقبه العلمي	**Module Leader's Qualification**	الشهادة
Module Tutor	Dr. Saad Enad Mohammed	**e-mail**	saadmohamed@uomosul.edu.iq
Peer Reviewer Name	اسم مُراجع الملف	**e-mail**	بريده الالكتروني
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Student be able to solve simultaneous liner equations and inequalities involving the square root and modulus function. 2. know addition and double-angle formulas for trigonometric functions and use them to express values of trigonometric functions in the surds form. 3. Student be able to recognize odd, even, periodic, increasing, decreasing functions. 4. understand the operation of composition of functions and the concept of functional inverse. 5. recognize linear, quadratic, power, polynomial, algebraic, rational, trigonometric, exponential, hyperbolic and logarithmic functions and sketch their graphs. 6. be able to calculate limits by substitution and by eliminating zero denominators. 7. know derivatives of power, trigonometric, exponential, hyperbolic, logarithmic and inverse trigonometric functions. 8. know the basic rules of differentiation and use them to find derivatives of products and quotients. 9. know the chain rule and use it to find derivatives of composite functions.	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	On completion of this course students will be expected to 1. be able to solve algebraic equations and inequalities involving the square root and modulus function. 2. understand the difference between equations and identities, and be able to prove simple identities and inequalities. 3. know addition and double-angle formulas for trigonometric functions and use them to express values of trigonometric functions in the surds form. 4. be able to recognize odd, even, periodic, increasing, decreasing functions. 5. understand the operation of composition of functions and the concept of functional inverse. 6. to able to recognize linear, quadratic, power, polynomial, algebraic, rational, trigonometric, exponential, hyperbolic and logarithmic functions and sketch their graphs. 7. be able to calculate limits by substitution and by eliminating zero denominators. 8. be able to calculate limits at infinity of rational functions. 9. know derivatives of power, trigonometric, exponential, hyperbolic, logarithmic and inverse trigonometric functions. 10. know the basic rules of differentiation and use them to find derivatives of products and quotients. 11. know the chain rule and use it to find derivatives of composite functions.	

	Indicative content includes the following.
Indicative Contents المحتويات الإرشادية	**Part A – Matrices** Basic Definitions, Addition, Subtraction and Multiplication, Determinants, The Inverse of a 3 x 3 Matrix, Cramers Rule, Solve equations by Matrices: Gaussian Elimination. the method of finding the inverse of a square matrix, solution of simultaneous linear equations by matrix method. [8 hrs.] Revision problem and tutorial classes [2 hrs.] Quizzes [1 hr.] **Part B - Coordinates and Graphs in the Plane** Directions and Quadrants, Distance between Points, Graphs of Equations, Intercepts and More about Graphing, Slope and Equations for Lines: Slope of Non-vertical Lines, Lines that are Parallel or Perpendicular, Point – Slope Equations, Slope – Intercept Equations, Functions and their Graphs, Domains and Ranges are Often Intervals, Even Functions and Odd Functions, Functions Defined in Pieces, Shifts, Circles, and Parabolas: How to Shift a Graph, Equations for Circles in the Plane, Equations for Parabolas, A Review of Trigonometric Functions: Radian Measure, The Six Basic Trigonometric Functions, Calculating Sines and Cosines, Graphs of Trigonometric Functions, Limits and Continuity: Limits, Examples of Limits, The Sandwich Theorem and $(\sin\theta)/\theta$, Limits Involving Infinity, Continuous Functions.. [14 hrs.] Revision problem and tutorial classes [4 hrs.] Quizzes [2 hr.] **Part C- Derivatives** Slopes, Tangent Lines, and Derivatives, Defining Slopes and Tangent Lines, The Derivative of a function, The Slope of Lines, Differentiation Rules: Integer Powers, Multiples, Sums, and Differences, Second and Higher Order Derivatives, Negative Integer Powers of x, Velocity, Speed, and Other Rate of Change: Velocity, Speed, Acceleration, Derivatives of Trigonometric Functions: The Derivative of the Sine, The Derivative of the Cosine, The Derivative of the Other Basic Functions, The Chain Rule: Integer Powers of Differentiable Functions, Derivative Formulas that Include the Chain Rule, Implicit Differentiation and Fractional Powers: Lenses, Tangents, and Normal Lines, Using Implicit Differentiation to Find Derivatives of Higher Order, Fractional Powers of Differentiable Functions, Linear Approximations and Differentials. [24 hrs.] Revision problem and tutorial classes [6 hrs.] Quizzes [2 hr.]

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1/5	20% (20)	4,8,12	LO #2, 5, 8, 9 and 11
	Assignments	5	20% (20)	2 to 12	LO #1, 2, 4, 6 7, and 11
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam	1.5 hr	10% (10)	7	LO # 1-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

	Delivery Plan (Weekly Syllabus)
	المنهاج الاسبوعي النظري
	Material Covered
Week 1	**Matrices:** Basic Definitions, Addition, Subtraction and Multiplication, Determinants, The Inverse of a 3 x 3 Matrix, Creamers Rule.
Week 2	**Solve equations by Matrices:** Gaussian Elimination. the method of finding the inverse of a square matrix, solution of simultaneous linear equations by matrix method.
Week 3	**Coordinates and Graphs in the Plane:** Directions and Quadrants, Distance between Points, Graphs of Equations, Intercepts and More about Graphing.
Week 4	**Slope and Equations for Lines:** Slope of Non-vertical Lines, Lines that are Parallel or Perpendicular, Point – Slope Equations, Slope – Intercept Equations.
Week 5	**Functions and their Graphs:** Domains and Ranges are Often Intervals, Even Functions and Odd Functions, Functions Defined in Pieces.
Week 6	**Shifts, Circles, and Parabolas:** How to Shift a Graph, Equations for Circles in the Plane, Equations for Parabolas.
Week 7	**A Review of Trigonometric Functions:** Radian Measure, The Six Basic Trigonometric Functions, Calculating Sines and Cosines, Graphs of Trigonometric Functions.
Week 8	**Limits and Continuity:** Limits, Examples of Limits, The Sandwich Theorem and $(\sin\theta)/\theta$, Limits Involving Infinity, Continuous Functions.
Week 9	**Derivatives:** Slopes, Tangent Lines, and Derivatives, Defining Slopes and Tangent Lines The Derivative of a function, The Slope of Lines.
Week 10	**Differentiation Rules:** Integer Powers, Multiples, Sums, and Differences Second and Higher Order Derivatives, Negative Integer Powers of x.
Week 11	**Velocity, Speed, and Other Rate of Change:** Velocity, Speed, Acceleration
Week 12	**Derivatives of Trigonometric Functions:** The Derivative of the Sine, The Derivative of the Cosine, The Derivative of the Other Basic Functions.
Week 13	**The Chain Rule:** Integer Powers of Differentiable Functions, Derivative Formulas that Include the Chain Rule.
Week 14	**Implicit Differentiation:** Lenses, Tangents, and Normal Lines Using Implicit Differentiation to Find Derivatives of Higher Order.
Week 15	**Fractional Powers:** Fractional Powers of Differentiable Functions, Linear Approximations and Differentials.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Calculus, Thirteenth Edition, by George B. Thomas,	Yes
Recommended Texts	Calculus, Mathematics for Engineers and Technologists, 2002, by Huw Fox and Bill Bolton.	No
Websites	Khan Academy math (https://www.khanacademy.org)	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td align="center">Engineering Drawing</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td align="center">Support</td><td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☒ Lab
☐ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td align="center">EE104</td></tr>
<tr><td>ECTS Credits</td><td align="center">4</td></tr>
<tr><td>SWL (hr./sem)</td><td align="center">100</td></tr>
<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td>1</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td>UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>اسم رئيس القسم</td><td>e-mail</td><td>البريد الالكتروني لرئيس القسم</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>لقبه العلمي</td><td>Module Leader's Qualification</td><td>الشهادة</td></tr>
<tr><td>Module Tutor</td><td>Sura Mohammad Adil Alhayali</td><td>e-mail</td><td>sura_alhayali@uomosul.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td>بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop the engineer's ability to imagine projections and their models. 2. Engineering drawing exercises hand movement to complete quick sketches. 3. This course deals with theory of Orthographic Projection. 4. This is the basic subject for isometric drawing. 5. To teach students engineering drawings using AutoCAD program, and this includes both theoretical lectures and Lab. 6. To help students to use AutoCAD for engineering drawings efficiently in their designs & projects.	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Absorbing all the engineering characteristics of an object or a product in a clear manner. 2. Know the tools used in engineering drawing and how to use them correctly 3. understand and apply the basics of engineering processes. 4. Conclude projections and isometric for each geometric figure and recognize its dimensions. 5. students will be able to use AutoCAD commands to make drawings 6. create & insert symbols, dimension in a drawing, create blocks, and plot drawings with certain scales.	
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A – tools, lines, scale, Engineering processes (part 1) & Getting started, view commands** Introduction to engineering drawing, learn about engineering tools and how to use them. Types of pens, Billboard layout and address field preparation, Types of lines [3 hrs.] Classwork 1. [2 hrs.] Defining the drawing scale and its types, apply and draw engineering processes [3 hrs.] Classwork 2. [2 hrs.] Lab: Getting started, view Commands [10 hrs.] Quizzes [1 hr.] **Part B- Engineering processes (part 2) , Orthographic Projection (part 1) &Drawing , modify I Commands** Draw tangents, Types of projections resulting from vertical projection. [6 hrs.] Classwork 3. [2 hrs.] , Classwork 4. [2 hrs.] Lab: Drawing Commands, modify I Commands [10 hrs.] Quizzes [1 hr.] **Part C- Orthographic Projection (part 2) , Isometric Drawing & Modify II, Dimensions , text Commands** Arrangement and drawing of projections, draw the isometrically axis, Imagine and draw the isometrically body [8 hrs.] Classwork 5. [2 hrs.] , Classwork 6. [2 hrs.] Lab: Modify II Commands, Dimension Commands, Text Commands [8 hrs.] Quizzes [1 hr.]	

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation				
تقييم المادة الدراسية				
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	1	10% (10)	4,8,12	LO #1, 5, 8 and 9
	Assignments	10	5% (5)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
	Projects / Lab.	2	25% (25)	Continuous	All
	Report	0	0% (0)	----	----
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction and definition of engineering drawing, learn about engineering tools, Types of pens used, Drawing board layout
Week 2	Types of lines in engineering drawing, Defining the drawing scale and its types
Week 3	Classwork 1
Week 4	Engineering processes (part 1): Teaching students how to apply and draw line relationships
Week 5	Classwork 2
Week 6	Engineering processes (part 2): Making tangents, reverse curves
Week 7	Classwork 3
Week 8	Mid-term Exam
Week 9	Orthographic Projection (part 1): theory of Orthographic Projection, combination of views
Week 10	Classwork 4
Week 11	Orthographic Projection (part 1): Arrangement and drawing of projections
Week 12	Classwork 5
Week 13	Isometric Drawing, I: draw the isometrically axis, Imagine and draw the isometrically body
Week 14	Classwork 6
Week 15	Isometric Drawing II: isometric circles
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: start a new drawing, user Interface, units, limits
Week 2	Lab 2: grid, snap, absolute & relative coordinate system, ortho.
Week 3	Lab 3: zoom, pan, osnap, polar tracking
Week 4	Lab 4: pline, pedit, selecting object, erase
Week 5	Lab 5: ltype, ltscale.
Week 6	Lab 6: line, arc, circle, ellipse
Week 7	Lab 7: polygon, rectangle
Week 8	Lab 8: copy, move, mirror, trim, rotate
Week 9	Lab 9: scale, undo, redo, stretch, divide
Week 10	Lab 10: extend, offset.
Week 11	Lab 11: array, Lweight , Measure
Week 12	Lab 12: Fillet , Chamfer, Explode
Week 13	Lab 13: Text, Mtext, Area
Week 14	Lab 14: Dimensions & Leaders, color
Week 15	Lab 15: Block, plot.

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Engineering Drawing and Graphic Technology , By French & Vierk , Steven Durbin , Twelve Edition	No
Recommended Texts	كتاب الرسم الهندسي تأليف : الأستاذ عبد الرسول الخفاف , 1986	No
Websites	دروس تعليم اوتوكاد 2014 : https://www.dailymotion.com/video/x31bg6x	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Physics**	**Module Delivery**	
Module Type	**Basic**	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**EE104**		
ECTS Credits	**4**		
SWL (hr./sem)	**100**		
Module Level	1	**Semester of Delivery**	1
Administering Department	2 - (Electrical Engineering)	**College**	UoM2 - (Engineering)
Module Leader	Dr. Mohammed Tariq Yaseen	**e-mail**	mtyaseen@uomosul.edu.iq
Module Leader's Acad. Title	Assist. Prof.	**Module Leader's Qualification**	Doctor
Module Tutor	Mr. Shamil Hamzah Hussein	**e-mail**	Shamil_alnajjar84@uomosul.edu.iq
Peer Reviewer Name	اسم مُراجع الملف	**e-mail**	بريده الالكتروني
Scientific Committee Approval Date	18/11/2023	**Version Number**	1.0

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

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

Module Aims أهداف المادة الدراسية	1. To understand many principles and units and their abbreviations correctly in the physics, such as State SI units, determine whether a physical quantity is a vector or a scalar, and distinguish between kinematic and kinetic energy. 2. To understand Differentiate between static and kinetic friction, and solve friction problems; State and apply Hooke's law for ideal springs; Define work, and calculate the work done by a constant force in one and two dimensions. 3. This course deals with Define, calculate, and distinguish between distance and displacement, average and instantaneous speed and velocity, and average and instantaneous acceleration; State, explain, and apply Newton's three laws of motion. 4. This course deals with the basic concept of the State the work–energy theorem, and use it to solve problems; Apply the principle of conservation of mechanical energy to solve simple problems in mechanics; Calculate both kinetic and potential energy; Calculate the power. 5. To develop problem, solve problems using Newton's law of universal gravitation and calculate the gravitation for different locations (i.e., Earth, Moon, Sun and etc.); Derive the equation of continuity for fluids. 6. To perform and analysis of heat transfer through the facades of the buildings; Define and describe the flow of heat through a material by direct molecular contact (conduction); Derive the equation of heat transfer by conduction. 7. To understand energy level and atomic structure through energy-band theory of materials; Internal structure of materials of materials including metals, insulators and semiconductors; Electrical conduction and characteristics of the all materials such as conductivity, Mobility, energy distribution of electrons, Fermi levels, work function, and electronic emission. 8. To perform current-voltage characteristics, charge control description for all types of both the diode and transistors. 9. To model small signal and large signal of the active electronic devices such as DC load line and AC load line concept.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Determine whether a physical quantity is a vector or a scalar; State, explain, and apply Newton's three laws of motion; State and apply Hooke's law for ideal springs; State the work–energy theorem, and use it to solve problems; Express Newton's laws in terms of rates of change of linear momentum; Calculate the pressure and density of fluid at different depth. 2. Define and describe the Bohr model of an atom; Define electron, proton, neutron, and nucleus; Explain electron shells and orbits; Explain insulators, conductors, and semiconductors and how they differ; Define valence band and conduction band Compare a semiconductor atom to a conductor atom. 3. Understanding of the fundamental concepts of current and voltage; Explain the of electrical circuit element and its objects; Define Ohm's Law; Define Power and Energy; Calculate Power and Energy. 4. Describe Analysis the Electric Circuits in Parallel and Series connection; Define Kirchhoff's law; Analysis the Electric Circuits using Kirchhoff's law; Solve

	problems using Kirchhoff's law; Explain the electrical symbol for a diode; Define bias and its effect on the depletion region; Define barrier potential and its effects; Several Diode Applications. 5. Discuss the various properties of diodes and transistors. 6. Explain the homo-junction and Hetero-junction materials such as PN junction diodes, PNP transistors, and NPN transistors. 7. Explain the other types of semiconductor diodes: Varactor diode, tunnel diode, photodiode and photovoltaic (solar) cell, Light emitting diode, metal electronic.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Introduction to physics** Physics quantities, Length, mass and time; Kinematics; Position, Displacement and Distance; Speed, Velocity and Acceleration; Forces and motion; Mass and gravity force; Newton's three laws of motion. Spring forces and Hooke's law; Friction forces; Uniform circular motion; Work; Kinetic and Potential Energy; The work-kinetic energy theorem; Conservation of total mechanical energy; and Power. Linear momentum; Momentum and kinetic energy; Rate of change of linear momentum and Newton's laws; Law of conservation of linear momentum; Impulse; and Simple Harmonic Motion. [**8 hrs**.] Revision problem and tutorial classes [**2 hrs**.] Quizzes [**1 hr**.] **Part B- Atoms:** Atoms Structure; Atomic Energy Level; and Materials Used in Electronics. Current and Voltage; electrical circuit; and Ohm's Law. Power and Energy; and Parallel and Series Networks. Kirchhoff's Law. [**8 hrs**.] Quizzes [**1 hr**.] **Part C- Diode Circuit Applications:** p-n junction in equilibrium, current-voltage characteristics, charge-control description of a diode, Transition and diffusion capacitance's, diode switching times, diode models, small-signal model and load line concept, and introduction to Hetero-junctions and double Hetero-junctions Rectifiers, Zener diodes voltage regulators, clipping circuits, clamping circuits and wave form generation. Other Types of Semiconductor Diodes: Varactor diode, tunnel diode, photodiode and photovoltaic (solar) cell, Light emitting diode, metal electronic. Transistors Principle of Operation and type, Transistor biasing circuits, Application Circuit. [**8 hrs**.] Revision problem and tutorial classes [**4 hrs**.] Quizzes [**1 hr**.]

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation					
تقييم المادة الدراسية					
		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	1	10% (10)	4,8,11,14	LO #1, 4, 6 and 7
	Assignments	10	5% (5)	2 to 13	LO #1, 2, 3, 4, 5 and 7
	Projects	0	0% (0)	----	-----
	Report	2	25% (25)	Continuous	All
Summative assessment	**Midterm Exam**	2 hr.	10% (10)	7	LO # 4-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

| | **Delivery Plan (Weekly Syllabus)** |
	المنهاج الاسبوعي النظري
	Material Covered
Week 1	Introduction to physics; Standards of length, mass and time; Scalar and Vector quantities; Kinematics; Position, Displacement and Distance; Speed, Velocity and Acceleration; Forces and motion; Mass and gravity force; Newton's three laws of motion.
Week 2	Spring forces and Hooke's law; Friction forces; Uniform circular motion; Work; Kinetic and Potential Energy; The work-kinetic energy theorem; Conservation of total mechanical energy; and Power.
Week 3	Linear momentum; Momentum and kinetic energy; Rate of change of linear momentum and Newton's laws; Law of conservation of linear momentum; Impulse; and Simple Harmonic Motion.
Week 4	Universal gravitation; Newton's law of universal gravitation; Free-fall acceleration and the gravitational force; and Solve problems using Newton's law of universal gravitation and calculate the gravitation for different locations.
Week 5	Fluid mechanics; Pressure and density of fluid at different depth; Hydrostatic pressure; Pascal's principle and the operation of a hydraulic lift; Buoyant forces and Archimedes's principle; the equation of continuity for fluids; and the Bernoulli's equation.
Week 6	Basic of Architectural Physics; and Solar Radiation.
Week 7	Basic of Architectural Physics; and Solar Radiation.
Week 8	Sound; Noise; Sound Intensity
Week 9	Sound Insulation; and Thermal Behavior of Materials
Week 10	Atoms Structure; Atomic Energy Level; and Materials Used in Electronics.
Week 11	Current and Voltage; electrical circuit; and Ohm's Law.
Week 12	Introduction of Diodes, current-voltage characteristics of diode. Forward and reverse biasing of diodes, Temperature effects for diode characteristics.
Week 13	Diode Circuit Applications: Rectifiers, clipping circuits, clamping circuits.
Week 14	Zener diodes voltage regulators, and wave form generation. Varactor diode, tunnel diode, photodiode and photovoltaic (solar) cell, Light emitting diode, metal electronic.
Week 15	Introduction of transistors, Principle of Operation and type. Current-Voltage characteristics of transistors, DC Load line with state Q-Point. Transistors biasing circuits.
Week 16	**Preparatory week before the final Exam**
	Learning and Teaching Resources
	مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Floyd, Thomas L. Electronics Fundamentals: Circuits, Devices and Applications (Floyd Electronics Fundamentals Series). Prentice-Hall, Inc., 2006.	Yes
Recommended Texts	Donald A. Neamen. (2003). "SEMICONDUCTOR PHYSICS AND DEVICES". 3rd Edition, ISBN 0-07-232107-05, USA. (can be downloaded from the Course web page/classroom).	Yes

Websites	Nashelsky, L., & Boylestad, R. L. (2021). Electronic Devices and Circuit Theory Eleventh Edition.

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="5" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center">Electronics Physics</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Basic</td><td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☐ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">EE112</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">3</td></tr>
<tr><td>SWL (hr./sem)</td><td colspan="2" align="center">75</td></tr>
<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td colspan="2">2</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td colspan="2">UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>Dr. Mohammed Tariq Yaseen</td><td>e-mail</td><td colspan="2">mtyaseen@uomosul.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Assist. Prof.</td><td>Module Leader's Qualification</td><td colspan="2">Doctor</td></tr>
<tr><td>Module Tutor</td><td>Mr. Shamil Hamzah Hussein</td><td>e-mail</td><td colspan="2">Shamil_alnajjar84@uomosul.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td colspan="2">بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>10/06/2023</td><td>Version Number</td><td colspan="2">1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Aims أهداف المادة الدراسية	1. To develop problem solving skills of electronic circuit through the understanding solid state for each electronic passive and active elements such as RLC, diodes, transistors, and integrated circuits. 2. To understand energy level and atomic structure through energy-band theory of materials. 3. This course deals with the basic concept and Internal structure of materials of materials including metals, insulators and semiconductors. 4. To understand electrical conduction and characteristics of the all materials such as conductivity, Mobility, energy distribution of electrons, Fermi levels, work function, and electronic emission. 5. To understand the intrinsic and extrinsic semiconductors parameters. 6. To perform current-voltage characteristics, charge control description for all types of both the diode and transistors. 7. To model small signal and large signal of the active electronic devices such as DC load line and AC load line concept.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the Semiconductors and compound semiconductors materials such as Si, Ge, and GaAs. 2. List the various terms associated with active electronics elements. 3. Summarize what is meant by an electronic circuit. 4. Describe energy band theory of all materials. 5. Discuss the various properties of diodes and transistors. 6. Explain the homo-junction and Hetero-junction materials such as PN junction diodes, PNP transistors, and NPN transistors. 7. Explain the other types of semiconductor diodes: Varactor diode, tunnel diode, photodiode and photovoltaic (solar) cell, Light emitting diode, metal electronic.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Energy Level and Atomic Structure** The atom, models, wave nature of light, dual nature of matter, energy-band theory of metals, insulators and semiconductors, crystal structure, ionic, covalent and metallic bonding, energy band of crystals, Internal structure of materials cell, packing miller indices, crystal planes and directions. [**8 hrs.**] Revision problem and tutorial classes [**4 hrs.**] Quizzes [**1 hr.**] **Part B- Electrical Conduction in Metals:** Mobility and conductivity, energy distribution of electrons, Fermi levels, work function, electronic emission. Semiconductors: Semiconductors materials (Si, Ge and compound semiconductors), extrinsic semiconductors, Fermi-level in semiconductor, diffusion and carrier life time, Hall effect. [**8 hrs.**] Revision problem and tutorial classes [**4 hrs.**] Quizzes [**1 hr.**]

	Part C- Semiconductor p-n Junction:
	p-n junction in equilibrium, current-voltage characteristics, charge-control description of a diode, Transition and diffusion capacitance's, diode switching times, diode models, small-signal model and load line concept, and introduction to Hetero-junctions and double Hetero-junctions. [**6 hrs**.]
	Revision problem and tutorial classes [**3 hrs**.]
	Quizzes [**1 hr**.]
	Part D- Diode Circuit Applications:
	Rectifiers, Zener diodes voltage regulators, clipping circuits, clamping circuits and wave form generation. Other Types of Semiconductor Diodes: Varactor diode, tunnel diode, photodiode and photovoltaic (solar) cell, Light emitting diode, metal electronic. Transistors Principle of Operation and type, Transistor biasing circuits, Application Circuit. [**8 hrs**.]
	Revision problem and tutorial classes [**4 hrs**.]
	Quizzes [**1 hr**.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	1	10% (10)	4,8,11,14	LO #1, 4, 6 and 7
	Assignments	10	5% (5)	2 to 13	LO #1, 2, 3, 4, 5 and 7
	Projects	0	0% (0)	----	-----
	Report	2	25% (25)	Continuous	All
Summative assessment	**Midterm Exam**	2 hr.	10% (10)	7	LO # 4-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Energy Level and Atomic Structure: The atom, models, wave nature of light, dual nature of matter. Energy-band theory of metals, Insulators and semiconductors, Crystal structure, Ionic, Covalent and metallic bonding.
Week 2	Energy band of crystals, Internal structure of materials cell, packing miller indices, crystal planes and directions.
Week 3	Electrical Conduction in Metals: Mobility and conductivity, energy distribution of electrons.
Week 4	Electrical Conduction in Metals: Fermi levels, Work function, Diffusion Current, Electronic emission.
Week 5	Introduction of semiconductors: Semiconductors materials (Si, Ge and compound semiconductors).
Week 6	Introduction of semiconductors: Intrinsic semiconductors, and Fermi-level in semiconductor.
Week 7	Introduction of semiconductors: Extrinsic semiconductors, and Fermi-level in semiconductor.
Week 8	Introduction of semiconductors: Demonstrated of electrical conductance in semiconductors materials. Diffusion Current in semiconductors, carrier life time, and Hall effect.
Week 9	Introduction semiconductor P-N junction: P-N junction in equilibrium, current-voltage characteristics. charge-control description of a diode.
Week 10	Diffusion current, diffusion current density, draw Energy-band level. Transition and diffusion capacitance's, diode switching times.
Week 11	diode models, small-signal model and load line concept, and introduction to Hetero-junctions and double Hetero-junctions.
Week 12	Introduction of Diodes, current-voltage characteristics of diode. Forward and reverse biasing of diodes, Temperature effects for diode characteristics.
Week 13	Diode Circuit Applications: Rectifiers, clipping circuits, clamping circuits.
Week 14	Zener diodes voltage regulators, and wave form generation. Varactor diode, tunnel diode, photodiode and photovoltaic (solar) cell, Light emitting diode, metal electronic.
Week 15	Introduction of transistors, Principle of Operation and type. Current-Voltage characteristics of transistors, DC Load line with state Q-Point. Transistors biasing circuits.
Week 16	**Preparatory week before the final Exam**

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	Floyd, Thomas L. Electronics Fundamentals: Circuits, Devices and Applications (Floyd Electronics Fundamentals Series). Prentice-Hall, Inc., 2006.	Yes
Recommended Texts	Donald A. Neamen. (2003). "SEMICONDUCTOR PHYSICS AND DEVICES". 3rd Edition, ISBN 0-07-232107-05, USA. (can be downloaded from the Course web page/classroom).	Yes
Websites	Nashelsky, L., & Boylestad, R. L. (2021). Electronic Devices and Circuit Theory Eleventh Edition.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center">Mechanics Engineering</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Support</td><td rowspan="4">☒ Theory
☐ Lecture
☐ Lab
☐ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">EE105</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">3</td></tr>
<tr><td>SWL (hr./sem)</td><td colspan="2" align="center">75</td></tr>
<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td>1</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td>UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>Dr. Mohammed Tariq Yaseen</td><td>e-mail</td><td>mtyaseen@uomosul.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Assist. Prof.</td><td>Module Leader's Qualification</td><td>Doctor</td></tr>
<tr><td>Module Tutor</td><td>Dr.ammar younis Ibrahim</td><td>e-mail</td><td>drammar2020@uomosul.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td>بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>08/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. The module aims of Mechanical and Thermodynamics typically include providing students with a comprehensive understanding of the principles and applications of mechanical engineering and thermodynamics. The specific aims may vary depending on the educational institution or course, but here are some common objectives: 2. Understanding Fundamental Concepts: The module aims to introduce students to the fundamental concepts and principles of mechanical engineering and thermodynamics. This includes topics such as mechanics, kinematics, dynamics, energy, heat transfer, and thermodynamic processes. 3. Analytical and Problem-Solving Skills: The module aims to develop students' analytical and problem-solving skills related to mechanical and thermodynamic systems. This involves teaching them how to apply mathematical and scientific principles to solve engineering problems, analyze mechanical systems, and evaluate thermodynamic processes. 4. Thermodynamic Systems: The module aims to familiarize students with the behavior of thermodynamic systems and their applications. This includes studying topics such as the laws of thermodynamics, properties of pure substances, gas laws, energy conversion processes, power cycles, and refrigeration cycles. 5. Heat Transfer: The module aims to teach students about the principles of heat transfer and its applications in engineering. This involves studying modes of heat transfer, including conduction, convection, and radiation, as well as heat exchangers, thermal insulation, and heat transfer analysis in various systems. 6. Mechanical Systems and Dynamics: The module aims to provide students with an understanding of mechanical systems and their dynamics. This includes topics such as statics, dynamics, forces, motion, and mechanical components like gears, bearings, and linkages.	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Mechanical Engineering: 1. Apply fundamental principles of mechanics to analyze and solve engineering problems. 2. analyze mechanical components and systems considering factors such as strength, stiffness, and safety. 3. knowledge of thermodynamics and fluid mechanics to analyze energy conversion systems. Thermodynamics: 4. Understand the basic concepts and laws of thermodynamics, including energy, entropy, and the First and Second Laws of Thermodynamics. 5. Apply thermodynamic principles to analyze and solve problems related to heat transfer, work, and energy conversion. 6. Analyze thermal systems, including power cycles, refrigeration cycles, and heat exchangers. 7. Apply thermodynamic principles to analyze combustion processes and internal combustion engines.	

	8. Apply thermodynamic principles to analyze renewable energy systems, such as solar and wind power systems. 9. Understand the impact of thermodynamics on environmental sustainability and energy efficiency.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A** Static: Force system, Units system, Forces + Components, Resultant, Moment and Couples, Equilibrium, Centroid, Moment of Inertia, Friction. Revision problem and tutorial classes. [**15 hr.**] Revision problem and tutorial classes [**5 hrs.**] Quizzes [**1 hr**.] **Part B** Dynamics: Rectilinear motion, Curvilinear motion, Projectile, Circular motion, Acceleration Components (Rectangular Comp., Normal Tangential Comp.), Kinetic -2nd Law of Newton. [**15 hrs.**] Revision problem and tutorial classes [**5 hrs.**] Quizzes [**1 hr**.] **Part C** Thermodynamics: Properties of Substance, Pressure and Temperature, Work and Energy, Ideal Gas, First Law of Thermodynamics, 2nd Law of Thermodynamics. Hook's law. [**15 hr**.] Revision problem and tutorial classes [**5 hrs**.] Revision problem and tutorial classes [**6 hrs.**] Quizzes [**1 hr**.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل		75	

Module Evaluation

تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	LO #1, 4, 6 and 7
	Assignments	5	5% (5)	2 to 13	LO #1, 2, 3, 4, 5 and 7
	Projects	0	0% (0)	----	-----
	Report	2	25% (25)	Continuous	All
Summative assessment	Midterm Exam	2 hr.	10% (10)	8	LO # 4-8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Static: Force system
Week 2	Units system, Forces and Components
Week 3	Resultant, Moment and Couples
Week 4	Equilibrium and Centroid
Week 5	Moment of Inertia and Friction
Week 6	Dynamics: Rectilinear motion

Week 7	Curvilinear motion, Projectile and Circular motion
Week 8	Midterm Exam
Week 9	Acceleration Components (Rectangular Comp., Normal Tangential Comp.)
Week 10	Kinetic - 2nd Law of Newton
Week 11	Thermodynamics: Properties of Substance and Pressure and Temperature
Week 12	Work and Energy and Ideal Gas
Week 13	First Law of Thermodynamics
Week 14	2nd Law of Thermodynamics
Week 15	Hook's law
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		
Recommended Texts		
Websites		

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		
Module Title	**Computer**	**Module Delivery**
Module Type	**Basic**	☒ **Theory**
Module Code	**UOM 103**	☐ **Lecture**
ECTS Credits	**3**	☒ **Lab**
SWL (hr/sem)	**75**	☐ **Tutorial** ☐ **Practical** ☐ **Seminar**

Module Level	1	**Semester of Delivery**		1
Administering Department	**Dam and Water Resources Engineering (DWRE)**	**College**	**College of Engineering**	
Module Leader	Dr. Talal Ahmed Basheer	**e-mail**	t.basheer@uomosul.edu.iq	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Omar Kanaan Taha	**e-mail**	omar.alsultan@uomosul.edu.iq	
Peer Reviewer Name	**Dr. Anmar Abdulazeez Al Talib**	**e-mail**	Anmar.altalib@uomosul.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 Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	The Module aim is to prepare student to deal with computers. In addition to, teach the student the fundamentals of computers and its components. Furthermore, learning how to use two of Microsoft Office applications (Word and Excel).
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An ability to identify, analyze, and solve complex engineering problems according to principles of engineering, science, and mathematics. 2. An ability to acquire and apply new knowledge and using appropriate learning strategies. 3. An ability to participate and work professionally and ethically in different projects to function on multi-disciplinary teams. It is expected from the student who passes this module learn the following topics:

	1. Computers and Operating System 2. Software and Hardware Interaction 3. Windows File Management 4. Operating System Customization 5. Computer Hardware 6. Monthly LAB Exam 7. Exploring Microsoft Office 2013 8. Getting Started with Word Essentials 9. Editing and Formatting Documents 10. Getting Started with Excel Essentials 11. Organizing and Enhancing Worksheets 12. Creating Formulas and Charting Data
Indicative Contents المحتويات الإرشادية	Computers and Operating System [6 hr] Software and Hardware Interaction [6 hr] Windows File Management [3 hr] Operating System Customization [3 hr] Computer Hardware [6 hr] Exploring Microsoft Office 2013 [3 hr] Getting Started with Word Essentials [3 hr] Editing and Formatting Documents [3 hr] Getting Started with Excel Essentials [3 hr] Organizing and Enhancing Worksheets [3 hr] Creating Formulas and Charting Data [3 hr]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the Lab activities, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, laboratory and by considering type of external search involving some of computer technology that are interesting to the students.

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعياً	0.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	4, 11	LO #Q1: 1-2, Q2: 7-9
	Assignments	2	5% (5)	3, 10	LO #A1: 1-2, A2: 7-9
	Lab.	10	20% (20)	Continuous	All
	Report	1	5% (5)	14	All
Summative assessment	**Midterm Exam**	2 hr	10% (10)	9	LO # 1-5
	Final Exam	3hr	50% (50)		
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Computers and Operating System
Week 2	Computers and Operating System (Continued)
Week 3	Software and Hardware Interaction
Week 4	Software and Hardware Interaction (Continued)
Week 5	Windows File Management
Week 6	Operating System Customization
Week 7	Computer Hardware
Week 8	Computer Hardware (Continued)
Week 9	Monthly Exam
Week 10	Exploring Microsoft Office 2013
Week 11	Getting Started with Word Essentials
Week 12	Editing and Formatting Documents
Week 13	Getting Started with Excel Essentials
Week 14	Organizing and Enhancing Worksheets
Week 15	Creating Formulas and Charting Data
Week 16	**Preparatory week before the final Exam**

	Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر
	Material Covered
Week 1, 2	Computers and Operating System
Week 3, 4	Software and Hardware Interaction
Week 5	Windows File Management
Week 6	Operating System Customization
Week 7, 8	Computer Hardware
Week 9	Monthly LAB Exam
Week 10	Exploring Microsoft Office 2013
Week 11	Getting Started with Word Essentials
Week 12	Editing and Formatting Documents
Week 13	Getting Started with Excel Essentials
Week 14	Organizing and Enhancing Worksheets
Week 15	Creating Formulas and Charting Data

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	2015 Computer Literacy BASICS: A Comprehensive Guide to IC3 Connie Morrison, Dolores Wells, Lisa Ruffolo Cengage Learning. ISBN: 128576658X	Available as PDF
Recommended Texts	IC3 GS5 Certification Guide Using Windows 10 & Office 2016	Available as PDF
Websites	Google Classroom	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		
Module Title اسم المنهج	اللغة العربية	**Module Delivery**
Module Type نوع المنهج	داعم	
Module Code رمز المنهج	UOM101	☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☒ **Seminar**
ECTS Credits عدد الوحدات	2	
SWL (hr/sem) الحمل الكلي	50	

Module Level / المستوى	1	Semester of Delivery / سحب المنهج	1
Administering Department القسم الإداري	ENV8	**College** الكلية	ENG4
Module Leader اسم التدريسي		**e-mail** البريد الالكتروني	
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor		**e-mail**	
Peer Reviewer Name	------	**e-mail**	E-mail
Scientific Committee Approval Date	26/11/2023	**Version Number**	2.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	الهدف من هذا الفصل الدراسي هو تعريف الطلاب بالموضوعات الرئيسية لمادة اللغة العربية. سيغطي الفصل الدراسي المتطلبات الأساسية لتعاريف اللغة العربية، قواعد نحوية للأزمنة، تنمية القدرات النحوية لصيغ المفرد والجمع والممنوع من الجرد، بالإضافة الى البلاغة والتطبيق. وفي نهاية الفصل، سيكون لدى الطلاب معرفة واسعة بالمفاهيم وسيتم تحقيق ذلك من خلال المحاضرات النظرية والدروس والواجبات البتية والتقارير ذات الصلة بالمواضيع المطروقة.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**CLO1:** تعريف الطالب بألفاظ اللّغة العربيّة الصحيحة وتراكيبها وأساليبها السليمة بطريقة مشوقة وجذابة. **CLO2:** أن يستغل الطالب وقت فراغه بالقراءة والاطلاع والرجوع إلى المكتبة. **CLO3:** تمكين الطالب من القراءة الصحيحة، وأن يكتسب القدرة على استعمال اللغة استعمالاً صحيحاً في الاتّصال مع الآخرين. **CLO4:** تنمية الذوق الأدبي لدى الطالب حتى يدرك النواحي الجمالية في أساليب الكلام ومعانيه وصورة. **CLO5:** تنمية قدرة ومهارة الطالب الإملائية والخطية بحيث يستطيع الكتابة الصحيحة للكتب والمخاطبات الرسمية. **CLO6:** تمكين الطالب على كتابة التقارير العملية والنظرية والعروض التقديمية بلغة عربية واضحة وصحيحة. **CLO7:** القدرة على اكتساب وتطبيق المعرفة الجديدة واستخدام استراتيجيات تعليم مناسبة. **CLO8:** القدرة على المشاركة والعمل بمهنية واخلاقية للعمل في فرق متعددة التخصصات.
Indicative Contents المحتويات الإرشادية	**الجزء الأول:** مقدمة عن اللغة العربية (4 ساعات) • مقدمة عن اللغة العربية • تعريف اللغة العربية ومميزاتها **الجزء الثاني:** قواعد نحوية وتشمل: (6 ساعات) • الفعل الماضي • الفعل الماضي • الافعال الخمسة **الجزء الثالث:** تنمية القواعد النحوية وتشمل: (6 ساعات) • المثنى والجمع (المذكر السالم والمؤنث السالم) • التعجب • الممنوع من الصرف • المجرد والمزيد **الجزء الرابع:** البلاغة والتطبيق (8 ساعات) • الاستعارة • الجناس • الطباق • التشبيه **الجزء الخامس:** قواعد املائية: (3 ساعات) سوف يتم تعريف الطالب عن الأخطاء الاملائية الشائعة وطرق تجنبها بالإضافة الى كتابة المخاطبات الادرية. **الجزء السادس:** قواعد العد والمعدود: (3 ساعات)

	تعريف الطالب بقواعد واحكام العد والمعدود في اللغة العربية.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

| Strategies
الاستراتيجيات	توسيع مدارك الطلاب لمادة اللغة العربية، والإلمام بالمفاهيم الأساسية للغية العربية والبلاغة، والقدرة على التمييز بين الأزمنة. يحتوي هذه الفصل على العديد من المكونات التي تشمل دراسة المحاضرات والبرامج التعليمية والمناقشة والواجبات المنزلية ومنصات التعلم الإلكتروني. سيتم تدريس الدورة باللغة العربية، ويجب تقديم جميع المهام الإلزامية في غضون المواعيد النهائية للقبول في الامتحان.

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

| Structured SWL (h/sem)
الحمل الدراسي المنتظم للطالب خلال الفصل | 33 | Structured SWL (h/w)
الحمل الدراسي المنتظم للطالب أسبوعيا | 2.2 |
|---|---|---|---|
| Unstructured SWL (h/sem)
الحمل الدراسي غير المنتظم للطالب خلال الفصل | 17 | Unstructured SWL (h/w)
الحمل الدراسي غير المنتظم للطالب أسبوعيا | 1.1 |
| Total SWL (h/sem)
الحمل الدراسي الكلي للطالب خلال الفصل | 50 | | |

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment
التقويم التكويني	Quizzes
الكويز	3	6% (18)	4, 9, and 13	All
	H.W Assignments
الواجبات البيتية	2	4% (8)	5, 11	CLO4, CLO5, and CLO6
	Seminars
السمنار	1	6% (6)	12	All
	On-site Assignment
واجبات داخل الصف	2	4% (8)	6, 10	CLO4, CLO5, and CLO6
Summative Assessment
التقويم التلخيصي	Midterm Exam
امتحان نصف الفصل	2 hrs	10% (10)	7	All
	Final Exam
الامتحان النهائي	3 hrs	50% (50)	16	All
Total Assessment / التقويم النهائي			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered / المواضيع المغطاة
Week 1	مقدمة عن اللغة العربية وتعريف اللغة العربية ومميزاتها
Week 2	قواعد نحوية: الفعل الماضي
Week 3	قواعد نحوية: الفعل المضارع

Week 4	قواعد نحوية: الأفعال الخمسة
Week 5	تنمية القواعد النحوية: المثنى والجمع (المذكر السالم والمؤنث السالم)
Week 6	تنمية القواعد النحوية: التعجب، الممنوع من الصرف والمجرد والمزيد
Week 7	الامتحان الفصلي
Week 8	البلاغة والتطبيق: الاستعارة
Week 9	البلاغة والتطبيق: الجناس
Week 10	البلاغة والتطبيق: الطباق
Week 11	البلاغة والتطبيق: التشبيه
Week 12	الأخطاء الاملائية
Week 13	المخاطبات الإدارية
Week 14	قواعد واحكام العد والمعدود
Week 15	قواعد واحكام العد والمعدود
Week 16	الامتحان النهائي

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

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text الاسم	**Available in the Library?** هل متوفر في المكتبة؟
Required Texts المنهج المطلوب	جامع الدروس العربية / مصطفى الغلاييني	نعم
Recommended Texts المنهج الموصى به	النحو الوافي / عباس حسن	نعم
Websites المواقع الالكترونية	https://uomosul.edu.iq/en/engineering/environmental-engineering-dept/	

Grading Scheme				
مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group **(50 - 100)**	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors

	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX –** Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**Basics of Electrical Engineering II**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**EE108**		
ECTS Credits	**8**		
SWL (hr./sem)	**200**		
Module Level	1	**Semester of Delivery**	2
Administering Department	2 - (Electrical Engineering)	**College**	UoM2 - (Engineering)
Module Leader	اسم رئيس القسم	**e-mail**	البريد الالكتروني لرئيس القسم
Module Leader's Acad. Title	لقبه العلمي	**Module Leader's Qualification**	الشهادة
Module Tutor	Dr. Omar Muwafaq Mahmood	**e-mail**	omer_alyousif@uomosul.edu.iq
Peer Reviewer Name	اسم مُراجع الملف	**e-mail**	بريده الالكتروني
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

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

Module Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of AC circuit theory through the application of techniques. 2. To understand voltage, current and power from a given AC circuit. 3. This course deals with the basic concept of AC electrical circuits. 4. This is the basic subject for all AC electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform mesh and Nodal analysis. 7. To perform Thevenin and superposition theory. 8. To understand the resonant circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic AC electric circuit. 4. Describe electrical AC voltage, current and power. 5. Define Ohm's law in AC circuits. 6. Identify the basic circuit passive and active elements and their applications. 7. Discuss the various properties of impedance. 8. Explain the two Kirchhoff's laws used in AC circuit analysis. 9. Explain the Analysis Methods used in AC Electrical Circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Circuit Components and values** AC circuits, Current and voltage definitions, circuit elements, impedance networks, real and ideal elements, voltage and current sources. [9 hrs.] Lab. [6 hrs.] Revision problem and tutorial classes [6 hrs.] Quizzes [1 hr.] **Part B- Circuit reduction** combining sources, Combining impedances elements in series and parallel, delta and star transformation. [12 hrs.] Revision problem and tutorial classes [8 hrs.] Lab. [8 hrs.] Quizzes [1 hr.] **Part C- Circuit Theory** Kirchhoff's laws and Ohm's law. Introduction to mesh and nodal analysis, Introduction to Thevenin and Norton theory, maximum power transfer, introduction to superposition theory, the resonant circuits. [24 hrs.] Revision problem and tutorial classes [16 hrs.] Lab. [16 hrs.] Quizzes [1 hr.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	107	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	7.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	4,8,12	LO #1, 5, 8 and 9
	Assignments	10	5% (5)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
	Projects / Lab.	2	25% (25)	Continuous	All
	Report	0	0% (0)	----	----
Summative assessment	Midterm Exam	2 hr.	10% (10)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic Concept & Units in AC circuits, waveforms of AC sources
Week 2	Average and RMS values, Form Factor, Crest Factor
Week 3	Ohm's law, impedance and admittance calculations
Week 4	equivalent impedance: Series-parallel and delta – star transformation
Week 5	power calculation in A.C circuit and power factor
Week 6	Kirchhoff's laws: KVL-KCL
Week 7	Phasor diagram
Week 8	Mid-term Exam
Week 9	introduction to network theorems, types of source: independent and dependent voltage and current sources and their transformation
Week 10	Maxwell's circulating currents (mesh analysis)
Week 11	nodal analysis
Week 12	superposition theorem
Week 13	Thevenin's theorem and Norton's theorem
Week 14	maximum power transfer theorem
Week 15	Resonant circuits
Week 16	**Preparatory week before the final Exam**

	Delivery Plan (Weekly Lab. Syllabus)
	المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to lab. components
Week 2	Lab 2: Introduction to AVO meter (using in AC circuits) and oscilloscope
Week 3	Lab 3: Introduction to AC function generator
Week 4	Lab 4: ohm's Law application in AC circuit
Week 5	Lab 5: series and parallel impedance, delta and star transformation
Week 6	Lab 6: Kirchhoff's Voltage Law
Week 7	Lab 7: Kirchhoff's Current Law
Week 8	Lab 8: implementation of Maxwell's circulating currents (mesh analysis)
Week 9	Lab 9: implementation of Nodal analysis
Week 10	Lab 10: implementation of Superposition theorem
Week 11	Lab 11: implementation of Thevenin's / Norton's Theorem
Week 12	Lab 12: implementation of maximum power transfer theorem
Week 13	Lab 13:AC power measurements (methods and instrumentations)
Week 14	Lab 14: power factor measurements
Week 15	Lab 15: resonance circuits validation

	Learning and Teaching Resources	
	مصادر التعلم والتدريس	
	Text	Available in the Library?
Required Texts	Engineering Circuit Analysis 7th Edition by William Hayt , Jack Kemmerly , Steven Durbin	Yes
Recommended Texts	Schaum's Outline of Basic Circuit Analysis, Second Edition (Schaum's Outlines) 2nd Edition, by John O'Malley	No
Websites	AC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2017.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="5" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center">Mathematics II</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Basic</td><td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☐ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">EE109</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">6</td></tr>
<tr><td>SWL (hr./sem)</td><td colspan="2" align="center">150</td></tr>
<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td colspan="2">2</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td colspan="2">UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>اسم رئيس القسم</td><td>e-mail</td><td colspan="2">البريد الالكتروني لرئيس القسم</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>لقبه العلمي</td><td>Module Leader's Qualification</td><td colspan="2">الشهادة</td></tr>
<tr><td>Module Tutor</td><td>Dr. Saad Enad Mohammed</td><td>e-mail</td><td colspan="2">saadmohamed@uomosul.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td colspan="2">بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/06/2023</td><td>Version Number</td><td colspan="2">1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Provide students with a strong support for basic learning calculus concepts: limits, derivatives, and integration. 2. Help students communicate mathematical ideas through the practice of proper mathematical notations. 3. Help students to verify mathematical ideas through the practice of proper mathematical proof techniques. 4. Developing mathematical thinking and understanding in students by guiding them towards deep thinking rather than "memorizing all the rules". 5. Increase students' awareness of alternate means of learning such as group study, as well as strategies that will enhance the learning of mathematics.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the course, the student will be able to: 1. how to calculate the area under and between curves. 2. interpret a volume of revolution of a function's graph around a given axis as a (Riemann) sum of disks or cylindrical shells, convert to definite integral form and compute its value. 3. express the length of a curve as a (Riemann) sum of linear segments, convert to definite integral form and compute its value. 4. express the surface area of revolution of a function's graph around a given axis as a (Riemann) sum of rings, convert to definite integral form and compute its value. 5. antidifferentiate products of functions by parts. 6. recognize and implement appropriate techniques to anti-differentiate products o trigonometric functions. 7. devise and apply a trigonometric substitution in integrals involving Pythagorean Quotients. 8. decompose a rational integrand using partial fractions. 9. determine convergence of improper integrals with discontinuities in their domain or infinite limits of integration.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following.

	Definite Integrals **Areas between Curves**: The Basic Formula, Curves That Cross Boundaries with Changing Formulas, Integrating with Respect to y, Combining Integrals with Formulas from Geometry, **Volumes of Solids of Revolution:** Disc Method, Washer Method, Cylindrical Shells Method, **Lengths of Curves in the Plane:** The Basic Formula, Dealing with Discontinuities in dy/dx, The Short Differential Formula, **Area of Surfaces of Revolution:** The Basic Formula, Revolution about the y-axis, The Short Differential Form. [16 hrs.] Revision problem and tutorial classes [4 hrs.] Quizzes [2 hr.] **Techniques of Integration:** **Basic Integration Formulas:** Algebraic Procedures and Trigonometric Identities, **Integration by Parts:** The Formula, Repeated Use, Solving for the Unknown Integral, Tabular Integration, **Trigonometric Integrals:** Products of Sines and Cosines, Eliminating Square Roots, Integrals of Powers of tanx and secx, Integrals of Odd Functions, Definite Integrals of Even Functions, **Trigonometric Substitution:** Trigonometric Substitution for Combining Squares, Integrals involving $ax2+bx+c$, $a \neq 0$, Two Useful Formulas, **Rational Functions and Partial Fractions:** General Description of the Method, The Substitution z=tan$(x2/)$. [24 hrs.] Revision problem and tutorial classes [6 hrs.] Quizzes [2 hr.] **Plane Curves and Polar Coordinates**: Polar Coordinates, Definition of Polar Coordinates, Negative Values of r, Changing to Radian Measure, The Use of Radian Measure, Elementary Coordinate, Equations and Inequalities, Cartesian Versus Polar Coordinates, **Graphing in Polar Coordinates:** Symmetry and Slope, Faster Graphing, Finding the Points Where Curves Intersect. [6 hrs.] Revision problem and tutorial classes [2 hrs.] Quizzes [1 hr.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

3

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

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1/5	20% (20)	2, 7, 8, 12, 14	LO #2, 6, 7, 8 and 9
	Assignments	7	20% (20)	2 to 15	LO # 2, 4, 6 7, 8, and 9
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam	1.5 hr	10% (10)	7	LO # 1-6
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Calculus and Area:** Regions Bounded by Curves, Area under the Graph of a Nonnegative Continuous Function.
Week 2	**Definite Integrals:** Constant Functions, Area is Strictly a Special Case.
Week 3	**Indefinite Integrals:** The Indefinite Integral of a Function, Rules of Algebra, The Integrals of $sin2x \; and \; cos2x$, Solving Initial Value Problems with Indefinite Integrals.
Week 4	**Integration by Substitution-Running the Chain Rule Backward:** The Generalized Power Rule in Integral Form, Sines and Cosines, The Substitution Method of Integration, Substitution in Definite Integrals.
Week 5	**Application of Definite Integrals: Areas between Curves**: The Basic Formula, Derived from Riemann Sums, Curves That Cross Boundaries with Changing Formulas, Integrating with Respect to y, Combining Integrals with Formulas from Geometry.

Week 6	**Volumes of Solids of Revolution:** Disc Method, Washer Method, Cylindrical Shells Method.
Week 7	**Lengths of Curves in the Plane:** The Basic Formula, Dealing with Discontinuities in dy/dx, The Short Differential Formula.
Week 8	**Area of Surfaces of Revolution:** The Basic Formula, Revolution about the y-axis, The Short Differential Form.
Week 9	**Techniques of Integration: Basic Integration Formulas**: Algebraic Procedures and Trigonometric Identities.
Week 10	**Integration by Parts:** The Formula, Repeated Use, Solving for the Unknown Integral, Tabular Integration.
Week 11	**Trigonometric Integrals:** Products of Sines and Cosines, Eliminating Square Roots, Integrals of Powers of tanx and secx, Integrals of Odd Functions, Definite Integrals of Even Functions.
Week 12	**Trigonometric Substitution:** Trigonometric Substitution for Combining Squares, Integrals involving $ax2+bx+c$, $a \neq 0$, Two Useful Formulas.
Week 13	**Rational Functions and Partial Fractions:** General Description of the Method, The Substitution z=tan($x2/$).
Week 14	**Plane Curves and Polar Coordinates:** Polar Coordinates, Definition of Polar Coordinates, Negative Values of r, Changing to Radian Measure, The Use of Radian Measure, Elementary Coordinate, Equations and Inequalities, Cartesian Versus Polar Coordinates.
Week 15	**Graphing in Polar Coordinates:** Symmetry and Slope, Faster Graphing, Finding the Points Where Curves Intersect.
Week 16	**Preparatory week before the final Exam**

	Learning and Teaching Resources	
	مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	Calculus, Thirteenth Edition, by George B. Thomas,	Yes
Recommended Texts	Calculus, Mathematics for Engineers and Technologists, 2002, by Huw Fox and Bill Bolton.	No
Websites	Khan Academy math (https://www.khanacademy.org)	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td align="center"><strong style="color:red">Computer programming</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td align="center">Basic</td><td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☒ Lab
☐ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td align="center"><strong style="color:red">EE110</td></tr>
<tr><td>ECTS Credits</td><td align="center">6</td></tr>
<tr><td>SWL (hr./sem)</td><td align="center"><strong style="color:red">150</td></tr>
<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td>2</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td>UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>اسم رئيس القسم</td><td>e-mail</td><td>البريد الالكتروني لرئيس القسم</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>لقبه العلمي</td><td>Module Leader's Qualification</td><td>الشهادة</td></tr>
<tr><td>Module Tutor</td><td>Nagham Hikmat Aziz</td><td>e-mail</td><td>naghamhikmat@uomosul.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

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

Module Aims أهداف المادة الدراسية	1. Introduction of MATLAB program (m file). 2. To understand Types of variables, numbers, Expressions, operation and function. 3. To understand Solving of Electrical circuit in MATLAB program. 4. To perform Solving equation by symbols. 5. To solve the Function and its application (pulse & ramp functions). 6. To perform Engineering graphics (two dimension and three dimensions) such as vector diagram mesh, bar plots). 7. To perform Matrix and its applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Proficiency in MATLAB: Students should develop a strong understanding of the MATLAB programming language, syntax, and functionality. They should be able to write, debug, and modify M-file programs effectively. 2. Problem-solving skills: MATLAB is often used for scientific and engineering applications, so students should learn how to apply MATLAB to solve complex problems in their respective fields. They should be able to analyze problems, develop algorithms, and implement them using MATLAB. 3. Data analysis and visualization: MATLAB offers powerful tools for data analysis and visualization. Students should learn how to import, manipulate, analyze, and visualize data using MATLAB functions and techniques. 4. computation: MATLAB is well-known for its mathematical computing capabilities. Students should become proficient in using MATLAB for performing mathematical computations, including linear algebra and differential equations. 5. Algorithm development: MATLAB allows students to develop algorithms and implement them in M-file programs. They should learn how to break down complex problems into smaller, manageable tasks, design algorithms to solve those tasks, and integrate them into a complete MATLAB program. 6. Code optimization: Students should develop skills in optimizing MATLAB code for improved performance and efficiency. 7. Debugging and troubleshooting: MATLAB programs may encounter errors or produce unexpected results. Students should learn how to effectively debug and troubleshoot their M-file programs, identify and resolve issues, and improve the overall reliability of their code. 8. Documentation and code organization: Writing clear and well-organized code is crucial for collaboration and future maintenance. Students should learn to document their MATLAB programs, including comments, variable naming conventions, and overall code structure.

	9. Project implementation: In some cases, students may be required to develop larger-scale projects using MATLAB. They should learn how to plan, manage, and implement MATLAB-based projects, ensuring that their programs meet the specified requirements and deliver the desired outcomes.
Indicative Contents المحتويات الإرشادية	**Part A - Circuit Components and values** Introduction to MATLAB, Types of variables, Numbers and Expressions, Operation, Functions, Solving set of linear equations, Function and its application (pulse & ramp functions). [14 hrs.] Lab. [14 hrs.] Revision problem and tutorial classes [4 hrs.] **Part B- Circuit reduction** Differentiation, Integration, Solving of Electrical circuit, Engineering graphics (two dimension and three dimensions) such as vector diagram mesh and bar plots, Solving of ordinary differential equation, Curve fitting and interpolation, Matrix and its applications [14 hrs.] Lab. [14 hrs.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	4,8,12	LO #1, 5, 8 and 9
	Assignments	10	5% (5)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
	Projects / Lab.	2	25% (25)	Continuous	All
	Report	0	0% (0)	----	----
Summative assessment	Midterm Exam	2 hr.	10% (10)	8	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to MATLAB, Types of variables, numbers. Expressions
Week 2	Complex Numbers, Array Operations, Matrix Operations.
Week 3	Application of matrix, Solving set of linear equations.
Week 4	Control structures in MATLAB program.
Week 5	Plotting commands for 2-D Graphics.
Week 6	Polynomials analysis.
Week 7	Function Files, its application (pulse & ramp functions)
Week 8	Revision
Week 9	Solving equation by symbols.
Week 10	Numerical Integration.
Week 11	Transient Analysis.
Week 12	Frequency Response using MATLAB
Week 13	Partial fraction Expansion.
Week 14	Application on Battery Charging on circuit.
Week 15	Engineering graphics 3D.
Week 16	Preparatory week before the final Exam

	Delivery Plan (Weekly Lab. Syllabus)
	المنهاج الاسبوعي للمختبر
	Material Covered
Week 1	Introduction to MATLAB, Types of variables, numbers. Expressions
Week 2	Applied Complex Numbers, Array Operations, Matrix Operations.
Week 3	Applied Application of matrix, Solving set of linear equations.
Week 4	Applied Control structures in MATLAB program.
Week 5	Applied Plotting commands for 2-D Graphics.
Week 6	Applied Polynomials analysis.
Week 7	Applied Function Files, its application (pulse & ramp functions)
Week 8	Revision
Week 9	Applied Solving equation by symbols.
Week 10	Applied Numerical Integration.
Week 11	Applied Transient Analysis.
Week 12	Applied Frequency Response using MATLAB
Week 13	Applied Partial fraction Expansion.
Week 14	Applied Application on Battery Charging on circuit.
Week 15	Applied Engineering graphics 3D.

	Learning and Teaching Resources	
	مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	Numerical Analysis Using MATLAB® and Excel® Third Edition, Steven T. Karris.	No
Recommended Texts	2- ELEMENTARY MATHEMATICAL and COMPUTATIONAL TOOLS for ELECTRICAL and COMPUTER ENGINEERS USING MATLAB, Jamal T. Manassah City College of New York,2011	No
Websites	3. ELECTRONICS and CIRCUIT ANALYSIS using MATLAB, JOHN O. ATTIA ,1999.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="5" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center"><b style="color:red">Computer programming</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Basic</td><td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☒ Lab
☐ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center"><b style="color:red">EE110</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">6</td></tr>
<tr><td>SWL (hr./sem)</td><td colspan="2" align="center"><b style="color:red">150</td></tr>
<tr><td>Module Level</td><td colspan="2" align="center">UGI</td><td>Semester of Delivery</td><td>2</td></tr>
<tr><td>Administering Department</td><td colspan="2">2 - (Electrical Engineering)</td><td>College</td><td>UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td colspan="2">اسم رئيس القسم</td><td>e-mail</td><td>البريد الالكتروني لرئيس القسم</td></tr>
<tr><td>Module Leader's Acad. Title</td><td colspan="2">لقبه العلمي</td><td>Module Leader's Qualification</td><td>الشهادة</td></tr>
<tr><td>Module Tutor</td><td colspan="2">Nagham Hikmat Aziz</td><td>e-mail</td><td>naghamhikmat@uomosul.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td colspan="2"></td><td>e-mail</td><td></td></tr>
<tr><td>Scientific Committee Approval Date</td><td colspan="2">01/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Introduction of MATLAB program (m file). 2. To understand Types of variables, numbers, Expressions, operation and function. 3. To understand Solving of Electrical circuit in MATLAB program. 4. To perform Solving equation by symbols. 5. To solve the Function and its application (pulse & ramp functions). 6. To perform Engineering graphics (two dimension and three dimensions) such as vector diagram mesh, bar plots). 7. To perform Matrix and its applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Proficiency in MATLAB: Students should develop a strong understanding of the MATLAB programming language, syntax, and functionality. They should be able to write, debug, and modify M-file programs effectively. 2. Problem-solving skills: MATLAB is often used for scientific and engineering applications, so students should learn how to apply MATLAB to solve complex problems in their respective fields. They should be able to analyze problems, develop algorithms, and implement them using MATLAB. 3. Data analysis and visualization: MATLAB offers powerful tools for data analysis and visualization. Students should learn how to import, manipulate, analyze, and visualize data using MATLAB functions and techniques. 4. computation: MATLAB is well-known for its mathematical computing capabilities. Students should become proficient in using MATLAB for performing mathematical computations, including linear algebra and differential equations. 5. Algorithm development: MATLAB allows students to develop algorithms and implement them in M-file programs. They should learn how to break down complex problems into smaller, manageable tasks, design algorithms to solve those tasks, and integrate them into a complete MATLAB program. 6. Code optimization: Students should develop skills in optimizing MATLAB code for improved performance and efficiency. 7. Debugging and troubleshooting: MATLAB programs may encounter errors or produce unexpected results. Students should learn how to effectively debug and troubleshoot their M-file programs, identify and resolve issues, and improve the overall reliability of their code. 8. Documentation and code organization: Writing clear and well-organized code is crucial for collaboration and future maintenance. Students should learn to document their MATLAB programs, including comments, variable naming conventions, and overall code structure.

	9. Project implementation: In some cases, students may be required to develop larger-scale projects using MATLAB. They should learn how to plan, manage, and implement MATLAB-based projects, ensuring that their programs meet the specified requirements and deliver the desired outcomes.
Indicative Contents المحتويات الإرشادية	**Part A - Circuit Components and values** Introduction to MATLAB, Types of variables, Numbers and Expressions, Operation, Functions, Solving set of linear equations, Function and its application (pulse & ramp functions). [14 hrs.] Lab. [14 hrs.] Revision problem and tutorial classes [4 hrs.] **Part B- Circuit reduction** Differentiation, Integration, Solving of Electrical circuit, Engineering graphics (two dimension and three dimensions) such as vector diagram mesh and bar plots, Solving of ordinary differential equation, Curve fitting and interpolation, Matrix and its applications [14 hrs.] Lab. [14 hrs.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	87	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	4,8,12	LO #1, 5, 8 and 9
	Assignments	10	5% (5)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
	Projects / Lab.	2	25% (25)	Continuous	All
	Report	0	0% (0)	----	----
Summative assessment	Midterm Exam	2 hr.	10% (10)	8	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to MATLAB, Types of variables, numbers. Expressions
Week 2	Complex Numbers, Array Operations, Matrix Operations.
Week 3	Application of matrix, Solving set of linear equations.
Week 4	Control structures in MATLAB program.
Week 5	Plotting commands for 2-D Graphics.
Week 6	Polynomials analysis.
Week 7	Function Files, its application (pulse & ramp functions)
Week 8	Revision
Week 9	Solving equation by symbols.
Week 10	Numerical Integration.
Week 11	Transient Analysis.
Week 12	Frequency Response using MATLAB
Week 13	Partial fraction Expansion.
Week 14	Application on Battery Charging on circuit.
Week 15	Engineering graphics 3D.
Week 16	Preparatory week before the final Exam

	Delivery Plan (Weekly Lab. Syllabus)
	المنهاج الاسبوعي للمختبر
	Material Covered
Week 1	Introduction to MATLAB, Types of variables, numbers. Expressions
Week 2	Applied Complex Numbers, Array Operations, Matrix Operations.
Week 3	Applied Application of matrix, Solving set of linear equations.
Week 4	Applied Control structures in MATLAB program.
Week 5	Applied Plotting commands for 2-D Graphics.
Week 6	Applied Polynomials analysis.
Week 7	Applied Function Files, its application (pulse & ramp functions)
Week 8	Revision
Week 9	Applied Solving equation by symbols.
Week 10	Applied Numerical Integration.
Week 11	Applied Transient Analysis.
Week 12	Applied Frequency Response using MATLAB
Week 13	Applied Partial fraction Expansion.
Week 14	Applied Application on Battery Charging on circuit.
Week 15	Applied Engineering graphics 3D.

	Learning and Teaching Resources	
	مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	Numerical Analysis Using MATLAB® and Excel® Third Edition, Steven T. Karris.	No
Recommended Texts	2- ELEMENTARY MATHEMATICAL and COMPUTATIONAL TOOLS for ELECTRICAL and COMPUTER ENGINEERS USING MATLAB, Jamal T. Manassah City College of New York,2011	No
Websites	3. ELECTRONICS and CIRCUIT ANALYSIS using MATLAB, JOHN O. ATTIA ,1999.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="5" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center">Digital Techniques</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Core</td><td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☐ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">EE111</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">3</td></tr>
<tr><td>SWL (hr./sem)</td><td colspan="2" align="center">75</td></tr>
<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td colspan="2">2</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td colspan="2">UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>اسم رئيس القسم</td><td>e-mail</td><td colspan="2">البريد الالكتروني لرئيس القسم</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>لقبه العلمي</td><td>Module Leader's Qualification</td><td colspan="2">الشهادة</td></tr>
<tr><td>Module Tutor</td><td>Mohammed Idrees dawod</td><td>e-mail</td><td colspan="2">Mohammed.idrees@uomosul.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td colspan="2">بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/06/2023</td><td>Version Number</td><td colspan="2">1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

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

Module Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of Digital circuit theory through the application of techniques. 2. To understand Digital circuit, latches and Flip-flops, asynchronous binary counters, synchronous binary counters. 3. This course deals with the basic concept of latches and Flip-flops, asynchronous binary counters, synchronous binary counters. 4. To construct data storage units/shift registers using flip flops 5. To analyze sequential logic circuits using appropriate tools. 6. To design and analyze synchronous binary, up/down counters.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how combinational logic circuits works. 2. Design combinational logic circuits using combination logic design process. 3. Define and describe various latches and Flip-flops 4. Construct data storage units/shift registers using flip flops 5. Define asynchronous and synchronous Digital circuit 6. Identify how to design and analyze asynchronous binary counters. 7. Explain how to design and analyze BCD asynchronous counters 8. Explain the Synchronous counters Binary Counters 2: bit, 3-bit. 9. Explain the types of shift registers and Shift register counters Ring Counter.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Circuit Components and values** Introduction to Digital Technique, Basic Definitions, System of Numbers, General number formula: Binary, octal, decimal & hexadecimal numbers, Numbers Base Conversion (Arithmetic operation in different numbers complements, binary codes, BCD, Ex-3, gray codes). [9 hrs.] : Revision problem and tutorial classes [6 hrs.] : Quizzes [1 hr.] **Part B- Circuit reduction** Boolean algebra: (Basic definitions, basic theorem & properties, Boolean functions), Canonical & Standard Forms Digital Logic Gates. [12 hrs.]: Revision problem and tutorial classes [8 hrs.]: Quizzes [1 hr.] **Part C- Circuit Theory** Karnaugh Maps (AND & OR implementation, don't care condition), Adders Arithmetic Operation (Sub tractors, half & full adders & Subtractors, binary parallel adders), Code Conversion (Even and odd party logic, decoders, encoders comparator, multiplexers & demultiplexers), Sequential Logic (Flip Flops (RS, T, D, JK…) Master slave FF, Counters, Shift registers).. [24 hrs.]: Revision problem and tutorial classes [16 hrs.]:Quizzes [1 hr.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to Digital Technique, General number formula
Week 2	Numbers Base Conversion, Boolean algebra
Week 3	Canonical & Standard Forms Digital Logic Gates, Karnaugh Maps
Week 4	Adders Arithmetic Operation, Code Conversion
Week 5	Introduction to sequential logic circuit design Latches, S-R Latch, gated RS Latch
Week 6	Edge-triggered Flip-Flops, JK-FF and D-FF Flip-Flop Operating Characteristics
Week 7	Shift Register operation
Week 8	Mid-term Exam
Week 9	Types of shift registers, Shift register counters: Ring Counter
Week 10	Models of State Machines
Week 11	Asynchronous Counters: Ripple counter
Week 12	Synchronous counters: Binary Counters 2: bit, 3-bit
Week 13	BCD Counter
Week 14	Up/down counter
Week 15	Synchronous counters design
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Digital Fundamental: By Thomas L. Floyd 11th Edition Pearson Education Limited (2015)	Yes
Recommended Texts	Contemporary Logic Design, Randy Katz Addison Wesley Publishing Company1993	No
Websites	Introduction to Boolean algebra and logic design by Gerhard and Melvin	

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center">Democracy and Human Rights</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Support</td><td rowspan="4">☒ Theory
☐ Lecture
☐ Lab
☐ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">UOM104</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">2</td></tr>
<tr><td>SWL (hr/sem)</td><td colspan="2" align="center">50</td></tr>
<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td>2</td></tr>
<tr><td>Administering Department</td><td></td><td>College</td><td></td></tr>
<tr><td>Module Leader</td><td>Rashad Adhed Alsaigh</td><td>e-mail</td><td>rashad.alsaigh@uomosul.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Assistant lecturer</td><td>Module Leader's Qualification</td><td>MSc</td></tr>
<tr><td>Module Tutor</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Peer Reviewer Name</td><td>Zainab abd alellah abd alkareem</td><td>e-mail</td><td>lawyerzainabaa@uomosul.edu.iq</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/07/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td>None</td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td>None</td></tr>
</table>

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

Module Aims أهداف المادة الدراسية	The aim of studying the democracy and human rights topics is to: 1. **Understand** the concept of human rights and explore their sources, including international, regional, national, and religious sources. 2. **Define** administrative corruption, explore its types, and understand its detrimental effects on society. Study methods to combat administrative corruption and promote transparency, accountability, and good governance. 3. **Trace** the historical development and evolution of human rights, examining key milestones and movements that have shaped the modern understanding of human rights. 4. **Differentiate** between different categories of human rights, including civil and political rights, economic and social rights, and environmental, cultural, and developmental rights. 5. **Explore** legal, institutional, and societal guarantees to prevent human rights violations, including guarantees of human rights in Islam, national-level protections, and international safeguards. 6. **Comprehend** the concept of democracy, including its principles, values, and various forms of democratic governance such as direct, semi-direct, indirect, and digital democracy. Overall, studying these topics aims to develop a comprehensive understanding of human rights, democracy, and combating corruption, empowering individuals to actively promote and protect human rights and democratic values in society.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	After these module aims, students should be able to: 1. Demonstrate a comprehensive understanding of the concept of human rights and their sources, including international, regional, national, and religious sources. 2. Identify and explain the fundamental characteristics of human rights, such as universality, indivisibility, interdependence, and inalienability. 3. Analyze the historical emergence and evolution of human rights, including key milestones and movements that have shaped their development. 4. Differentiate between different categories of human rights, including civil and political rights, economic and social rights, and environmental, cultural, and developmental rights. 5. Evaluate and apply legal, institutional, and societal guarantees to prevent human rights violations, considering guarantees in Islam, at the national level, and within the international framework. 6. Understand and discuss the concept of democracy, including its principles, values, and different forms of democratic governance. 7. Evaluate the Islamic stance on democracy and engage in critical analysis of the strengths and weaknesses of the democratic system. 8. Recognize and assess the impact of administrative corruption on society and propose methods to combat and prevent corruption in administrative systems. 9. Demonstrate critical thinking skills by analyzing and evaluating different perspectives on human rights, democracy, and corruption. 10. Apply acquired knowledge and skills to promote and protect human rights,

	democracy, and good governance in personal, professional, and civic contexts.
	Overall, students should have a solid understanding of democracy and human rights, democracy, and corruption issues, and be able to apply this knowledge to contribute to the advancement of human rights and democratic values in society.
Indicative Contents المحتويات الإرشادية	The indicative content includes: 1. Definition and sources of democracy and human rights (international, regional, national, religious). [3h] 2. Characteristics of democracy and human rights: universality, indivisibility, interdependence, inalienability. [3h] 3. Emergence and evolution of human rights: historical development, key milestones, influential movements. [3h] 4. Types of human rights: civil and political, economic and social, environmental, cultural, and developmental. [3h] 5. Guarantees to prevent human rights violations: legal, institutional, societal safeguards, Islamic guarantees, national and international levels. [3h] 6. Concept of democracy: principles, values, forms of governance (direct, semi-direct, indirect). [3h] 7. Islamic stance on democracy: compatibility, strengths, weaknesses. [3h] 8. Critique of the democratic system: analysis of strengths and weaknesses. [3h] 9. Administrative corruption: definition, types, societal impact. [3h] 10. Methods to combat administrative corruption. [3h]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	When it comes to learning and teaching strategies for a human rights module, there are several approaches can be taken to enhance understanding and engagement. Here are some effective strategies: 1. Interactive Discussions: Encourage students to actively participate in discussions, debates, and group activities. This promotes critical thinking, allows for different perspectives to be shared, and fosters a deeper understanding of human rights issues. 2. Case Studies: Present real-life case studies that highlight human rights violations or achievements. Analyzing these cases helps students apply theoretical concepts to practical situations and develops their problem-solving skills. 3. Research Projects: Assign research projects on specific human rights topics or issues. This encourages independent learning, critical analysis, and the development of research skills.

4. Collaborative Learning: Foster collaboration among students through group projects or assignments. This encourages teamwork, peer learning, and the exchange of diverse perspectives.
5. Assessment Variety: Use a variety of assessment methods, including essays, presentations, debates, and quizzes, to assess students' understanding of human rights concepts and their ability to apply them to real-world situations.

Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #2, 4, 6 and 8
	Assignments	2	10% (10)	3, 5, 8, 11, 13	LO # 1, 3, 7, 6, 9 and 10
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 2,4,5,7,9and 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 (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered

Week 1	Definition of human rights and sources of rights (international sources / regional sources / national sources / religious sources).
Week 2	Characteristics of human rights.
Week 3	The emergence and evolution of human rights.
Week 4	Types of human rights / civil and political rights. Economic and social rights. Environmental, cultural, and developmental rights.
Week 5	Guarantees to prevent human rights violations / guarantees of human rights in Islam.
Week 6	Guarantees for the protection of human rights at the national level.
Week 7	Guarantees of human rights at the international level.
Week 8	The concept of democracy.
Week 9	Characteristics of a democratic system.
Week 10	Forms of democratic governance (direct democracy / semi-direct democracy / indirect democracy).
Week 11	Digital democracy / definition and advantages and disadvantages of digital democracy / manifestations of digital democracy.
Week 12	The Islamic stance on democracy.
Week 13	Critique of the democratic system.
Week 14	Administrative corruption / definition and types.
Week 15	Methods to combat administrative corruption.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	ضمانات حقوق الانسان وحمايتها وفقا للقانون الدولي والتشريع الوطني / نبيل عبد الرحمن ناصر الدين	No
Recommended Texts	الديمقراطية وحقوق الانسان / د. امير عبد العزيز	No
Websites		

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	**English language**		**Module Delivery**	
Module Type	**Support**		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**UoM221EE112**			
ECTS Credits	**2**			
SWL (hr./sem)	**50**			
Module Level	1	**Semester of Delivery**		2
Administering Department	2 - (Electrical Engineering)	**College**	UoM2 - (Engineering)	
Module Leader		**e-mail**	البريد الالكتروني لرئيس القسم	
Module Leader's Acad. Title	لقبه العلمي	**Module Leader's Qualification**		الشهادة
Module Tutor		**e-mail**		
Peer Reviewer Name	اسم مُراجع الملف	**e-mail**	بريده الالكتروني	
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0	

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

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop Communications skills in the English language. 2. To let the students able to read and write in correct Grammer. 3. To develop the skills of writing professional writing 4. To develop the skills of writing emails for future Engineers	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning Parts of Speech in English 2. Learn different tenses of verbs. 3. Learn active and passive voice. 4. Learn adjectives and adverbs. 5. Learn the correct prepositions. 6. Learn the correct articles	
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A – learn parts of speech** Nouns, verbs, adjectives, articles, pronouns. [9 hrs.] Revision problem and tutorial classes [5 hrs.] Quizzes [1 hr.] **Part B-different tenses** Present simple, present perfect, present continuous, past simple, past perfect, past continuous. [9 hrs.] Revision problem and tutorial classes [6 hrs.] Quizzes [1 hr.] **Part C- active and passive voice** Active and passive voice, since and for [6 hrs.] Revision problem and tutorial classes [6 hrs.] Quizzes [1 hr.]	

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

Student Workload (SWL)

<div dir="rtl">الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا</div>

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

Module Evaluation

<div dir="rtl">تقييم المادة الدراسية</div>

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	3	10% (10)	4,8,12	LO #1, 5, 8 and 9
	Assignments	5	10% (5)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
	Projects	1	20% (25)	Continuous	All
	Report	0	0% (0)	----	----
Summative assessment	**Midterm Exam**	2 hr	10% (10)	8	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

<div dir="rtl">المنهاج الاسبوعي النظري</div>

	Material Covered
Week 1	Introduction
Week 2	Part of speech: Verbs present
Week 3	Part of speech: Verbs past
Week 4	Part of speech: perfect tenses
Week 5	Part of speech: Noun
Week 6	Part of speech: preposition
Week 7	Part of speech: adVerbs
Week 8	Mid-term Exam
Week 9	Part of speech: passive and active
Week 10	Part of speech: since and for

Week 11	Part of speech: articles
Week 12	Part of speech: conjunctions
Week 13	Writing an email
Week 14	Writing an email exercises
Week 15	Technique to fix Grammers.
Week 16	**Preparing week before the Final Exam**

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	NEW HEADWAY INTERMEDIATE	Yes
Recommended Texts	ENGLISH GRAMMAR IN USE	No
Websites	https://www.udemy.com/course/english-for-engineers/	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="5" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr>
<td>Module Title</td>
<td colspan="2" align="center"><strong style="color:red">Electrical Circuits Analysis</td>
<td colspan="2">Module Delivery</td>
</tr>
<tr>
<td>Module Type</td>
<td colspan="2" align="center">Core / C</td>
<td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☐ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td>
</tr>
<tr>
<td>Module Code</td>
<td colspan="2" align="center"><strong style="color:red">EEEC201</td>
</tr>
<tr>
<td>ECTS Credits</td>
<td colspan="2" align="center">6</td>
</tr>
<tr>
<td>SWL (hr./sem)</td>
<td colspan="2" align="center"><strong style="color:red">150</td>
</tr>
<tr>
<td>Module Level</td>
<td>2</td>
<td>Semester of Delivery</td>
<td colspan="2">3</td>
</tr>
<tr>
<td>Administering Department</td>
<td>2 - (Electrical Engineering)</td>
<td>College</td>
<td colspan="2">UoM2 - (Engineering)</td>
</tr>
<tr>
<td>Module Leader</td>
<td>اسم رئيس القسم</td>
<td>e-mail</td>
<td colspan="2">البريد الالكتروني لرئيس القسم</td>
</tr>
<tr>
<td>Module Leader's Acad. Title</td>
<td>لقبه العلمي</td>
<td>Module Leader's Qualification</td>
<td colspan="2">الشهادة</td>
</tr>
<tr>
<td>Module Tutor</td>
<td>Asst. Prof Dr. Omar Sharaf Al-Deen</td>
<td>e-mail</td>
<td colspan="2">o.yehya@uomosul.edu.iq</td>
</tr>
<tr>
<td>Peer Reviewer Name</td>
<td>اسم مُراجع الملف</td>
<td>e-mail</td>
<td colspan="2">بريده الالكتروني</td>
</tr>
<tr>
<td>Scientific Committee Approval Date</td>
<td>10/06/2023</td>
<td>Version Number</td>
<td colspan="2">1.0</td>
</tr>
</table>

<table>
<tr><td colspan="3" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr>
<td>Prerequisite module</td>
<td>Basics of Electrical Engineering I and Basics of Electrical Engineering II</td>
<td>Semester</td>
</tr>
<tr>
<td>Co-requisites module</td>
<td>None</td>
<td>Semester</td>
</tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents

<table>
<tr><td colspan="2" align="center">Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</td></tr>
<tr>
<td>Module Aims
أهداف المادة الدراسية</td>
<td>

1. Ability to understand the AC Circuit Power Analysis and Poly-phase Circuits
2. Ability to determine the Transient Response of RL /RC Circuit and the Transient Response of RLC Circuit
3. Ability to analysis Magnetically Coupled Circuits and Ideal Transformers
4. Ability to solve the mathematical equations for Complex Frequency, Laplace Transform, Frequency Response and Fourier Circuit Analysis
5. Ability to synthesize the Circuit Analysis in the s-Domain and Two-Port Networks
</td>
</tr>
<tr>
<td>Module Learning Outcomes

مخرجات التعلم للمادة الدراسية</td>
<td>

1. Use basic electrical DC concepts and theorems to analyze circuits
2. Build and simulate electrical DC circuits and perform measurements with electronic test equipment
3. Understand the fundamental concepts of electrical circuits, including voltage, current, resistance, and power.
4. Analyze and solve basic DC (direct current) circuits using Ohm's Law, Kirchhoff's Laws, and nodal/mesh analysis techniques.
5. Apply techniques to analyze and solve AC (alternating current) circuits, including complex impedance, phasor representation, and frequency response.
6. Demonstrate proficiency in analyzing circuits with passive elements such as resistors, capacitors, and inductors.
7. Use circuit simulation software and laboratory equipment to verify theoretical analysis and gain practical experience in circuit analysis.
8. Analyze and solve circuits with operational amplifiers (op-amps), including understanding their basic configurations and applications.
9. Understand the concepts of power in electrical circuits, including active power, reactive power, and power factor correction.
10. Develop critical thinking and problem-solving skills by applying circuit analysis techniques to real-world electrical engineering problems.
</td>
</tr>
<tr>
<td>Indicative Contents
المحتويات الإرشادية</td>
<td>

Indicative content includes the following.
<u>Part A - Transient Circuits</u>
The Transient Circuits: RC, RL, RLC circuit in series and parallel and their complete response in time and Frequency. [16 hrs.]
Revision problem and tutorial classes [8 hrs.]
Quizzes [1 hr.]
</td>
</tr>
</table>

	Part B- Poly-phase Circuits
	Poly-phase Circuits: Single-phase and three phase wire system, 3-Phase balance and unbalance system star and delta connections, Power in 3-phase circuits. [**16 hrs**.]
	Revision problem and tutorial classes [**8 hrs**.]
	Quizzes [**1 hr**.]
	Part C- Coupling
	Coupling: Magnetic coupling, Coefficient of coupling, Linear and ideal transformers. [**12 hrs**.]
	Revision problem and tutorial classes [**6 hrs**.]
	Part D- Two-Port Networks
	Two-Port Networks: One-pot networks, y-z-h-g and ABCD parameters.
	Filters: Constant k-filters, Low pass and high pass modern filter design, Active filter. [**16 hrs**.]
	Revision problem and tutorial classes [**8 hrs**.]
	Quizzes [**1 hr**.]

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	4,8,12	LO #1, 5, 8 and 9
	Assignments	10	5% (5)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
	Projects / Lab.	0	0% (0)	----	----
	Report	0	0% (0)	----	----
Summative assessment	Midterm Exam	2 hr	25% (25)	7	LO # 1-5
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction; syllabus; Advantages and Disadvantages of Electrical Networks as a different circuits .
Week 2	Transient Response of RL Circuit
Week 3	Transient Response of RC Circuit
Week 4	Transient Response of RLC Circuit / Parallel connection
Week 5	Transient Response of RLC Circuit / Series connection
Week 6	Poly-phase Circuits
Week 7	Mid-term Exam
Week 8	Three phase circuit analysis / Balance load
Week 9	Three phase circuit analysis / Un-Balance load
Week 10	Magnetically Coupled Circuits
Week 11	Linear and Ideal Transformers
Week 12	Frequency Response
Week 13	Circuit Analysis in the S-Domain
Week 14	Two-Port Networks
Week 15	Filters
Week 16	Preparatory week before the final Exam

<table>
<tr><td colspan="3" align="center">**Learning and Teaching Resources**
مصادر التعلم والتدريس</td></tr>
</table>

	Text	Available in the Library?
Required Texts	Engineering Circuit Analysis Eight Edition (William H. Hayt) 2012 Fundamentals of Electric Circuits (Charles K. Alexander)2009	Yes
Recommended Texts	Electric Circuits Tenth Edition (James W. Nilsson) 2015	Yes
Websites	**https://www.pdfdrive.com/schaums-outline-of-electric-circuits-e185851170.html**	

<table>
<tr><td colspan="5" align="center">**Grading Scheme**
مخطط الدرجات</td></tr>
</table>

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center">Engineering Mathematics I</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Basic</td><td rowspan="4">☒ Theory
☐ Lecture
☐ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">EEEC202</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">5</td></tr>
<tr><td>SWL (hr./sem)</td><td colspan="2" align="center">125</td></tr>
<tr><td>Module Level</td><td>2</td><td>Semester of Delivery</td><td>3</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td>UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>اسم رئيس القسم</td><td>e-mail</td><td>البريد الالكتروني لرئيس القسم</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>لقبه العلمي</td><td>Module Leader's Qualification</td><td>الشهادة</td></tr>
<tr><td>Module Tutor</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td>بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents
	أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Aims أهداف المادة الدراسية	1. Develop problem-solving skills and understand partial differentiation. 2. Understand the chain rule and the total derivative. 3. Understand vectors and units, space coordinates, and space vectors. 4. Understand gradient, divergence, and Curl in curved coordinates. 5. Solving linear differential equations of the first and second order with constant coefficients. 6. Understanding Fourier series.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the concept of partial derivatives for functions of two or more variables. 2. Understand the concept of the total derivative and its relationship to partial derivatives. 3. Determine whether a critical point is a maximum, minimum, or saddle point using the second derivative test or other methods. 4. Understand vector representation and components in Cartesian coordinates. 5. Understand the geometric interpretation of the vector product. 6. Express gradient, divergence, and curl in terms of curvilinear coordinates. 7. Solve first and second-order linear differential equations with constant coefficients. 8. Understand the need for Fourier series in representing periodic functions. 9. Understand double integrals and their properties.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Partial Differentiation and Vectors** Partial Differentiation, function of two or more variables, partial derivatives, The Chain Rule and total Derivative, maxima, minima and saddle point, Vectors component and Units, Space coordinate and Space Vector, Scalar Product and Vector Product, Product of Three Vectors, Applications [20 hrs.] Revision problem and tutorial classes [5 hrs.] Quizzes [1 hr.] **Part B- Vector Calculus and Differential Equations** Vector Functions and Their Derivatives, Gradient of Scalar Field, Divergence of Vector Field, Curl of Vector Field, Directional Derivatives, Gradient, Divergence, and Curl in Curvilinear Coordinates, 1st and 2nd order linear differential equations. [20 hrs.] Revision problem and tutorial classes [5 hrs.] Quizzes [1 hr.] **Part C- Fourier Series and Multiple Integrals** Fourier series, Periodic functions and Fourier Series-Euler formulas, Double integrals, areas, and volumes [20 hrs.] Revision problem and tutorial classes [5 hrs.] Quizzes [1 hr.]

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	4,8,12	All
	Assignments	10	5% (5)	2 to 12	All
	Project	2	15% (15)	Continuous	All
	Report	0	0% (0)	----	----
Summative assessment	Midterm Exam	2hr	25% (25)	8	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Partial Differentiation: Function of two or more variables, partial derivatives.
Week 2	The Chain Rule and Total Derivative, Maxima, minima, and saddle points.
Week 3	Vectors: Vector components and units, Space coordinates and space vectors.
Week 4	Scalar Product and Vector Product, Units and plane equations.
Week 5	Equations of lines and planes, Product of Three Vectors, Applications of vectors.
Week 6	Vector Functions and Their Derivatives, Gradient of Scalar Field.
Week 7	Divergence of Vector Field, Curl of Vector Field.
Week 8	Mid-term Exam
Week 9	Directional Derivatives, Gradient, Divergence, and Curl in Curvilinear Coordinates.
Week 10	Introduction to Differential Equations, 1st and 2nd order linear differential equations.
Week 11	Application of differential equations to electrical systems.
Week 12	Transformation of higher order linear differential equations onto coupled differential equations.
Week 13	Periodic functions and Fourier Series-Euler formulas.
Week 14	Application of Fourier series in Electrical Engineering.
Week 15	Double integrals, areas, and volumes
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		No
Recommended Texts		No
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	**Electronics Principles**		**Module Delivery**	
Module Type	Core / C		☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**EEEC203**			
ECTS Credits	**5**			
SWL (hr./sem)	**125**			
Module Level	2	**Semester of Delivery**		3
Administering Department	2 - (Electrical Engineering)	**College**	UoM2 - (Engineering)	
Module Leader	Dr. Mohammed Tariq Yaseen	**e-mail**	mtyaseen@uomosul.edu.iq	
Module Leader's Acad. Title	Assist. Prof.	**Module Leader's Qualification**		Doctor
Module Tutor	Mr. Shamil Hamzah Hussein	**e-mail**	Shamil_alnajjar84@uomosul.edu.iq	
Peer Reviewer Name	اسم مُراجع الملف	**e-mail**	بريده الالكتروني	
Scientific Committee Approval Date	10/06/2023	**Version Number**	1.0	

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

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

Module Aims أهداف المادة الدراسية	1. To develop problem solving skills of electronic circuit through the understanding solid state for each electronic passive and active elements such as RLC, diodes, transistors, and integrated circuits. 2. To understand the Basic Transistor Construction through graphical analysis of transistors Connections and biasing. 3. This course deals with the basic concept of the small-signal analysis of the transistors such as D.C. and A.C. Equivalent Circuits. 4. To understand the Load Line Analysis, Operating Point Transistor Parameters, and Rating Amplification Stabilization. 5. To understand the H-parameters, Hybrid Equivalent Circuit. Z-parameters, R-parameters Equivalent Circuit. 6. To perform current-voltage characteristics, charge control description for all types of both the diode and transistors. 7. To Describe and operation of the Multistage Transistor Amplifiers
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the regions of operation, graphical analysis of BJT, regions of operation stability. 2. List the various terms associated with bias configuration of the transistors. 3. Summarize what is meant of the practical circuit of transistor amplifier. 4. Describe the types of multistage amplifiers. 5. Discuss the various properties of transistors used as an amplifier 6. Explain the transistor construction and operation such as amplifier and switching. 7. Explain the operation of the linear amplifier through the a.c. load line and DC load line analysis.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Transistor Construction, Operation, and Stabilization** Transistor Construction. Transistor Symbols. Transistor Operation. Transistor Connections: Common Base CB Connection, Common Emitter CE Connection, Transistor Curves, Cutoff and Saturation. Transistor as a switch. Common Collector Connection. Transistor Load Line Analysis, Operating Point, Transistor Parameters and Rating Amplification. Stabilization, Stability Factor Methods of Transistor Biasing. [**15 hrs**.] Revision problem and tutorial classes [**5 hrs**.] Quizzes [**1 hr**.] **Part B- D.C and A.C Equivalent Circuits of the transistors** Practical Circuit of Transistor Amplifier, D.C. and A.C. Equivalent Circuits. Transistor ac Equivalent Circuits h-parameters, Hybrid Equivalent Circuit. r-parameters, r-parameters Equivalent Circuit. The Linear Amplifier. [**15 hrs**.] Revision problem and tutorial classes [**5 hrs**.] Quizzes [**1 hr**.]

	Part C- Transistor Bias Configuration and Multistage Transistor Amplifiers
	The a.c. Load Line, A.C. Analysis Using re Model for Transistor Common Emitter Fixed Bias Configuration, Common-Emitter Emitter Bias Configuration, Common – Emitter Collector Feedback Configuration, Common – Emitter Voltage Divider Configuration. The Common – Collector Amplifier, the Common – Base Amplifier. Multistage Transistor Amplifiers. [**15 hrs**.]
	Revision problem and tutorial classes [**5 hrs**.]
	Quizzes [**1 hr**.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (5)	4,8,14	LO #1, 4, 6 and 7
	Assignments	10	5% (5)	2 to 13	LO #1, 2, 3, 4, 5 and 7
	Projects	0	0 (0)	----	-----
	Report	2	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2 hr	15% (15)	7	LO # 4-7
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

<table>
<tr><td colspan="2" align="center">Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري</td></tr>
<tr><td></td><td>Material Covered</td></tr>
<tr><td>Week 1</td><td>Transistor Construction. Transistor Symbols. Transistor Operation.</td></tr>
<tr><td>Week 2</td><td>Transistor Connections: Common Base CB Connection, Common Emitter CE Connection.</td></tr>
<tr><td>Week 3</td><td>Transistor Curves, Cutoff and Saturation. Transistor as a switch. Common Collector Connection.</td></tr>
<tr><td>Week 4</td><td>Transistor Load Line Analysis, Operating Point, Transistor Parameters and Rating Amplification.</td></tr>
<tr><td>Week 5</td><td>Stabilization, Stability Factor Methods of Transistor Biasing.</td></tr>
<tr><td>Week 6</td><td>Practical Circuit of Transistor Amplifier.</td></tr>
<tr><td>Week 7</td><td>D.C. and A.C. Equivalent Circuits. Transistor ac Equivalent Circuits.</td></tr>
<tr><td>Week 8</td><td>Transistor ac Equivalent Circuits h-parameters, Hybrid Equivalent Circuit.</td></tr>
<tr><td>Week 9</td><td>Transistor ac Equivalent Circuits, r-parameters, r-parameters Equivalent Circuit.</td></tr>
<tr><td>Week 10</td><td>The Linear Amplifier.</td></tr>
<tr><td>Week 11</td><td>The a.c. Load Line, A.C. Analysis Using re Model for Transistor Common Emitter Fixed Bias Configuration.</td></tr>
<tr><td>Week 12</td><td>The a.c. Load Line, A.C. Analysis Using re Model for Transistor Common – Emitter Emitter – Bias Configuration, Common – Emitter Collector Feedback Configuration.</td></tr>
<tr><td>Week 13</td><td>The a.c. Load Line, A.C. Analysis Using re Model for Transistor Common – Emitter Voltage Divider Configuration.</td></tr>
<tr><td>Week 14</td><td>The Common – Collector Amplifier, the Common – Base Amplifier.</td></tr>
<tr><td>Week 15</td><td>Multistage Transistor Amplifiers.</td></tr>
<tr><td>Week 16</td><td>Preparatory week before the final Exam</td></tr>
</table>

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Floyd, Thomas L. Electronics Fundamentals: Circuits, Devices and Applications (Floyd Electronics Fundamentals Series). Prentice-Hall, Inc., 2006.	Yes
Recommended Texts	Donald A. Neamen. (2003). "SEMICONDUCTOR PHYSICS AND DEVICES". 3rd Edition, ISBN 0-07-232107-05, USA. (can be downloaded from the Course web page/classroom).	Yes
Websites	Nashelsky, L., & Boylestad, R. L. (2021). Electronic Devices and Circuit Theory Eleventh Edition.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td align="center"><strong style="color:red">Communication Principles</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td align="center">Core</td><td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☐ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td align="center"><strong style="color:red">EEEC204</td></tr>
<tr><td>ECTS Credits</td><td align="center">5</td></tr>
<tr><td>SWL (hr./sem)</td><td align="center"><strong style="color:red">125</td></tr>
<tr><td>Module Level</td><td>2</td><td>Semester of Delivery</td><td>3</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td>UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>اسم رئيس القسم</td><td>e-mail</td><td>البريد الالكتروني لرئيس القسم</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>لقبه العلمي</td><td>Module Leader's Qualification</td><td>الشهادة</td></tr>
<tr><td>Module Tutor</td><td>Dr. Omar Mustafa Ali</td><td>e-mail</td><td>omarmostafa@uomosul.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td>بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of the propagation methods of electrical signals across transmission lines. 2. To understand the reflection in transmission line. 3. This course deals with the mathematical calculations for the propagation of signals through transmission lines. 4. This is the basic subject for all A.C. Steady state transmission line. 5. To understand crank method for the analysis of transmission lines. 6. To perform graphical solution of lossless transmission line using Smith chart. 7. To perform transmission line matching using Quarter Wave Transformer ($\lambda/4$).	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Know the propagation methods of electrical signals across transmission lines. 2. Conduct mathematical calculations for the propagation of signals through transmission lines. 3. Handling crank method in the analysis of transmission lines. 4. Use the Smith chart and its applications. 5. Identify types of electrical signals. 6. Analysis of electrical signals using Fourier series and Fourier transform.	
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Transmission Lines basics** Reflection in transmission line, Space-Time diagram (zig-zag), Discharge of transmission line. Transmission line equation, Propagation constant, Transmission line distortion, A.C. Steady state transmission line, Standing wave in transmission line. [16 hrs.] Revision problem and tutorial classes [4hrs.] Quizzes [1 hr.] **Part B- Transmission Lines analysis** Graphical solution of lossless transmission line using Crack diagram. Graphical solution of lossless transmission line using Smith chart. Graphical solution of lossy transmission line using Smith chart. Transmission line matching using Quarter Wave Transformer ($\lambda/4$). Transmission line matching using single stub. [16hrs.] Revision problem and tutorial classes [4 hrs.] Quizzes [1 hr.] **Part C- Signals and Systems** Signal classifications. Fourier series. Fourier Transform. Signals and linear systems. Power spectral density and Correlation. [16 hrs.] Revision problem and tutorial classes [4 hrs.] Quizzes [1 hr.]	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy for delivering this module will be to encourage students to participate in the exercises while also refining and expanding their critical thinking skills. This will be accomplished through classes, interactive tutorials, and the consideration of simple experiments involving some sampling activities that students find interesting.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	4,8,12	All
	Assignments	10	5% (5)	2 to 12	All
	Projects	2	15% (15)	Continuous	All
	Report	0	0% (0)	----	----
Summative assessment	Midterm Exam	2 hr	25% (25)	10	All
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction, Transmission Line Analysis.
Week 2	Reflection in transmission line, Space-Time diagram (zig-zag).
Week 3	Discharge of transmission line.
Week 4	Transmission line equations
Week 5	Graphical solution of lossless transmission line using Crank diagram.
Week 6	Graphical solution of lossless transmission line using Smith chart.
Week 7	Graphical solution of lossy transmission line using Smith chart.
Week 8	Transmission line matching using Quarter Wave Transformer ($\lambda/4$).
Week 9	Transmission line matching using single stub.
Week 10	Mid-term Exam
Week 11	Signal classifications.
Week 12	Fourier Series.
Week 13	Fourier Transform.
Week 14	Signals and linear systems 1.
Week 15	Signals and linear systems 2.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	The fundamentals of signal transmission line by Lem Ibbotson, 1999. Modern digital and analog communication systems by Lathi, 1998. Communications Principles by Dr. Sami Mohamed, 1989. Transmission line and network by Johnson.	no
Recommended Texts	Transient signal on transmission lines by Peterson, 2009.	No
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	**Electromagnetic Fields**	**Module Delivery**	
Module Type	**Basic**	☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**EEEC205**		
ECTS Credits	**4**		
SWL (hr./sem)	**100**		
Module Level	2	**Semester of Delivery**	3
Administering Department	2 - (Electrical Engineering)	**College** UoM2 - (Engineering)	
Module Leader	Dr. Mohammed Tariq Yaseen	**e-mail**	mtyaseen@uomosul.edu.iq
Module Leader's Acad. Title	Assist. Prof.	**Module Leader's Qualification**	Doctor
Module Tutor	Mr. Shamil Hamzah Hussein	**e-mail**	Shamil_alnajjar84@uomosul.edu.iq
Peer Reviewer Name	اسم مُراجع الملف	**e-mail**	بريده الالكتروني
Scientific Committee Approval Date	10/06/2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop problem solving skills of coordinate systems through the understanding the rectangular coordinate system, cylindrical coordinate system, spherical coordinate system. 2. To understand the vector analysis (scalars and vectors).

	3. This course deals with the basic concept of the Electric Field Intensity, Electric Flux Density, magnetic Field Intensity, and magnetic Flux Density.
	4. To understand the Energy and Potential.
	5. To understand the electric fields in material space. conductors, dielectrics, and capacitance.
	6. To perform the electric fields due to continuous charge distributions.
	7. To understand the magnetic field due to different current distributions.
	8. To understand different laws such as Coulomb's Law, Gauss's Law, Biot-Savart's Law, Ampere's Law, and Faraday's Law.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the electric field, electric field intensity, and charge distributions.
	2. Recognize the magnetic Field Intensity, and magnetic Flux Density
	3. List the various terms associated with continuous charge and different current distributions.
	4. Summarize what is meant by a coordinate system, scalars and vectors analysis, conductors, dielectrics, capacitance, and inductance.
	5. Describe the electric flux density and gauss's law. magnetic Flux Density and Ampere's Law.
	6. Discuss the various charge and current distributions such as line, sheet, and volume.
	7. Explain the work, potential & potential difference.
	8. Explain the electric fields in material space. conductors, dielectrics, and capacitance.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Coordinate systems and Vector analysis** coordinate systems: rectangular coordinate system, cylindrical coordinate system, spherical coordinate system. vector analysis: scalars and vectors, vector algebra, vector components and unit vectors, vector addition and subtraction, vector multiplication. coulomb's law and electric force: the experimental law of coulomb. Magneto-statics: the static magnetic fields, biot-savart law. Magneto-statics: magnetic field due to different current distributions, right-hand rule. Magneto-statics: solenoid, applications of solenoid, toroid. [**8 hrs**.] Revision problem and tutorial classes [**4 hrs**.] Quizzes [**1 hr**.] **Part B- Electric field intensity and Charge distributions** electric field intensity: electric field of a point charge, electric field of n point charges. electric fields due to continuous charge distributions: electric field of a line charge. electric fields due to continuous charge distributions: electric field of a sheet of charge. electric fields due to continuous charge distributions: electric field of a volume of charge. Magneto-statics: ampere's circuital law, applications of ampere's law: infinite line current, infinite sheet of current, infinitely long coaxial transmission line. Magneto-statics: magnetic flux and magnetic flux density. inductance: inductance of a conductor, inductance of toroid. [**8 hrs**.] Revision problem and tutorial classes [**4 hrs**.] Quizzes [**1 hr**.] **Part C- Electric flux density and Gauss's law application**

	Electric flux density and gauss's law: gauss's law application on a point charge, gauss's law application on a line charge. electric flux density and gauss's law: gauss's law application on a surface charge. electric flux density and gauss's law: gauss's law application on a volume charge. work, potential & potential difference: work done in moving a point charge. work, potential & potential difference: potential & potential difference. Force on a moving charge. magnetic forces, work & power: work. magnetic forces, work & power: power. time varying fields: faraday's law. time varying fields: induced electromotive force. [**6 hrs**.] Revision problem and tutorial classes [**3 hrs**.]
	Part D- conductors, dielectrics, and capacitance conductors, dielectrics, and capacitance: electric fields in material space. conductors, dielectrics, and capacitance: dielectric – dielectric boundary conditions, conductor – dielectric boundary conditions, conductor – free space boundary conditions. conductors, dielectrics, and capacitance: capacitance and capacitors. Maxwell's equations: the vector operator (del) and the divergence theorem. Maxwell's equations: derivation of Maxwell's equations and applications. Maxwell's equations: the uniform plane wave. Maxwell's equations: wave propagation in free space. [**8 hrs**.] Revision problem and tutorial classes [**4 hrs**.] Quizzes [**1 hr**.]

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	1	10% (10)	4,8,14	LO #1, 4, 6 and 7
	Assignments	10	5% (5)	2 to 13	LO #1, 2, 3, 4, 5 and 7
	Projects	0	0% (0)	----	-----
	Report	0	0% (0)	----	----
Summative assessment	**Midterm Exam**	2 hr	25% (25)	7	LO # 4-7
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	coordinate systems: rectangular coordinate system, cylindrical coordinate system, spherical coordinate system. vector analysis: scalars and vectors.
Week 2	Vector analysis: vector algebra, vector components and unit vectors, vector addition and subtraction. vector multiplication. coulomb's law and electric force: the experimental law of coulomb.
Week 3	Electric field intensity: electric field of a point charge, electric field of n point charges. Electric fields due to continuous charge distributions: electric field of a line charge. electric field of a volume of charge.
Week 4	Electric flux density and gauss's law: gauss's law application on a point charge, gauss's law application on a line charge.
Week 5	Electric flux density and gauss's law: gauss's law application on a surface charge. electric flux density and gauss's law: gauss's law application on a volume charge.
Week 6	Work, potential & potential difference: work done in moving a point charge. work, potential & potential difference: potential & potential difference. Conductors, dielectrics, and capacitance: electric fields in material space. conductors, dielectrics, and capacitance.
Week 7	dielectric – dielectric boundary conditions, conductor – dielectric boundary conditions, conductor – free space boundary conditions. Conductors, dielectrics, and capacitance: capacitance and capacitors.
Week 8	Magneto-statics: the static magnetic fields, biot-savart law. magnetic field due to different current distributions. right-hand rule. solenoid, applications of solenoid, toroid. ampere's circuital law, applications of ampere's law. applications of ampere's law: infinite line current, infinite sheet of current. infinitely long coaxial transmission line.
Week 9	Magneto-statics: magnetic flux and magnetic flux density. inductance: inductance of a conductor, inductance of toroid.
Week 10	Magnetic forces, work & power: force on a moving charge. work and power.
Week 11	Magnetic forces, work & power: power. time varying fields: faraday's law. time varying fields: induced electromotive force.

Week 12	Maxwell's equations: the vector operator (del) and the divergence theorem
Week 13	Maxwell's equations: derivation of Maxwell's equations and applications.
Week 14	Maxwell's equations: the uniform plane wave.
Week 15	Maxwell's equations: wave propagation in free space.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Johnk, Carl Theodore Adolf. "Engineering electromagnetic fields and waves." New York (1975).	Yes
Recommended Texts	Rojansky, Vladimir Borisovich, and Vladimir Rojansky. Electromagnetic fields and Waves. Courier Corporation, 1979. (can be downloaded from the Course web page/classroom).	Yes
Websites	Nefyodov, Eugene I., and Sergey Smolskiy. Electromagnetic fields and waves. Springer, 2019.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center"><strong style="color:red">Electrical Engineering Lab. I</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Core</td><td rowspan="4">☐ Theory
☐ Lecture
☒ Lab
☐ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center"><strong style="color:red">EEEC206</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">3</td></tr>
<tr><td>SWL (hr./sem)</td><td colspan="2" align="center"><strong style="color:red">75</td></tr>
<tr><td>Module Level</td><td>2</td><td>Semester of Delivery</td><td>3</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td>UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>اسم رئيس القسم</td><td>e-mail</td><td>البريد الالكتروني لرئيس القسم</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>لقبه العلمي</td><td>Module Leader's Qualification</td><td>الشهادة</td></tr>
<tr><td>Module Tutor</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td>بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To handle laboratory equipment and electrical elements professionally and scientifically. 2. To analyze electrical circuits and comprehend their operational principles. 3. To cultivate a scientific mindset in the student by interpreting practical results based on theoretical concepts. 4. To enhance the student's capability to design basic electronic circuits in accordance with their scientific aptitude. 5. To analyze and simulate circuit processes using various software tools on electronic calculators and compare the analysis results with practical outcomes.	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Dealing with laboratory equipment and electrical elements in a professional and scientific manner(i). 2. Ability to analyze electrical circuits and understand the nature of their work(ii). 3. Building a scientific mentality for the student through his ability to interpret the practical results according to theoretical concepts(iii). 4. Develop the student's ability to design simple electronic circuits in line with his scientific abilities(iv). 5. Analyze and simulate the process circuit using different software on the electronic calculator and match the results of the analysis with the practical results(v).	
Indicative Contents المحتويات الإرشادية	Indicative content includes the following.	

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes				
	Assignments				
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam				
	Final Exam				
Total assessment			100% (100 Marks)		

	Delivery Plan (Weekly Lab. Syllabus)
	المنهاج الاسبوعي للمختبر
	Material Covered
Week 1	Introduction & representation about first group of experiments
Week 2	Thevenin theory in AC circuits
Week 3	Measurement of power factor in electrical networks
Week 4	Study of I-V characteristics of normal diode & zener diode
Week 5	First quiz
Week 6	Introduction & representation about second group of experiment
Week 7	Diode application I: Rectifier filters
Week 8	Diode application II: Clipping & clamping circuits
Week 9	Transient condition for R-L & R-C circuits
Week 10	Second quiz + first term theoretical exam. for 1st &2nd group
Week 11	First term practical exam
Week 12	Introduction & representation about third group of experiment
Week 13	Transient condition for RLC circuits
Week 14	Transformer tests: open, short & load test
Week 15	Study of common emitter transistor characteristics

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• Electrical technology (twenty-third edition) BL.THERAJA, AK. THERAJA S. Chand and company Ltd. (2005), ISBN: 81-219-2440-5. • Electronics devices (Ninth edition) by Thomas L. Floyd (2012), Prentice Hall ISBN-13: 978-0-13-254986-8.	No
Recommended Texts		No
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center"><strong style="color:red">Electronic Circuits</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Core / C</td><td rowspan="4">☒ Theory
☒ Lecture
☐ Lab
☒ Tutorial
☐ Practical
☒ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center"><strong style="color:red">EEEC210</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">5</td></tr>
<tr><td>SWL (hr./sem)</td><td colspan="2" align="center"><strong style="color:red">125</td></tr>
<tr><td>Module Level</td><td>2</td><td>Semester of Delivery</td><td>4</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td>UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>Dr. Mohammed Tariq Yaseen</td><td>e-mail</td><td>mtyaseen@uomosul.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Assist. Prof.</td><td>Module Leader's Qualification</td><td>Doctor</td></tr>
<tr><td>Module Tutor</td><td>Mr. Shamil Hamzah Hussein</td><td>e-mail</td><td>Shamil_alnajjar84@uomosul.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td>بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>10/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop problem solving skills of the Field Effect Transistors through the basic operation, Symbols, and current-voltage Characteristics. 2. To understand Basic Junction Field Effect Transistor (JFET) through graphical analysis, Connections, and biasing circuits. 3. This course deals with the basic concept of the Field Effect Transistors FET, Junction Field Effect Transistor JFET, Metal Oxide Semiconductor FET (MOSFET), and Tuned Amplifiers. 4. To understand the D.C. And A.C. Equivalent Circuits of the FET, JFET, MOSFET. 5. To understand the Silicon Controlled Rectifier, Diac, Thyristor, GTO and Triac. 6. To perform the Equations for Trans conductance Curve. 7. To Describe and operation of High Frequency Equivalent Circuit, Low – Frequency Equivalent Circuit.	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the classes of the Frequency Response of the Amplifiers. 2. List the various terms associated with transistor amplifiers. 3. Summarize what is meant by an active electronic device such as FET, JFET, and MOSFET. 4. Describe the types of MOSFET Biasing Circuits. 5. Discuss the various properties of Silicon Controlled Rectifier, Diac, Thyristor, GTO and Triac. 6. Explain the Small – Signal Model of FET, JFET, and MOSFET. 7. Explain the Types of MOSFET and operation modes.	
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Field Effect Transistors** Types of Field Effect Transistors: Junction Field Effect Transistor JFET, Basic Structure, Basic Operation, JFET Symbols. Difference Between JFET and Bipolar Transistor JFET Characteristics Important Terms (IDSS, VP, VGS (off) Expression for Drain Current ID Advantages of JFET Parameters of JFET, Relation Among JFET Parameters, Variation of Trans conductance gm of JFET. JFET Biasing Circuit: JFET Biasing by Bias Battery, Self – Bias for JFET, JFET with Voltage – Divider Bias. JFET Connections: Common Source Connection, Common Gate Connection, Common Drain Connection. [**15 hrs**.] Revision problem and tutorial classes [**5 hrs**.] Quizzes [**1 hr**.] **Part B- D.C. And A.C. Equivalent Circuits of JFET and Introduction of MOSFET** Practical JFET Amplifier, D.C. And A.C. Equivalent Circuits of JFET. D.C. Load Line Analysis JFET Small – Signal Model JFET A.C. Equivalent Circuit Fixed – Bias Configuration Self – Bias Configuration Voltage – Divider Configuration Common – Gate Configuration Source – Follower (Common – Drain) Configuration JFET Applications. Metal Oxide Semiconductor FET (MOSFET): Types of MOSFET D – MOSFET, Circuit Operation of D – MOSFET. [**15 hrs**.] Revision problem and tutorial classes [**5 hrs**.] Quizzes [**1 hr**.]	

	Part C- Depletion and Enhancement Mode MOSFET, and Frequency Equivalent Circuit
	Depletion Mode, Enhancement Mode D – MOSFET. Transfer Characteristic D – MOSFET. Biasing D – MOSFET Small – Signal Model E – MOSFET, Operation, Schematic Symbols, Equation for Trans conductance Curve. E – MOSFET Biasing Circuits E – MOSFET Small – Signal Model, E – MOSFET Drain – Feedback Configuration, E – MOSFET Voltage – Divider Configuration E – MOSFET Versus D – MOSFET Tuned Amplifiers, Single – Tuned Amplifiers, Double – Tuned Amplifiers Introduction to Four – Layer Devices Description and Operation of Silicon Controlled Rectifier, Diac, Thyristor, GTO and Triac. High Frequency Equivalent Circuit, Low – Frequency Equivalent Circuit. [**15 hrs**.] Revision problem and tutorial classes [**5 hrs**.] Quizzes [**1 hr**.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

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

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	4,8,14	LO #1, 4, 6 and 7
	Assignments	10	5% (5)	2 to 13	LO #1, 2, 3, 4, 5 and 7
	Projects	0	0 (0)	----	-----
	Report	2	15% (15)	Continuous	All
Summative assessment	Midterm Exam	2 hr	15% (15)	7	LO # 4-7
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Types of Field Effect Transistors: Junction Field Effect Transistor JFET, Basic Structure, Basic Operation, JFET Symbols
Week 2	Junction Field Effect Transistors: Difference Between JFET and Bipolar Transistor. JFET Characteristics Important Terms (IDSS, VP, VGS (off).
Week 3	Junction Field Effect Transistors: Expression for Drain Current ID Advantages of JFET Parameters of JFET, Relation Among JFET Parameters, Variation of Trans conductance gm of JFET.
Week 4	Junction Field Effect Transistors: JFET Biasing Circuit: JFET Biasing by Bias Battery, Self – Bias for JFET, JFET With Voltage – Divider Bias.
Week 5	Junction Field Effect Transistors: JFET Connections: Common Source Connection, Common Gate Connection, Common Drain Connection.
Week 6	Junction Field Effect Transistors: Practical JFET Amplifier, D.C. And A.C. Equivalent Circuits of JFET. D.C. Load Line Analysis.
Week 7	Junction Field Effect Transistors: JFET Small – Signal Model, JFET A.C. Equivalent Circuit Fixed – Bias Configuration Self – Bias Configuration Voltage – Divider Configuration
Week 8	Junction Field Effect Transistors: Common – Gate Configuration Source – Follower (Common – Drain) Configuration.
Week 9	Junction Field Effect Transistors: JFET Applications.
Week 10	Metal Oxide Semiconductor FET (MOSFET): Types of MOSFET D – MOSFET, Circuit Operation of D – MOSFET.
Week 11	Metal Oxide Semiconductor FET (MOSFET): Depletion Mode, Enhancement Mode D – MOSFET. Transfer Characteristic D – MOSFET. Biasing D – MOSFET Small – Signal Model E – MOSFET.
Week 12	Metal Oxide Semiconductor FET (MOSFET): Operation, Schematic Symbols, Equation for Trans conductance Curve. E – MOSFET Biasing Circuits E – MOSFET Small – Signal Model, E – MOSFET Drain – Feedback Configuration.
Week 13	Metal Oxide Semiconductor FET (MOSFET): E – MOSFET Voltage – Divider Configuration, E – MOSFET Versus D – MOSFET Tuned Amplifiers, Single – Tuned Amplifiers.
Week 14	Metal Oxide Semiconductor FET (MOSFET): Double – Tuned Amplifiers Introduction to Four – Layer Devices.
Week 15	Description and Operation of Silicon Controlled Rectifier, Diac, Thyristor, GTO and Triac. High Frequency Equivalent Circuit, Low – Frequency Equivalent Circuit.
Week 16	**Preparatory week before the final Exam**

| Learning and Teaching Resources |||
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Floyd, Thomas L. Electronics Fundamentals: Circuits, Devices and Applications (Floyd Electronics Fundamentals Series). Prentice-Hall, Inc., 2006.	Yes
Recommended Texts	Donald A. Neamen. (2003). "SEMICONDUCTOR PHYSICS AND DEVICES". 3rd Edition, ISBN 0-07-232107-05, USA. (can be downloaded from the Course web page/classroom).	Yes
Websites	Nashelsky, L., & Boylestad, R. L. (2021). Electronic Devices and Circuit Theory Eleventh Edition.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	**English Language II**		**Module Delivery**
Module Type	Support		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	**EEEC214**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		
Module Level	2	**Semester of Delivery**	4
Administering Department	2 - (Electrical Engineering)	**College**	UoM2 - (Engineering)
Module Leader	Dr. Mohammed Tariq Yaseen	**e-mail**	mtyaseen@uomosul.edu.iq
Module Leader's Acad. Title	Assist. Prof.	**Module Leader's Qualification**	Doctor
Module Tutor	Mr. Shamil Hamzah Hussein	**e-mail**	Shamil_alnajjar84@uomosul.edu.iq
Peer Reviewer Name	اسم مُراجع الملف	**e-mail**	بريده الالكتروني
Scientific Committee Approval Date	10/06/2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims and Learning Outcomes	Students will be able to: 1. Distinguish between dependent, Independent, and Integrated essays. 2. Find the topic and the thesis statement of short essays. 3. Identify the main ideas from the introduction paragraph. 4. Identify the main ideas from the body paragraph. 5. Find the supporting details from the introduction paragraph. 6. Find the supporting details from the body paragraph. 7. Draw an outline to link the ideas, supporting details, and essay topic. 8. Make notes in response to an essay question to create main ideas, supporting details, and thesis statement. 9. Write the introduction paragraph on basis of the thesis statement and main ideas. 10. Build the body paragraphs based on main ideas and supporting details. 11. Write the introduction paragraph based on the main ideas. 12. Enhance the smoothness and fluency of an essay by employing transition words and sentence starters.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Classification of Essays:** [2 hrs] - Independent essays based on personal thoughts. - Dependent essays based on data, figures, diagrams. - Integrated essays **Structure of academic essays:** [6 hrs] - Analyzing academic essays according to the standard structure of academic essays. **Idea Maps:** [3 hrs] - Filling the idea maps from the major information extracted while reading an essay. **Responding to an essay question:** [4 hrs] - Building an outline using personal ideas in response to an essay question. **Writing Paragraphs:** [6 hrs] - Writing thesis statement. - The Introduction Paragraph. - The Body Paragraphs. **Essay Conclusion:** [3 hrs] - Writing the conclusion paragraph considering the main ideas stated in the introduction and body paragraphs **Transition words and connection phrases:** [3 hrs] **Dependent essays:** [3hrs] - Introduction to essays based on figures, tables, diagrams, and processes

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The approach to be followed here is to motivate students to analyze previously written model essays to understand the standard structure of academic essays then implement the same procedures to build their own essays.

Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 3, 8 and 10
	Assignments	2	10% (10)	3, 12	LO # 5, 6,11 and 12
	Projects / Lab.				
	Report	1	20% (20)	14	LO # 1-10
Summative assessment	Midterm Exam				
	Final Exam	3hr	60% (60)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
Material Covered	
Week 1	Overview of Academic Essays Independent, Dependent, and Integrated essays Structure of academic essays
Week 2	Structure of academic essays
Week 3	Topic sentence and thesis statement Identifying topic sentence and thesis statement of academic essays.
Week 4	Main Ideas: Identifying the main Ideas of academic essays.
Week 5	Supporting Details: Identifying the supporting details
Week 6	Essay outlines: Building Essay outlines using idea maps

Week 7	Essay Questions: Responding to essay questions by making personal notes
Week 8	Topic Sentence : Writing a thesis statement or topic sentence using personal thoughts.
Week 9	Personal Thoughts: Using personal thoughts to express main ideas and supporting details in response to an essay question.
Week 10	Idea Map Creation: Building an idea map of an essay question.
Week 11	Transition words and sentence starters Increasing the fluency, coherence, and smooth transition of thoughts using sentence starters and transition words.
Week 12	Writing the Introduction: Combining the thesis statement and main ideas together to build the introduction paragraph.
Week 13	Writing the Conclusion
Week 14	Introduction to dependent writing tasks
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: There are no laboratory experiments.
Week 2	Lab 2: There are no laboratory experiments.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	➢ No Textbook is required for this course. Supplemental materials will be provided by provided by the instructor.	
Recommended Texts	➢ *Sharpe, P. J. (2009). Barron's TOEFL iBT. Barron's Educational Series.* ➢ *Lougheed, L. (2016). Barron's Ielts with Mp3 Cd. Barron's.*	No
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center">Electrical Circuits Analysis I</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Core</td><td rowspan="4">☒ Theory
☐ Lecture
☐ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">EEPM201</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">6</td></tr>
<tr><td>SWL (hr./sem)</td><td colspan="2" align="center">150</td></tr>
<tr><td>Module Level</td><td>2</td><td>Semester of Delivery</td><td>3</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td>UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>اسم رئيس القسم</td><td>e-mail</td><td>البريد الالكتروني لرئيس القسم</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>لقبه العلمي</td><td>Module Leader's Qualification</td><td>الشهادة</td></tr>
<tr><td>Module Tutor</td><td>Asst. Prof Dr. Omar Sharaf Al-Deen</td><td>e-mail</td><td>o.yehya@uomosul.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td>بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>10/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="3" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>Basics of Electrical Engineering I and Basics of Electrical Engineering II</td><td>Semester</td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td></tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Ability to understand the AC Circuit Power Analysis and Poly-phase Circuits 2. Ability to determine the Transient Response of RL /RC Circuit and the Transient Response of RLC Circuit 3. Ability to analysis Magnetically Coupled Circuits and Ideal Transformers 4. Ability to solve the mathematical equations for Complex Frequency, Laplace Transform, Frequency Response and Fourier Circuit Analysis 5. Ability to synthesize the Circuit Analysis in the s-Domain and Two-Port Networks
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Use basic electrical DC concepts and theorems to analyze circuits 2. Build and simulate electrical DC circuits and perform measurements with electronic test equipment 3. Understand the fundamental concepts of electrical circuits, including voltage, current, resistance, and power. 4. Analyze and solve basic DC (direct current) circuits using Ohm's Law, Kirchhoff's Laws, and nodal/mesh analysis techniques. 5. Apply techniques to analyze and solve AC (alternating current) circuits, including complex impedance, phasor representation, and frequency response. 6. Demonstrate proficiency in analyzing circuits with passive elements such as resistors, capacitors, and inductors. 7. Use circuit simulation software and laboratory equipment to verify theoretical analysis and gain practical experience in circuit analysis. 8. Analyze and solve circuits with operational amplifiers (op-amps), including understanding their basic configurations and applications. 9. Understand the concepts of power in electrical circuits, including active power, reactive power, and power factor correction. 10. Develop critical thinking and problem-solving skills by applying circuit analysis techniques to real-world electrical engineering problems.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Transient Circuits** The Transient Circuits: RC, RL, RLC circuit in series and parallel and their complete response in time and Frequency. [15 hrs.] Revision problem and tutorial classes [8 hrs.] Quizzes [1 hr.]

	Part B- Poly-phase Circuits
	Poly-phase Circuits: Single-phase and three phase wire system, 3-Phase balance and unbalance system [12 hrs.], star and delta connections [9 hrs.], Power in 3-phase circuits. [12 hrs.]
	Revision problem and tutorial classes [8 hrs.]
	Quizzes [1 hr.]
	Part C- Magnetic coupling circuit
	Magnetic coupling circuit: Coefficient of coupling, Linear and ideal transformers. [15 hrs.]
	Revision problem and tutorial classes [8 hrs.]
	Quizzes [1 hr.]

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	4,8,12	LO #1, 5, 8 and 9
	Assignments	10	5% (5)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
	Projects / Lab.	0	0% (0)	Continuous	All
	Report	0	0% (0)	----	----
Summative assessment	Midterm Exam	2 hr	25% (25)	7	LO # 1-5
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction; syllabus; Advantages and Disadvantages of Electrical Networks as a different circuits .
Week 2	Transient Response of RL Circuit
Week 3	Transient Response of RC Circuit
Week 4	Unit step functions
Week 5	Complete response of RL and RC Circuits
Week 6	Transient Response of RLC Circuit / Parallel connection
Week 7	Transient Response of RLC Circuit / Series connection
Week 8	Complete response of RLC Circuit / Parallel and Series connections
Week 9	Mid-term Exam
Week 10	Poly-phase Circuits
Week 11	Three phase circuit analysis / Balance load
Week 12	Three phase circuit analysis / Un-Balance load
Week 13	Three phase wattmeter's
Week 14	Magnetically Coupled Circuits
Week 15	Linear and Ideal Transformers
Week 16	Preparatory week before the final Exam

<table>
<tr><td colspan="3" align="center">**Learning and Teaching Resources**
مصادر التعلم والتدريس</td></tr>
<tr><td></td><td align="center">**Text**</td><td>**Available in the Library?**</td></tr>
<tr><td>**Required Texts**</td><td>Engineering Circuit Analysis Eight Edition (William H. Hayt) 2012
Fundamentals of Electric Circuits (Charles K. Alexander)2009</td><td align="center">Yes</td></tr>
<tr><td>**Recommended Texts**</td><td>Electric Circuits Tenth Edition (James W. Nilsson) 2015</td><td align="center">Yes</td></tr>
<tr><td>**Websites**</td><td colspan="2" align="center">**https://www.pdfdrive.com/schaums-outline-of-electric-circuits-e185851170.html**</td></tr>
</table>

<table>
<tr><td colspan="5" align="center">**Grading Scheme**
مخطط الدرجات</td></tr>
<tr><td>**Group**</td><td>**Grade**</td><td>التقدير</td><td>**Marks (%)**</td><td>**Definition**</td></tr>
<tr><td rowspan="5">**Success Group (50 - 100)**</td><td>**A** - Excellent</td><td>امتياز</td><td>90 - 100</td><td>Outstanding Performance</td></tr>
<tr><td>**B** - Very Good</td><td>جيد جدا</td><td>80 - 89</td><td>Above average with some errors</td></tr>
<tr><td>**C** - Good</td><td>جيد</td><td>70 - 79</td><td>Sound work with notable errors</td></tr>
<tr><td>**D** - Satisfactory</td><td>متوسط</td><td>60 - 69</td><td>Fair but with major shortcomings</td></tr>
<tr><td>**E** - Sufficient</td><td>مقبول</td><td>50 - 59</td><td>Work meets minimum criteria</td></tr>
<tr><td rowspan="2">**Fail Group (0 – 49)**</td><td>**FX** – Fail</td><td>راسب (قيد المعالجة)</td><td>(45-49)</td><td>More work required but credit awarded</td></tr>
<tr><td>**F** – Fail</td><td>راسب</td><td>(0-44)</td><td>Considerable amount of work required</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td></tr>
</table>

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr>
<td>Module Title</td>
<td colspan="2" align="center">Engineering Mathematics I</td>
<td>Module Delivery</td>
</tr>
<tr>
<td>Module Type</td>
<td colspan="2" align="center">Basic</td>
<td rowspan="4">☒ Theory
☐ Lecture
☒ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td>
</tr>
<tr>
<td>Module Code</td>
<td colspan="2" align="center">EEPM202</td>
</tr>
<tr>
<td>ECTS Credits</td>
<td colspan="2" align="center">5</td>
</tr>
<tr>
<td>SWL (hr./sem)</td>
<td colspan="2" align="center">125</td>
</tr>
<tr>
<td>Module Level</td>
<td>2</td>
<td>Semester of Delivery</td>
<td>3</td>
</tr>
<tr>
<td>Administering Department</td>
<td>2 - (Electrical Engineering)</td>
<td>College</td>
<td>UoM2 - (Engineering)</td>
</tr>
<tr>
<td>Module Leader</td>
<td>اسم رئيس القسم</td>
<td>e-mail</td>
<td>البريد الالكتروني لرئيس القسم</td>
</tr>
<tr>
<td>Module Leader's Acad. Title</td>
<td>لقبه العلمي</td>
<td>Module Leader's Qualification</td>
<td>الشهادة</td>
</tr>
<tr>
<td>Module Tutor</td>
<td>Dr. Omar Muwafaq Mahmood</td>
<td>e-mail</td>
<td>omer_alyousif@uomosul.edu.iq</td>
</tr>
<tr>
<td>Peer Reviewer Name</td>
<td>اسم مُراجع الملف</td>
<td>e-mail</td>
<td>بريده الالكتروني</td>
</tr>
<tr>
<td>Scientific Committee Approval Date</td>
<td>01/06/2023</td>
<td>Version Number</td>
<td>1.0</td>
</tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr>
<td>Prerequisite module</td>
<td>None</td>
<td>Semester</td>
<td></td>
</tr>
<tr>
<td>Co-requisites module</td>
<td>None</td>
<td>Semester</td>
<td></td>
</tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To understand differential equations and Partial Differentiation. 2. To understand Vectors components. 3. To understand Fourier series: 4. To perform Applications in Electrical Eng. 5. To perform Multiple Integrals and Double integral.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize differential equations and Partial Differentiation. 2. Summarize the Vectors components. 3. Identify the Multiple Integrals and Double integral and their applications. 4. Identify the Fourier series and their applications. 5. Identify the application in Electrical Circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Differential Equations: Introduction to Differential Equations, 1st and 2nd order linear differential equations with constant coefficients, solution via the auxiliary equation, nonhomogeneous equations, application to electrical systems. Coupled 1st order linear differential equations; transformation of higher order linear differential equations on to coupled differential equations. Homogenous differential of higher order. Vectors: Vectors component and Units, Space coordinate and Space Vector, Scalar Product and Vector Product, Units and plane equation, equations of lines and planes, Product of Three Vectors, Applications. Vector Functions and Their Derivatives Gradient of Scalar Reid; Divergence of Vector Field; Curl of Vector Field; Directional Derivatives; Gradient, Divergence and Curl in Curvilinear Coordinates. Fourier series: The need for Fourier series, Periodic functions, Fourier Series-Euler formulas. Even and odd functions, Half-Range expansions, Application in Electrical Eng.

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	3,6,11,14	LO #1, 5, 8 and 9
	Assignments	8	5% (5)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
Summative assessment	Midterm Exam	2 hr	25% (25)	7	LO # 1-5
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Differential Equations, 1st and 2nd order linear differential equations with constant coefficients, homogeneous equations
Week 2	solution via the auxiliary equation, nonhomogeneous equations,
Week 3	application to electrical systems. Coupled 1st order linear differential equations;
Week 4	transformation of higher order linear differential equations on to coupled differential equations. Homogenous differential of higher
Week 5	Multiple Integrals and Double integral.
Week 6	The Chain Rule and total Derivative, maxima, minima and saddle point.
Week 7	Vectors component and Units, Space coordinate and Space Vector, Scalar Product and Vector Product,
Week 8	Mid-term Exam
Week 9	Units and plane equation, equations of lines and planes,
Week 10	Product of Three Vectors, Applications, dot and cross product
Week 11	Vector Functions and Their Derivatives Gradient of Scalar Reid;
Week 12	Divergence of Vector Field; Curl of Vector Field; Directional Derivatives;
Week 13	Gradient, Divergence and Curl in Curvilinear Coordinates
Week 14	Fourier series: The need for Fourier series, Periodic functions, Fourier Series-Euler formulas
Week 15	Even and odd functions, Half-Range expansions, Application in Electrical Eng. Multiple Integrals: Double integral, Areas and volume, Double integral polar coordinates.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to lab. components
Week 2	Lab 2: Introduction to AVO meter (analog and digital)
Week 3	Lab 3: Introduction to resistance measurements (practical and color code)
Week 4	Lab 4: resistance temperature affect, internal resistance of a source, open circuit & short circuit
Week 5	Lab 5: ohm's Law
Week 6	Lab 6: series and parallel resistance
Week 7	Lab 7: resistance delta and star transformation
Week 8	Lab 8: Kirchhoff's Voltage Law

Week 9	Lab 9: Kirchhoff's Current Law
Week 10	Lab 10: implementation of Maxwell's circulating currents (mesh analysis)
Week 11	Lab 11: implementation of Nodal analysis
Week 12	Lab 12: implementation of Superposition theorem
Week 13	Lab 13: implementation of Thevenin's / Norton's Theorem
Week 14	Lab 14: implementation of maximum power transfer theorem
Week 15	Lab 15: DC power measurements (methods and instrumentations)

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Circuit Analysis 7th Edition by William Hayt , Jack Kemmerly , Steven Durbin	Yes
Recommended Texts	Schaum's Outline of Basic Circuit Analysis, Second Edition (Schaum's Outlines) 2nd Edition, by John O'Malley	No
Websites	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2017.	

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td>Electromagnetic Fields</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td>Core / C</td><td colspan="2" rowspan="4">☒ Theory
☒ Lecture
☐ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td>EEPM203</td></tr>
<tr><td>ECTS Credits</td><td>5</td></tr>
<tr><td>SWL (hr./sem)</td><td>125</td></tr>
<tr><td>Module Level</td><td>2</td><td>Semester of Delivery</td><td>3</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td>UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>Dr. Mohammed Tariq Yaseen</td><td>e-mail</td><td>mtyaseen@uomosul.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Assist. Prof.</td><td>Module Leader's Qualification</td><td>Doctor</td></tr>
<tr><td>Module Tutor</td><td></td><td>e-mail</td><td></td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td>بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>10/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="3" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

<table>
<tr><td colspan="2" align="center">Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية</td></tr>
<tr><td>Module Aims
أهداف المادة الدراسية</td><td>1. To develop problem solving skills of coordinate systems through the understanding the rectangular coordinate system, cylindrical coordinate system, spherical coordinate system.
2. To understand the vector analysis (scalars and vectors).
3. This course deals with the basic concept of the Electric Field Intensity, Electric Flux Density, magnetic Field Intensity, and magnetic Flux Density.</td></tr>
</table>

	4. To understand the Energy and Potential.
	5. To understand the electric fields in material space. conductors, dielectrics, and capacitance.
	6. To perform the electric fields due to continuous charge distributions.
	7. To understand the magnetic field due to different current distributions.
	8. To understand different laws such as Coulomb's Law, Gauss's Law, Biot-Savart's Law, Ampere's Law, and Faraday's Law.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the electric field, electric field intensity, and charge distributions. 2. Recognize the magnetic Field Intensity, and magnetic Flux Density 3. List the various terms associated with continuous charge and different current distributions. 4. Summarize what is meant by a coordinate system, scalars and vectors analysis, conductors, dielectrics, capacitance, and inductance. 5. Describe the electric flux density and gauss's law. magnetic Flux Density and Ampere's Law. 6. Discuss the various charge and current distributions such as line, sheet, and volume. 7. Explain the work, potential & potential difference. 8. Explain the electric fields in material space. conductors, dielectrics, and capacitance.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Coordinate systems and Vector analysis** coordinate systems: rectangular coordinate system, cylindrical coordinate system, spherical coordinate system. vector analysis: scalars and vectors, vector algebra, vector components and unit vectors, vector addition and subtraction, vector multiplication. coulomb's law and electric force: the experimental law of coulomb. Magneto-statics: the static magnetic fields, biot-savart law. Magneto-statics: magnetic field due to different current distributions, right-hand rule. Magneto-statics: solenoid, applications of solenoid, toroid. [**12 hrs**.] Revision problem and tutorial classes [**4 hrs**.] Quizzes [**1 hr**.] **Part B- Electric field intensity and Charge distributions** electric field intensity: electric field of a point charge, electric field of n point charges. electric fields due to continuous charge distributions: electric field of a line charge. electric fields due to continuous charge distributions: electric field of a sheet of charge. electric fields due to continuous charge distributions: electric field of a volume of charge. Magneto-statics: ampere's circuital law, applications of ampere's law: infinite line current, infinite sheet of current, infinitely long coaxial transmission line. Magneto-statics: magnetic flux and magnetic flux density. inductance: inductance of a conductor, inductance of toroid. [**12 hrs**.] Revision problem and tutorial classes [**4 hrs**.] Quizzes [**1 hr**.] **Part C- Electric flux density and Gauss's law application** Electric flux density and gauss's law: gauss's law application on a point charge, gauss's law application on a line charge. electric flux density and gauss's law: gauss's law application on a

surface charge. electric flux density and gauss's law: gauss's law application on a volume charge. work, potential & potential difference: work done in moving a point charge. work, potential & potential difference: potential & potential difference. Force on a moving charge. magnetic forces, work & power: work. magnetic forces, work & power: power. time varying fields: faraday's law. time varying fields: induced electromotive force. [**9 hrs**.]

Revision problem and tutorial classes [**3 hrs**.]

Part D- conductors, dielectrics, and capacitance

conductors, dielectrics, and capacitance: electric fields in material space. conductors, dielectrics, and capacitance: dielectric – dielectric boundary conditions, conductor – dielectric boundary conditions, conductor – free space boundary conditions. conductors, dielectrics, and capacitance: capacitance and capacitors. Maxwell's equations: the vector operator (del) and the divergence theorem. Maxwell's equations: derivation of Maxwell's equations and applications. Maxwell's equations: the uniform plane wave. Maxwell's equations: wave propagation in free space. [**12 hrs**.]

Revision problem and tutorial classes [**4 hrs**.]

Quizzes [**1 hr**.]

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	4,8,14	LO #1, 4, 6 and 7
	Assignments	10	5% (5)	2 to 13	LO #1, 2, 3, 4, 5 and 7
	Projects	0	0% (0)	----	-----
	Report	0	0% (0)	----	----
Summative assessment	Midterm Exam	2 hr	25% (25)	7	LO # 4-7
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	coordinate systems: rectangular coordinate system, cylindrical coordinate system, spherical coordinate system. vector analysis: scalars and vectors.
Week 2	Vector analysis: vector algebra, vector components and unit vectors, vector addition and subtraction. vector multiplication. coulomb's law and electric force: the experimental law of coulomb.
Week 3	Electric field intensity: electric field of a point charge, electric field of n point charges. Electric fields due to continuous charge distributions: electric field of a line charge. electric field of a volume of charge.
Week 4	Electric flux density and gauss's law: gauss's law application on a point charge, gauss's law application on a line charge.
Week 5	Electric flux density and gauss's law: gauss's law application on a surface charge. electric flux density and gauss's law: gauss's law application on a volume charge.
Week 6	Work, potential & potential difference: work done in moving a point charge. work, potential & potential difference: potential & potential difference. Conductors, dielectrics, and capacitance: electric fields in material space. conductors, dielectrics, and capacitance.
Week 7	dielectric – dielectric boundary conditions, conductor – dielectric boundary conditions, conductor – free space boundary conditions. Conductors, dielectrics, and capacitance: capacitance and capacitors.
Week 8	Magneto-statics: the static magnetic fields, biot-savart law. magnetic field due to different current distributions. right-hand rule. solenoid, applications of solenoid, toroid. ampere's circuital law, applications of ampere's law. applications of ampere's law: infinite line current, infinite sheet of current. infinitely long coaxial transmission line.
Week 9	Magneto-statics: magnetic flux and magnetic flux density. inductance: inductance of a conductor, inductance of toroid.
Week 10	Magnetic forces, work & power: force on a moving charge. work and power.
Week 11	Magnetic forces, work & power: power. time varying fields: faraday's law. time varying fields: induced electromotive force.
Week 12	Maxwell's equations: the vector operator (del) and the divergence theorem

Week 13	Maxwell's equations: derivation of Maxwell's equations and applications.
Week 14	Maxwell's equations: the uniform plane wave.
Week 15	Maxwell's equations: wave propagation in free space.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Johnk, Carl Theodore Adolf. "Engineering electromagnetic fields and waves." New York (1975).	Yes
Recommended Texts	Rojansky, Vladimir Borisovich, and Vladimir Rojansky. Electromagnetic fields and Waves. Courier Corporation, 1979. (can be downloaded from the Course web page/classroom).	Yes
Websites	Nefyodov, Eugene I., and Sergey Smolskiy. Electromagnetic fields and waves. Springer, 2019.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center">Electrical Transformers</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Core</td><td rowspan="4">☒ Theory
☐ Lecture
☒ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">EEPM204</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">5</td></tr>
<tr><td>SWL (hr./sem)</td><td colspan="2" align="center">120</td></tr>
<tr><td>Module Level</td><td>2</td><td>Semester of Delivery</td><td>3</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td>UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>اسم رئيس القسم</td><td>e-mail</td><td>البريد الالكتروني لرئيس القسم</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>لقبه العلمي</td><td>Module Leader's Qualification</td><td>الشهادة</td></tr>
<tr><td>Module Tutor</td><td>Dr.</td><td>e-mail</td><td>@uomosul.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td>بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>09/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To understand the principle of transformers, E.M.F and transformer construction. 2. To understand and study transformer on no load and on load. 3. To understand the transformer equivalent circuit and Separation of core losses. 4. To study the Regulation of transformer, Losses and efficiency. 5. To study the Parallel operation of transformer, Three-phase transformer, connections and cooling of transformers.	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the principle of transformers. 2. Identify the transformer on no load and on load. 3. Identify the Regulation of transformer, Losses and efficiency. 4. Summarize the Parallel operation of transformer, Three-phase transformer.	
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Transformers working, principle of transformers. Transformer construction, E.M.F equation. Transformer on no load and on load. Transformer equivalent circuit. Open and short circuit test. Separation of core losses. Regulation of transformer. Losses and efficiency. All-Day efficiency. Auto transformer. Parallel operation. Three-phase transformer, connections. Open-Delta Scoot connection, cooling of transformers.	

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

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

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	4	10% (10)	3,6,11,14	LO #1, 5, 8 and 9
	Assignments	8	5% (5)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
Summative assessment	Midterm Exam	2 hr	25% (25)	7	LO # 1-5
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Transformers working, principle of transformers.
Week 2	Transformer construction, E.M.F equation.
Week 3	Transformer on no load and on load (R load, RL load, RC load).
Week 4	equivalent circuit and phasor diagram of Transformers.
Week 5	Open and short circuit test.
Week 6	Separation of core losses

Week 7	Regulation of transformer.
Week 8	Mid-term Exam
Week 9	Losses and efficiency.
Week 10	All-Day efficiency.
Week 11	Auto transformer.
Week 12	Parallel operation.
Week 13	Three-phase transformer, connections.
Week 14	Open-Delta Scoot connection
Week 15	cooling of transformers.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to lab. components
Week 2	Lab 2: Introduction to AVO meter (analog and digital)
Week 3	Lab 3: Introduction to resistance measurements (practical and color code)
Week 4	Lab 4: resistance temperature affect, internal resistance of a source, open circuit & short circuit
Week 5	Lab 5: ohm's Law
Week 6	Lab 6: series and parallel resistance
Week 7	Lab 7: resistance delta and star transformation
Week 8	Lab 8: Kirchhoff's Voltage Law
Week 9	Lab 9: Kirchhoff's Current Law
Week 10	Lab 10: implementation of Maxwell's circulating currents (mesh analysis)
Week 11	Lab 11: implementation of Nodal analysis
Week 12	Lab 12: implementation of Superposition theorem
Week 13	Lab 13: implementation of Thevenin's / Norton's Theorem
Week 14	Lab 14: implementation of maximum power transfer theorem
Week 15	Lab 15: DC power measurements (methods and instrumentations)

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	Engineering Circuit Analysis 7th Edition by William Hayt , Jack Kemmerly , Steven Durbin	Yes
Recommended Texts	Schaum's Outline of Basic Circuit Analysis, Second Edition (Schaum's Outlines) 2nd Edition, by John O'Malley	No
Websites	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2017.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	**Electronics Principles**		**Module Delivery**	
Module Type	Basic		☒ Theory	
Module Code	**EEPM205**		☒ Lecture ☐ Lab	
ECTS Credits	**4**		☒ Tutorial	
SWL (hr./sem)	**100**		☐ Practical ☐ Seminar	
Module Level	2	**Semester of Delivery**		3
Administering Department	2 - (Electrical Engineering)	**College**	UoM2 - (Engineering)	
Module Leader	Dr. Mohammed Tariq Yaseen	**e-mail**	mtyaseen@uomosul.edu.iq	
Module Leader's Acad. Title	Assist. Prof.	**Module Leader's Qualification**		Doctor
Module Tutor	Mr. Shamil Hamzah Hussein	**e-mail**	Shamil_alnajjar84@uomosul.edu.iq	
Peer Reviewer Name	اسم مُراجع الملف	**e-mail**	بريده الالكتروني	
Scientific Committee Approval Date	10/06/2023	**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop problem solving skills of electronic circuit through the understanding solid state for each electronic passive and active elements such as RLC, diodes, transistors, and integrated circuits. 2. To understand the Basic Transistor Construction through graphical analysis of transistors Connections and biasing. 3. This course deals with the basic concept of the small-signal analysis of the transistors such as D.C. and A.C. Equivalent Circuits. 4. To understand the Load Line Analysis, Operating Point Transistor Parameters, and Rating Amplification Stabilization. 5. To understand the H-parameters, Hybrid Equivalent Circuit. Z-parameters, R-parameters Equivalent Circuit. 6. To perform current-voltage characteristics, charge control description for all types of both the diode and transistors. 7. To Describe and operation of the Multistage Transistor Amplifiers
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the regions of operation, graphical analysis of BJT, regions of operation stability. 2. List the various terms associated with bias configuration of the transistors. 3. Summarize what is meant of the practical circuit of transistor amplifier. 4. Describe the types of multistage amplifiers. 5. Discuss the various properties of transistors used as an amplifier 6. Explain the transistor construction and operation such as amplifier and switching. 7. Explain the operation of the linear amplifier through the a.c. load line and DC load line analysis.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Transistor Construction, Operation, and Stabilization** Transistor Construction. Transistor Symbols. Transistor Operation. Transistor Connections: Common Base CB Connection, Common Emitter CE Connection, Transistor Curves, Cutoff and Saturation. Transistor as a switch. Common Collector Connection. Transistor Load Line Analysis, Operating Point, Transistor Parameters and Rating Amplification. [**15 hrs**.] Revision problem and tutorial classes [**5 hrs**.] Quizzes [**1 hr**.] **Part B- D.C and A.C Equivalent Circuits of the transistors** Practical Circuit of Transistor Amplifier, D.C. and A.C. Equivalent Circuits. Transistor ac Equivalent Circuits h-parameters, Hybrid Equivalent Circuit. The Linear Amplifier. [**15 hrs**.] Revision problem and tutorial classes [**5 hrs**.] Quizzes [**1 hr**.] **Part C- Transistor Bias Configuration and Multistage Transistor Amplifiers**

	The a.c. Load Line, A.C. Analysis Using re Model for Transistor Common Emitter Fixed Bias Configuration, Common-Emitter Emitter Bias Configuration, Common – Emitter Collector Feedback Configuration, Common – Emitter Voltage Divider Configuration. The Common – Collector Amplifier, the Common – Base Amplifier. Multistage Transistor Amplifiers. [**15 hrs**.] Revision problem and tutorial classes [**5 hrs**.] Quizzes [**1 hr**.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	52	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	4,8,14	LO #1, 4, 6 and 7
	Assignments	10	5% (5)	2 to 13	LO #1, 2, 3, 4, 5 and 7
	Projects	0	0 (0)	----	-----
	Report	2	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2 hr	15% (15)	7	LO # 4-7
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

	Delivery Plan (Weekly Syllabus)
	المنهاج الاسبوعي النظري

	Material Covered
Week 1	Transistor Construction. Transistor Symbols. Transistor Operation.
Week 2	Transistor Connections: Common Base CB Connection, Common Emitter CE Connection.
Week 3	Transistor Curves, Cutoff and Saturation. Transistor as a switch. Common Collector Connection.
Week 4	Transistor Load Line Analysis, Operating Point.
Week 5	Transistor Parameters and Rating Amplification.
Week 6	Practical Circuit of Transistor Amplifier.
Week 7	D.C. and A.C. Equivalent Circuits. Transistor ac Equivalent Circuits.
Week 8	Transistor ac Equivalent Circuits h-parameters, Hybrid Equivalent Circuit.
Week 9	Transistor ac Equivalent Circuits.
Week 10	The Linear Amplifier.
Week 11	The a.c. Load Line, A.C. Analysis Using re Model for Transistor Common Emitter Fixed Bias Configuration.
Week 12	The a.c. Load Line, A.C. Analysis Using re Model for Transistor Common – Emitter Emitter – Bias Configuration, Common – Emitter Collector Feedback Configuration.
Week 13	The a.c. Load Line, A.C. Analysis Using re Model for Transistor Common – Emitter Voltage Divider Configuration.
Week 14	The Common – Collector Amplifier, the Common – Base Amplifier.
Week 15	Multistage Transistor Amplifiers.
Week 16	**Preparatory week before the final Exam**

	Learning and Teaching Resources	
	مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	Floyd, Thomas L. Electronics Fundamentals: Circuits, Devices and Applications (Floyd Electronics Fundamentals Series). Prentice-Hall, Inc., 2006.	Yes
Recommended Texts	Donald A. Neamen. (2003). "SEMICONDUCTOR PHYSICS AND DEVICES". 3rd Edition, ISBN 0-07-232107-05, USA. (can be downloaded from the Course web page/classroom).	Yes
Websites	Nashelsky, L., & Boylestad, R. L. (2021). Electronic Devices and Circuit Theory Eleventh Edition.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	**Electrical Engineering Lab. I**		**Module Delivery**	
Module Type	Core		☐ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**EEPM206**			
ECTS Credits	3			
SWL (hr./sem)	**75**			
Module Level	2	**Semester of Delivery**		3
Administering Department	2 - (Electrical Engineering)	**College**	UoM2 - (Engineering)	
Module Leader	اسم رئيس القسم	**e-mail**	البريد الالكتروني لرئيس القسم	
Module Leader's Acad. Title	لقبه العلمي	**Module Leader's Qualification**		الشهادة
Module Tutor		**e-mail**		
Peer Reviewer Name	اسم مُراجع الملف	**e-mail**	بريده الالكتروني	
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0	

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

1

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course deals with general and different topics in the fields of electronic and power within the framework of the student's curriculum and includes practical experiences in studying the characteristics of the diode and its applications and the types of connection of the transistor and its advantages. This course also covers the study of transient conditions in electrical circuits and transformer tests and DC machines
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	This course designed to develop the students' abilities about using the different measurement equipment's that necessary to execute the practical experiments. Also this course covered the need of students to investigate the theoretical subjects according to practical method that's will improve the scientific level of students through this course By the end of this course, student should be able to: • Dealing with laboratory equipment and electrical elements in a professional and scientific manner(i). • Ability to analyze electrical circuits and understand the nature of their work(ii). • Building a scientific mentality for the student through his ability to interpret the practical results according to theoretical concepts(iii). • Develop the student's ability to design simple electronic circuits in line with his scientific abilities(iv). • Analyze and simulate the process circuit using different software on the electronic calculator and match the results of the analysis with the practical results(v).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Circuit Components and values** DC circuits, Current and voltage definitions, Passive sign convention and circuit elements, Resistive networks, real and ideal elements, voltage and current sources. [9 hrs.] Lab. [6 hrs.] Revision problem and tutorial classes [6 hrs.] Quizzes [1 hr.] **Part B- Circuit reduction** combining sources, Combining resistive elements in series and parallel, delta and star transformation. [12 hrs.] Revision problem and tutorial classes [8 hrs.] Lab. [8 hrs.] Quizzes [1 hr.] **Part C- Circuit Theory** Kirchhoff's laws and Ohm's law. Introduction to mesh and nodal analysis, Introduction to thevenin and Norton theory, maximum power transfer, introduction to superposition theory. [24 hrs.] Revision problem and tutorial classes [16 hrs.] Lab. [16 hrs.]

	Quizzes [1 hr.]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	4,8,12	LO #1, 5, 8 and 9
	Assignments	0	0% (0)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
	Projects / Lab.	2	25% (25)	Continuous	All
	Report	10	10% (5)	----	----
Summative assessment	Midterm Exam	2 hr	15% (15)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to lab. components
Week 2	Lab 2: Study of I-V characteristics of normal diode & zener diode
Week 3	Lab 3: Diode application I: Rectifier filters
Week 4	Lab 4: Diode application II: Clipping circuits
Week 5	Lab 5: Diode application III: clamping circuits
Week 6	Lab 6: Transient condition for R-L
Week 7	Lab 7: Transient condition for R-C
Week 8	Lab 8: Transient condition for R-L-C
Week 9	Lab 9: Mid-term exam
Week 10	Lab 10: Thevenin theory in AC circuits
Week 11	Lab 11: Thevenin theory in DC circuits
Week 12	Lab 12: Measurement of power factor in electrical networks
Week 13	Lab 13: Transient condition for RLC circuits
Week 14	Lab 14: Transformer tests : open, short & load test
Week 15	Lab 15: preparatory week before the Final exam and review
Week 16	Lab 16 : Final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	•Electrical technology (twenty-third edition) BL.THERAJA ,AK.THERAJA S.Chand and company Ltd. (2005), ISBN: 81-219-2440-5	Yes
Recommended Texts	Electronics devices (Ninth edition) by Thomas L. Floyd (2012),Prentice Hall ISBN-13: 978-0-13-254986-8	Yes
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	**Electrical Circuits Analysis II**	**Module Delivery**	
Module Type	Core	☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**EEPM208**		
ECTS Credits	**6**		
SWL (hr./sem)	**150**		
Module Level	2	**Semester of Delivery**	3
Administering Department	2 - (Electrical Engineering)	**College**	UoM2 - (Engineering)
Module Leader	اسم رئيس القسم	**e-mail**	البريد الالكتروني لرئيس القسم
Module Leader's Acad. Title	لقبه العلمي	**Module Leader's Qualification**	الشهادة
Module Tutor	Asst. Prof Dr. Omar Sharaf Al-Deen	**e-mail**	o.yehya@uomosul.edu.iq
Peer Reviewer Name	اسم مُراجع الملف	**e-mail**	بريده الالكتروني
Scientific Committee Approval Date	10/06/2023	**Version Number**	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Basics of Electrical Engineering I and Basics of Electrical Engineering II	**Semester**	
Co-requisites module	Electrical Circuits Analysis I	**Semester**	

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. Ability to understand the AC Circuit Power Analysis and Poly-phase Circuits 2. Ability to determine the Transient Response of RL /RC Circuit and the Transient Response of RLC Circuit 3. Ability to analysis Magnetically Coupled Circuits and Ideal Transformers 4. Ability to solve the mathematical equations for Complex Frequency, Laplace Transform, Frequency Response and Fourier Circuit Analysis 5. Ability to synthesize the Circuit Analysis in the s-Domain and Two-Port Networks	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Use basic electrical DC concepts and theorems to analyze circuits 2. Build and simulate electrical DC circuits and perform measurements with electronic test equipment 3. Understand the fundamental concepts of electrical circuits, including voltage, current, resistance, and power. 4. Analyze and solve basic DC (direct current) circuits using Ohm's Law, Kirchhoff's Laws, and nodal/mesh analysis techniques. 5. Apply techniques to analyze and solve AC (alternating current) circuits, including complex impedance, phasor representation, and frequency response. 6. Demonstrate proficiency in analyzing circuits with passive elements such as resistors, capacitors, and inductors. 7. Use circuit simulation software and laboratory equipment to verify theoretical analysis and gain practical experience in circuit analysis. 8. Analyze and solve circuits with operational amplifiers (op-amps), including understanding their basic configurations and applications. 9. Understand the concepts of power in electrical circuits, including active power, reactive power, and power factor correction. 10. Develop critical thinking and problem-solving skills by applying circuit analysis techniques to real-world electrical engineering problems.	
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Two-Port Networks** Two-Port Networks: One-pot networks, y-z-h-g and ABCD parameters, [15 hrs.] Revision problem and tutorial classes [8 hrs.] Quizzes [1 hr.]	

	Part B- Frequency Response	
	Complex Frequency and Circuit Analysis in the s-Domain [12 hrs.]	
	Frequency Response [12 hrs.]	
	Revision problem and tutorial classes [8 hrs.]	
	Quizzes [1 hr.]	
	Part C- Filters	
	Filters: Constant k-filters, Low pass and high pass modern filter design, Butterworth and filters, Network transformations, and all pass filter, Active filter. [15 hrs.]	
	Fourier circuit analysis [9 hrs.]	
	Revision problem and tutorial classes [8 hrs.]	
	Quizzes [1 hr.]	

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	57	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation				
تقييم المادة الدراسية				
	Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Quizzes	1	10% (10)	4,8,12	LO #1, 5, 8 and 9

3

Formative assessment	Assignments	10	5% (5)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
	Projects / Lab.	0	0% (0)	Continuous	All
	Report	0	0% (0)	----	----
Summative assessment	Midterm Exam	2 hr	25% (25)	7	LO # 1-5
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction; syllabus; Advantages and Disadvantages of Electrical Networks as a different circuits .
Week 2	Two-Port Networks : One-pot networks
Week 3	Two-Port Networks : y-z-h-g parameters
Week 4	Two-Port Networks : ABCD parameters
Week 5	Complex Frequency
Week 6	Circuit Analysis in the S-Domain
Week 7	Frequency Response
Week 8	Bode Diagrams
Week 9	Mid-term Exam
Week 10	Filters: Constant k-filters, Low pass and high pass
Week 11	Filters: modern filter design, Butterworth and filters
Week 12	Filters: Network transformations
Week 13	All pass filter
Week 14	Active filter
Week 15	Fourier circuit analysis
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Circuit Analysis Eight Edition (William H. Hayt) 2012	Yes

		Fundamentals of Electric Circuits (Charles K. Alexander)2009	
Recommended Texts	Electric Circuits Tenth Edition (James W. Nilsson) 2015		Yes
Websites	**https://www.pdfdrive.com/schaums-outline-of-electric-circuits-e185851170.html**		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="5" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr>
<td>Module Title</td>
<td colspan="2" align="center"><strong style="color:red">Engineering Mathematics II</td>
<td colspan="2">Module Delivery</td>
</tr>
<tr>
<td>Module Type</td>
<td colspan="2" align="center">Basic</td>
<td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☒ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td>
</tr>
<tr>
<td>Module Code</td>
<td colspan="2" align="center"><strong style="color:red">EEPM209</td>
</tr>
<tr>
<td>ECTS Credits</td>
<td colspan="2" align="center">5</td>
</tr>
<tr>
<td>SWL (hr./sem)</td>
<td colspan="2" align="center"><strong style="color:red">125</td>
</tr>
<tr>
<td>Module Level</td>
<td>2</td>
<td>Semester of Delivery</td>
<td colspan="2">4</td>
</tr>
<tr>
<td>Administering Department</td>
<td>2 - (Electrical Engineering)</td>
<td>College</td>
<td colspan="2">UoM2 - (Engineering)</td>
</tr>
<tr>
<td>Module Leader</td>
<td>اسم رئيس القسم</td>
<td>e-mail</td>
<td colspan="2">البريد الالكتروني لرئيس القسم</td>
</tr>
<tr>
<td>Module Leader's Acad. Title</td>
<td>لقبه العلمي</td>
<td>Module Leader's Qualification</td>
<td colspan="2">الشهادة</td>
</tr>
<tr>
<td>Module Tutor</td>
<td>Dr. Omar Muwafaq Mahmood</td>
<td>e-mail</td>
<td colspan="2">omer_alyousif@uomosul.edu.iq</td>
</tr>
<tr>
<td>Peer Reviewer Name</td>
<td>اسم مُراجع الملف</td>
<td>e-mail</td>
<td colspan="2">بريده الالكتروني</td>
</tr>
<tr>
<td>Scientific Committee Approval Date</td>
<td>01/06/2023</td>
<td>Version Number</td>
<td colspan="2">1.0</td>
</tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr>
<td>Prerequisite module</td>
<td>None</td>
<td>Semester</td>
<td></td>
</tr>
<tr>
<td>Co-requisites module</td>
<td>None</td>
<td>Semester</td>
<td></td>
</tr>
</table>

	Module Aims, Learning Outcomes and Indicative Contents
	أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية
Module Aims أهداف المادة الدراسية	1. To develop problem solving of Eigenvalues and eigenvectors 2. To understand Laplace Transforms. 3. This course deals with the basic concept of DC electrical circuits. 4. To understand the application of Laplace Transforms in the electronic circuits. 5. To understand Fourier, transform and their applications in electrical engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize Eigenvalues and eigenvectors. 2. Summarize series and series geometric. 3. Identify the Laplace Transforms. 4. Identify the Fourier transform their applications. 5. Identify the application in Electrical Circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Eigenvalues and eigenvectors; diagonalization. Sequence and series, sequence convergence, series geometric series, nth partial sum, test of convergence, Laplace Transforms: Introduction to transforms and operators, Laplace transforms of basic functions; unit step function, transforms of 1st and 2nd derivatives, Application to electric circuits; Transforms of piecewise continuous functions Inverse Laplace transforms, derivation using partial fractions. Direct (s-domain) analysis of electrical circuits, Interpretation of s-domain functions Initial & final value theorems. Fourier transform for different functions (unit step function, unit impulse function, singularity function, applications in electrical engineering. Fourier transform for different functions (unit step function, unit impulse function, singularity function, applications in electrical engineering.

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	47	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	4	10% (10)	3,6,11,14	LO #1, 5, 8 and 9
	Assignments	8	5% (5)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
Summative assessment	**Midterm Exam**	2 hr	25% (25)	7	LO # 1-5
	Final Exam	3hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Sequence and series, sequence convergence,
Week 2	series geometric series, nth partial sum, test of convergence,
Week 3	Taylor and Mandarin series,
Week 4	Eigenvalues and eigenvectors; diagonalization.
Week 5	Introduction to transforms and operators, Laplace Transforms
Week 6	Laplace transforms of basic functions
Week 7	unit step function, transforms of 1st and 2nd derivatives
Week 8	Mid-term Exam
Week 9	Inverse Laplace transforms,
Week 10	Application to electric circuits;

Week 11	Direct (s-domain) analysis of electrical circuits, Interpretation of s-domain functions Initial & final value theorems.
Week 12	derivation using partial fractions
Week 13	Transforms of piecewise continuous functions.
Week 14	Fourier transform: Introduction, Fourier transform equation, properties,
Week 15	Fourier transform for different functions (unit step function, unit impulse function, singularity function, applications in electrical engineering.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to lab. components
Week 2	Lab 2: Introduction to AVO meter (analog and digital)
Week 3	Lab 3: Introduction to resistance measurements (practical and color code)
Week 4	Lab 4: resistance temperature affect, internal resistance of a source, open circuit & short circuit
Week 5	Lab 5: ohm's Law
Week 6	Lab 6: series and parallel resistance
Week 7	Lab 7: resistance delta and star transformation
Week 8	Lab 8: Kirchhoff's Voltage Law
Week 9	Lab 9: Kirchhoff's Current Law
Week 10	Lab 10: implementation of Maxwell's circulating currents (mesh analysis)
Week 11	Lab 11: implementation of Nodal analysis
Week 12	Lab 12: implementation of Superposition theorem
Week 13	Lab 13: implementation of Thevenin's / Norton's Theorem
Week 14	Lab 14: implementation of maximum power transfer theorem
Week 15	Lab 15: DC power measurements (methods and instrumentations)

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?

Required Texts	Engineering Circuit Analysis 7th Edition by William Hayt , Jack Kemmerly , Steven Durbin	Yes
Recommended Texts	Schaum's Outline of Basic Circuit Analysis, Second Edition (Schaum's Outlines) 2nd Edition, by John O'Malley	No
Websites	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2017.	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	**DC Machines**		**Module Delivery**	
Module Type	Core		☒ Theory	
Module Code	**EEPM210**		☐ Lecture	
ECTS Credits	**5**		☒ Lab ☒ Tutorial	
SWL (hr./sem)	**125**		☐ Practical ☐ Seminar	
Module Level	2	**Semester of Delivery**		4
Administering Department	2 - (Electrical Engineering)	**College**	UoM2 - (Engineering)	
Module Leader	اسم رئيس القسم	**e-mail**	البريد الالكتروني لرئيس القسم	
Module Leader's Acad. Title	لقبه العلمي	**Module Leader's Qualification**		الشهادة
Module Tutor	Dr.	**e-mail**	@uomosul.edu.iq	
Peer Reviewer Name	اسم مُراجع الملف	**e-mail**	بريده الالكتروني	
Scientific Committee Approval Date	09/06/2023	**Version Number**	1.0	

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

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To understand the principle of Electro-Mechanical Energy Conversion of DC Machine. 2. To understand Armature. Reaction and communication. 3. To understand the D.C generator. General principle 4. To study the Regulation of DC generator, Losses and efficiency. 5. To study Motors principle. Voltage equation of motor, torque, types of motors. Motor characteristics	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the principle of DC machine. 2. Identify the Armature. Reaction and communication. 3. Identify the Regulation of DC generator, Losses and efficiency. 4. Summarize the testing of DC machines and Speed control of D.C motors.	
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Principles of Electro-Mechanical Energy Conversion. Classification of Electrical machines. D.C generator. General principle. Construction and working, E.M.F equation. Armature Winding Armature. Reaction and communication, types of generation. Losses in generator. The efficiency, generation characteristics. Parallel operation of D.C generator. D.C Motors principle. Voltage equation of motor, torque, types of motors. Motor characteristics, power stages, losses and efficiency. Speed control of D.C motors, breaking. Starters, testing of D.C Machines Permeant D.C Machines.	

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

Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	4	10% (10)	3,6,11,14	LO #1, 5, 8 and 9
	Assignments	8	5% (5)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
Summative assessment	**Midterm Exam**	2 hr	25% (25)	7	LO # 1-5
	Final Exam	3hr	60% (60)	16	All
Total assessment		100% (100 Marks)			

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Principles of Electro-Mechanical Energy Conversion. Classification of Electrical machines.
Week 2	D.C generator. General principle
Week 3	Construction and working, E.M.F equation.
Week 4	Armature Winding Armature. Reaction and communication, types of generation.
Week 5	Losses in generator. The efficiency, generation characteristics.
Week 6	Parallel operation of D.C generator.
Week 7	D.C Motors principle.
Week 8	Mid-term Exam
Week 9	Voltage equation of motor, torque
Week 10	Types of motors. Motor characteristics,
Week 11	power stages, losses and efficiency
Week 12	Speed control of D.C motors
Week 13	Breaking of D.C motors
Week 14	Starters of D.C motors
Week 15	testing of D.C Machines Permeant D.C Machines.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction to lab. components
Week 2	Lab 2: Introduction to AVO meter (analog and digital)
Week 3	Lab 3: Introduction to resistance measurements (practical and color code)
Week 4	Lab 4: resistance temperature affect, internal resistance of a source, open circuit & short circuit
Week 5	Lab 5: ohm's Law
Week 6	Lab 6: series and parallel resistance
Week 7	Lab 7: resistance delta and star transformation
Week 8	Lab 8: Kirchhoff's Voltage Law

Week 9	Lab 9: Kirchhoff's Current Law
Week 10	Lab 10: implementation of Maxwell's circulating currents (mesh analysis)
Week 11	Lab 11: implementation of Nodal analysis
Week 12	Lab 12: implementation of Superposition theorem
Week 13	Lab 13: implementation of Thevenin's / Norton's Theorem
Week 14	Lab 14: implementation of maximum power transfer theorem
Week 15	Lab 15: DC power measurements (methods and instrumentations)

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Circuit Analysis 7th Edition by William Hayt , Jack Kemmerly , Steven Durbin	Yes
Recommended Texts	Schaum's Outline of Basic Circuit Analysis, Second Edition (Schaum's Outlines) 2nd Edition, by John O'Malley	No
Websites	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2017.	

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		

		Module Delivery
Module Title	**Renewable Energy Sources**	☒ Theory ☒ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Type	**Core**	
Module Code	**EEPM212**	
ECTS Credits	**4**	
SWL (hr./sem)	**100**	

Module Level	2	**Semester of Delivery**	4
Administering Department	2 - (Electrical Engineering)	**College**	UoM2 - (Engineering)
Module Leader	Dr. Mohammed Tariq Yaseen	**e-mail**	mtyaseen@uomosul.edu.iq
Module Leader's Acad. Title	Assist. Prof.	**Module Leader's Qualification**	Doctor
Module Tutor		**e-mail**	
Peer Reviewer Name	اسم مُراجع الملف	**e-mail**	بريده الالكتروني
Scientific Committee Approval Date	14/06/2023	**Version Number**	1.0

Relation with other Modules		
العلاقة مع المواد الدراسية الأخرى		

Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

	Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	· To explain the concepts of Non-renewable and renewable energy systems · To outline utilization of renewable energy sources for both domestic and industrial applications · To analyze the environmental and cost economics of renewable energy sources in comparison with fossil fuels.	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Students will be able to understand selected renewable energy sources. 2. Students will be able to design photovoltaic energy system. 3. Students will be able to design wind energy system. 4. Students will be able to understand the use of energy storage devices. 5. Students will be able to understand integration of renewable energy sources into utility grid. 6. Students will be able to explain application of renewable energy for distributed generation.	
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Non-renewable and renewable energy** The concepts of Non-renewable and renewable energy systems. Renewable energy sources for both domestic and industrial applications. [12 hrs.] Revision problem and tutorial classes [4 hrs.] Quizzes [1 hr.] **Part B - Renewable energy sources** The environmental and cost economics of renewable energy sources in comparison with fossil fuels. [12 hrs.] Revision problem and tutorial classes [4 hrs.] Quizzes [1 hr.] **Part C – Design energy system** Design photovoltaic energy system. design wind energy system [9 hrs.] Revision problem and tutorial classes [3 hrs.] **Part D - Application of renewable energy** energy storage devices. integration of renewable energy sources into utility grid. application of renewable energy for distributed generation. [12 hrs.] Revision problem and tutorial classes [4 hrs.] Quizzes [1 hr.]	

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

<table>
<tr><th colspan="4" style="text-align:center">Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا</th></tr>
<tr>
<td>Structured SWL (h/sem)
الحمل الدراسي المنتظم للطالب خلال الفصل</td>
<td>48</td>
<td>Structured SWL (h/w)
الحمل الدراسي المنتظم للطالب أسبوعيا</td>
<td>3.2</td>
</tr>
<tr>
<td>Unstructured SWL (h/sem)
الحمل الدراسي غير المنتظم للطالب خلال الفصل</td>
<td>52</td>
<td>Unstructured SWL (h/w)
الحمل الدراسي غير المنتظم للطالب أسبوعيا</td>
<td>3.4</td>
</tr>
<tr>
<td>Total SWL (h/sem)
الحمل الدراسي الكلي للطالب خلال الفصل</td>
<td colspan="3" style="text-align:center">100</td>
</tr>
</table>

<table>
<tr><th colspan="6" style="text-align:center">Module Evaluation
تقييم المادة الدراسية</th></tr>
<tr>
<th></th>
<th></th>
<th>Time/ Number</th>
<th>Weight (Marks)</th>
<th>Week Due</th>
<th>Relevant Learning Outcome</th>
</tr>
<tr>
<td rowspan="4">Formative assessment</td>
<td>Quizzes</td>
<td>1</td>
<td>10% (10)</td>
<td>4,8,14</td>
<td>LO #1, 4, 6 and 7</td>
</tr>
<tr>
<td>Assignments</td>
<td>10</td>
<td>5% (5)</td>
<td>2 to 13</td>
<td>LO #1, 2, 3, 4, 5 and 7</td>
</tr>
<tr>
<td>Projects</td>
<td>0</td>
<td>0% (0)</td>
<td>----</td>
<td>-----</td>
</tr>
<tr>
<td>Report</td>
<td>0</td>
<td>0% (0)</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td rowspan="2">Summative assessment</td>
<td>Midterm Exam</td>
<td>2 hr</td>
<td>25% (25)</td>
<td>7</td>
<td>LO # 4-7</td>
</tr>
<tr>
<td>Final Exam</td>
<td>3hr</td>
<td>60% (60)</td>
<td>16</td>
<td>All</td>
</tr>
<tr>
<td colspan="2">Total assessment</td>
<td colspan="2" style="text-align:center">100% (100 Marks)</td>
<td></td>
<td></td>
</tr>
</table>

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Traditional power plants
Week 2	Introduction to Renewable Energy
Week 3	Solar Energy and Physics of Energy Conversion in Solar Cell (Current and Voltage)
Week 4	Understanding basic terminologies of a PV cell (1-V Curve, Efficiency, FF)
Week 5	Wind Energy
Week 6	Biogas Energy and Ocean Energy
Week 7	Small hydro Power Plant
Week 8	Geothermal Energy
Week 9	Mid Exam
Week 10	Photovoltaic Energy Systems
Week 11	Energy Storage devices
Week 12	Integration of Renewable Energy Resources
Week 13	Distributed Generation
Week 14	Economics of Renewable Energy
Week 15	Future Trends and Challenges
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Goswami, D. Yogi, and Frank Kreith, eds. Energy efficiency and renewable energy handbook. CRC press, 2015.	Yes
Recommended Texts	John Twidell and Tony Weir, "Renewable Energy Resources", 3st Edition, CRC Press, USA, 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 Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	**Electrical Engineering Lab. I I**		**Module Delivery**	
Module Type	Core		☐ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**UoM221EE211**			
ECTS Credits	3			
SWL (hr./sem)	**75**			
Module Level	2	**Semester of Delivery**		4
Administering Department	2 - (Electrical Engineering)	**College**	UoM2 - (Engineering)	
Module Leader	اسم رئيس القسم	**e-mail**	البريد الالكتروني لرئيس القسم	
Module Leader's Acad. Title	لقبه العلمي	**Module Leader's Qualification**		الشهادة
Module Tutor		**e-mail**		
Peer Reviewer Name	اسم مُراجع الملف	**e-mail**	بريده الالكتروني	
Scientific Committee Approval Date	01/06/2023	**Version Number**		1.0

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

1

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This course deals with general and different topics in the fields of electronic and power within the framework of the student's curriculum and includes practical experiences in studying the characteristics of the diode and its applications and the types of connection of the transistor and its advantages. This course also covers the study of transient conditions in electrical circuits and transformer tests and DC machines
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	This course designed to develop the students' abilities about using the different measurement equipment's that necessary to execute the practical experiments. Also this course covered the need of students to investigate the theoretical subjects according to practical method that's will improve the scientific level of students through this course By the end of this course, student should be able to: • Dealing with laboratory equipment and electrical elements in a professional and scientific manner(i). • Ability to analyze electrical circuits and understand the nature of their work(ii). • Building a scientific mentality for the student through his ability to interpret the practical results according to theoretical concepts(iii). • Develop the student's ability to design simple electronic circuits in line with his scientific abilities(iv). • Analyze and simulate the process circuit using different software on the electronic calculator and match the results of the analysis with the practical results(v).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A - Circuit Components and values** DC circuits, Current and voltage definitions, Passive sign convention and circuit elements, Resistive networks, real and ideal elements, voltage and current sources. [9 hrs.] Lab. [6 hrs.] Revision problem and tutorial classes [6 hrs.] Quizzes [1 hr.] **Part B- Circuit reduction** combining sources, Combining resistive elements in series and parallel, delta and star transformation. [12 hrs.] Revision problem and tutorial classes [8 hrs.] Lab. [8 hrs.] Quizzes [1 hr.] **Part C- Circuit Theory** Kirchhoff's laws and Ohm's law. Introduction to mesh and nodal analysis, Introduction to thevenin and Norton theory, maximum power transfer, introduction to superposition theory. [24 hrs.] Revision problem and tutorial classes [16 hrs.] Lab. [16 hrs.]

	Quizzes [1 hr.]			

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	4,8,12	LO #1, 5, 8 and 9
	Assignments	0	0% (0)	2 to 12	LO #1, 2, 4, 6 7, 8 and 9
	Projects / Lab.	2	25% (25)	Continuous	All
	Report	10	10% (5)	----	----
Summative assessment	Midterm Exam	2 hr	15% (15)	7	LO # 1-5
	Final Exam	3hr	50% (50)	16	All

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to lab. components
Week 2	Lab 2: Study of common base transistor characteristic
Week 3	Lab 3: Common emitter transistor as an amplifier
Week 4	Lab 4: Common Collector transistor as an amplifier
Week 5	Lab 5: Low bass filter
Week 6	Lab 6: band bass filter
Week 7	Lab 7: high bass filter
Week 8	Lab 8: Transistor as a switch & device drive
Week 9	Lab 9: Mid-term exam
Week 10	Lab 10: Digital logics
Week 11	Lab 11: Digital Circuits
Week 12	Lab 12: Study of JFET Transistor characteristics
Week 13	Lab 13: Negative feedback connection
Week 14	Lab 14: Speed control for DC motor
Week 15	Lab 15: preparatory week before the Final exam and review
Week 16	Lab 16 : Final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	•Electrical technology (twenty-third edition) BL.THERAJA ,AK.THERAJA S.Chand and company Ltd. (2005), ISBN: 81-219-2440-5	Yes
Recommended Texts	Electronics devices (Ninth edition) by Thomas L. Floyd (2012),Prentice Hall ISBN-13: 978-0-13-254986-8	Yes
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center">English Language II</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">Support</td><td rowspan="4">☒ Theory
☐ Lecture
☐ Lab
☐ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">EEPM214</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">2</td></tr>
<tr><td>SWL (hr/sem)</td><td colspan="2" align="center">50</td></tr>
<tr><td>Module Level</td><td>2</td><td>Semester of Delivery</td><td>4</td></tr>
<tr><td>Administering Department</td><td>2 - (Electrical Engineering)</td><td>College</td><td>UoM2 - (Engineering)</td></tr>
<tr><td>Module Leader</td><td>Dr. Mohammed Tariq Yaseen</td><td>e-mail</td><td>mtyaseen@uomosul.edu.iq</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Assist. Prof.</td><td>Module Leader's Qualification</td><td>Doctor</td></tr>
<tr><td>Module Tutor</td><td>Mr. Shamil Hamzah Hussein</td><td>e-mail</td><td>Shamil_alnajjar84@uomosul.edu.iq</td></tr>
<tr><td>Peer Reviewer Name</td><td>اسم مُراجع الملف</td><td>e-mail</td><td>بريده الالكتروني</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>10/06/2023</td><td>Version Number</td><td>1.0</td></tr>
</table>

<table>
<tr><td colspan="4" align="center">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</td><td>Semester</td><td></td></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td><td></td></tr>
</table>

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims and Learning Outcomes	Students will be able to: 1. Distinguish between dependent, Independent, and Integrated essays. 2. Find the topic and the thesis statement of short essays. 3. Identify the main ideas from the introduction paragraph. 4. Identify the main ideas from the body paragraph. 5. Find the supporting details from the introduction paragraph. 6. Find the supporting details from the body paragraph. 7. Draw an outline to link the ideas, supporting details, and essay topic. 8. Make notes in response to an essay question to create main ideas, supporting details, and thesis statement. 9. Write the introduction paragraph on basis of the thesis statement and main ideas. 10. Build the body paragraphs based on main ideas and supporting details. 11. Write the introduction paragraph based on the main ideas. 12. Enhance the smoothness and fluency of an essay by employing transition words and sentence starters.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Classification of Essays:** [2 hrs] - Independent essays based on personal thoughts. - Dependent essays based on data, figures, diagrams. - Integrated essays **Structure of academic essays:** [6 hrs] - Analyzing academic essays according to the standard structure of academic essays. **Idea Maps:** [3 hrs] - Filling the idea maps from the major information extracted while reading an essay. **Responding to an essay question:** [4 hrs] - Building an outline using personal ideas in response to an essay question. **Writing Paragraphs:** [6 hrs] - Writing thesis statement. - The Introduction Paragraph. - The Body Paragraphs. **Essay Conclusion:** [3 hrs] - Writing the conclusion paragraph considering the main ideas stated in the introduction and body paragraphs **Transition words and connection phrases:** [3 hrs] **Dependent essays:** [3hrs] - Introduction to essays based on figures, tables, diagrams, and processes

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The approach to be followed here is to motivate students to analyze previously written model essays to understand the standard structure of academic essays then implement the same procedures to build their own essays.

Student Workload (SWL)			
الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1, 2, 3, 8 and 10
	Assignments	2	10% (10)	3, 12	LO # 5, 6,11 and 12
	Projects / Lab.				
	Report	1	20% (20)	14	LO # 1-10
Summative assessment	Midterm Exam				
	Final Exam	3hr	60% (60)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
Material Covered	
Week 1	Overview of Academic Essays Independent, Dependent, and Integrated essays Structure of academic essays
Week 2	Structure of academic essays
Week 3	Topic sentence and thesis statement Identifying topic sentence and thesis statement of academic essays.
Week 4	Main Ideas: Identifying the main Ideas of academic essays.
Week 5	Supporting Details: Identifying the supporting details
Week 6	Essay outlines: Building Essay outlines using idea maps

Week 7	Essay Questions: Responding to essay questions by making personal notes
Week 8	Topic Sentence : Writing a thesis statement or topic sentence using personal thoughts.
Week 9	Personal Thoughts: Using personal thoughts to express main ideas and supporting details in response to an essay question.
Week 10	Idea Map Creation: Building an idea map of an essay question.
Week 11	Transition words and sentence starters Increasing the fluency, coherence, and smooth transition of thoughts using sentence starters and transition words.
Week 12	Writing the Introduction: Combining the thesis statement and main ideas together to build the introduction paragraph.
Week 13	Writing the Conclusion
Week 14	Introduction to dependent writing tasks
Week 15	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: There are no laboratory experiments.
Week 2	Lab 2: There are no laboratory experiments.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	➢ No Textbook is required for this course. Supplemental materials will be provided by provided by the instructor.	
Recommended Texts	➢ *Sharpe, P. J. (2009). Barron's TOEFL iBT. Barron's Educational Series.* ➢ *Lougheed, L. (2016). Barron's Ielts with Mp3 Cd. Barron's.*	No
Websites		

4

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

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