Ministry of Higher Education and
Scientific Research - Iraq
Al-Furat Al-Awsat Technical University
Technical College /Al-Mussaib
Department of Electrical Engineering Techniques

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	DC ELECTRICAL CIRCUITS	Module Delivery	
Module Type	CORE	✓ Theory Lecture ✓ Lab Tutorial Practical ✓ Seminar	
Module Code	ATU23011		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	1
Administering Department	DEPARTMENT OF ELECTRICAL ENGINEERING TECHNIQUES	College	AL-FURAT AL-AWSAT TECHNICAL UNIVERSITY TECHNICAL COLLEGE / AL-MUSSAIB
Module Leader	Ammar Ouead	e-mail	
Module Leader's Acad. Title	Assist. lec.	Module Leader's Qualification	Master
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Review Committee Approval	14/06/2023	Version Number	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	1
Co-requisites module	None	Semester	

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

Module Objectives أهداف المادة الدراسية	1-Understanding the Fundamentals: The primary objective of a DC circuits course is to provide students with a solid foundation in the fundamental principles of direct current (DC) circuits. This includes concepts such as voltage, current, resistance, Ohm's law, power, and energy. 2-Analyzing Circuit Components: Students will learn how to analyze and work with various circuit components. They will understand their behavior in DC circuits and be able to calculate their effects on voltage, current, and power. 3-Circuit Laws and Theorems: Students will become familiar with important laws and theorems governing DC circuits, including Ohm's law, Kirchhoff's laws (KCL and KVL), Thevenin's theorem, Norton's theorem, and maximum power transfer theorem. They will gain proficiency in applying these principles to solve complex circuit problems. 4-Circuit Simulation and Design: The course may involve introducing students to circuit simulation software. They will learn how to use simulation tools to analyze and design DC circuits, verify their calculations, and gain practical insights into circuit behavior. 5-Problem-Solving Skills: An important objective is to develop students' problem-solving skills in the context of DC circuits. They will learn how to analyze circuit diagrams, formulate appropriate strategies, and apply their knowledge to solve a variety of circuit problems efficiently.

	6-Laboratory Skills: The course includes hands-on laboratory experiments to provide students with practical experience in building, testing, and troubleshooting DC circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Fundamental Knowledge: Students will acquire a solid understanding of the fundamental concepts and principles of direct current (DC) circuits, including voltage, current, resistance, power, and energy. 2-Circuit Analysis Skills: Students will develop the ability to analyze DC circuits using various techniques such as applying Kirchhoff's laws, performing nodal and mesh analysis, and utilizing circuit theorems like Thevenin's and Norton's theorem. They will gain proficiency in solving complex circuit problems and calculating circuit parameters. 3-Circuit Design and Simulation: Students will be able to design and simulate DC circuits, using appropriate components and considering design constraints. They will learn to use circuit simulation software to verify their designs, analyze circuit performance, and troubleshoot circuit issues. 4-Laboratory Skills: Through hands-on laboratory experiments, students will develop practical skills in building, testing, and troubleshooting DC circuits. They will become proficient in using measuring instruments, interpreting experimental data, and ensuring safety precautions while working with electrical circuits. 5-Critical Thinking and Analysis: The course will promote critical thinking and analytical skills among students. They will learn to evaluate different circuit solutions, analyze circuit behavior, and make informed decisions based on their understanding of DC circuits. By the end of the course, students will possess a comprehensive knowledge of DC circuits, enabling them to analyze, design, and troubleshoot a wide range of electrical circuits. They will be prepared for further studies in electrical engineering or related fields and equipped with skills that can be applied in professional practice.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part A – General Electric System. Constituent parts of an electrical system (source, load, communication & control), Current flow in a circuit, Electromotive force and potential difference, Electrical units. Ohm's law, Resistors, Resistivity, Temperature rise & Temperature coefficient of resistance, Voltage & Current sources [8 hrs] • Part B DC circuits. Series circuits, Parallel circuits. Kirchhoff's laws. Power and energy [14 hrs] • Part C Network Theorems . Star-delta & delta-star transformation. Sources transformations Mesh analysis. Nodal analysis. Superposition theorem. Thevnin's theorem. Norton's theorem. Maximum power transfer theorem. [32 hrs] • Revision problem classes [6 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1-Hands-on Experiments: Engage students in practical experiments to deepen their understanding of circuits. 2-Simulation Software: Use circuit simulation software for virtual circuit design and analysis. 3-Problem-solving Exercises: Include various problem-solving exercises to apply circuit analysis techniques. 4-Group Projects: Assign collaborative projects for circuit design and construction. 5-Real-world Applications: Discuss practical applications of circuits in different devices and systems. 5-Interactive Discussions: Encourage student participation and critical thinking

	through open-ended questions. 6-Conceptual Understanding: Focus on intuitive understanding alongside mathematical analysis. 7-Assessment Variety: Use diverse assessment methods to gauge student understanding. 8-Office Hours and Support: Offer individualized assistance through office hours or online support.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.12
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	4	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	7	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	9	10% (10)	Continuous	All
	Report	8	10% (10)	2, 12	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-8
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
1	**Fundamental electric quantities: voltage, current, power and energy**
2	• Resistance, capacitance and inductance **Dependent and Independent source.**
5	• Series and parallel resistors **voltage and current division**
6	**Kirchhoff's laws (KVL & KCL).**
7	**• Conversion of delta-connected resistance into an equivalent Wye connection & vice versa.**
8,9,10	• Mesh analysis **Node analysis**
11	**• Superposition's theorem.**
12,13	• Thevenin's theorem **Norton's theorem.**
14	**• Maximum power transfer.**
15	**• Final Examination**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
1	**Introduction to Measurement Devices**

2	**Color of Resistance**
3,4	**Ohm's Law and Resistance in Series and Parallel**
5,6	**Star& Delta Connection**
7	**Kirchhoff's Law**
8	**MID-TERM EXAM**
9,10	**Super Position Theorem**
11,12	**Thevenin's Theorem**
13,14	**Norton's Theorem & Maximum Power Transfer**
15	Review

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Charles K. Alexander, Matthew N.O. Sdiku Fundamentals of Electrical Engineering, 4th Edition, 2009	Yes
Recommended Texts	Tony R. Kuphaldt, Lessons In Electric Circuits, Volume I - DC 5th edition, Pearson Education 2002	No
Websites	Direct Current (DC) https://www.allaboutcircuits.com/textbook/direct-current/	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

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

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MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**DIGITAL TECHNOLOGIES**		Module Delivery	
Module Type	**Core**		✓ Theory Lecture ✓ Lab Tutorial Practical ✓ Seminar	
Module Code	**ATU23012**			
ECTS Credits	**6**			
SWL (hr/sem)	**150**			
Module Level	1		Semester of Delivery	1
Administering Department	Department of Electrical Engineering Techniques		College	Al-Furat Al-Awsat Technical University Technical College /Al-Mussaib
Module Leader	Zahraa Emad		e-mail	Zahraa.emad@atu.edu.iq
Module Leader's Acad. Title	Assist. Lect.		Module Leader's Qualification	M.Sc.
Module Tutor	None		e-mail	None
Peer Reviewer Name	None		e-mail	None
Scientific Committee Approval Date	01/06/2023		Version Number	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	**1-Training students on the basics of logical circuits used in electronic computers and how they work.** **2- Building logical circuits and learning about computer operation.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning about the different number systems. 2. Learning the arithmetic operations related to different number systems. 3. Learning the different logic gates of computer system and their work. 4. Ability to design, simplify and implement different logical and arithmetic circuits that considered the basic of digital system. 5. Ability to design, simplify and implement different sequential circuits, counters and shift registers.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part 1 – Numbers Systems, Operations, and Codes Different Number Systems, Data representation (integer and fraction) using different number systems. Conversion Between Different Numbers Systems. Arithmetic operations using different number systems, and Digital Codes (BCD, Parity, Gray, etc.) [10 hrs] • Part 2- Logic Gates The Inverter (NOT Gate), AND Gate, OR Gate, NAND Gate, NOR Gate, the Exclusive-OR Gate and Exclusive-NOR Gates. [8 hrs] • Part 3 Boolean Algebra and Logic Simplification Boolean Operations and Expressions, Laws and Rules of Boolean Algebra, Simplification Using Boolean Algebra, DeMorgan's theorems,The Karnaugh Map (1, 2 , 3 and 4 variables) , SOP and POS Minimization. [8 hrs] • Part 4 Combinational Logic Analysis Basic Combinational Logic Circuits, Implementing Combinational Logic, Combinational Logic Using NAND and NOR Gates, Logic Circuit Operation with Pulse Waveform Inputs. [10 hrs] Revision problem classes [10 hrs] • Part 5 – Functions of Combinational Logic. Half , Full and Parallel Binary Adders and Subtractors. 1's and 2's Complement Subtractor, 2's Complement Adder-Subtractor, BCD Adder, etc. Comparators, Decoders, Encoders, Multiplexers, Demultiplexer [10 hrs] • Part 6- Latches, Flip-Flops, and Timers. Latches, Edge-Triggered Flip-Flops. Flip-Flop operating (R-S, T, J-K ,D) [12 hrs] • Part 7Counters Synchronous Counters, Asynchronous Counters. Design of Counters. [8 hrs] • Part 8 Shift Registers Basic Shift Register Operations: SISO, SIPO, PISO, PIPO, Bidirectional and special Types Shift Register. [6 hrs] • Revision problem classes [6 hrs] • Part 9– Microprocessor Introduction to Microprocessor: component of microprocessor, Microprocessor architecture [6 hrs]

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**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	4	10% (10)	3,5 and 10	1,3,and 4
	Assignments	7	10% (10)	2 and 12	2,3
	Projects / Lab.	9	10% (10)	Continuous	All
	Report	8	10% (10)	2 and 12	LO #3, #4 and #5
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #5
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - Difference between Circuit Theory and Field Theory
Week 1	• General number formula: Binary, octal, decimal and hexadecimal numbers
Week 2	• Arithmetic operations in different number system
Week 3	• complements, binary codes, BCD, Ex-3, Gray codes
Week 4	• Basic definitions, basic theorem and properties, Boolean functions
Week 5	• Canonical and Standard forms Digital Logic Gates
Week 6	• Karanough Maps: AND- OR implementation, don't care conditions
Week 7	• Subtractions, half and full adders and subtractions, binary parallel address
Week 8	• decoders, encoders, comparators
Week 9,10	• multiplexers and demultiplexers
Week 11	• Flip-flops (RS, T, D, JK ...) • Master slave FF, counter • shift registers
Week 12,13	• Introduction to Microprocessor • Microprocessor architecture
Week 14	• component of microprocessor
Week 15	• Final Examination

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	• Lab 1: Introduction to digital laboratory kit operation • Lab 2: Logic Gates (AND, OR, NOT, NAND, NOR).
Week 2	• Lab 3: Logic Gates (XOR, XNOR). • Lab 4: De Morgan's Theorems 1st and 2nd Laws.
Week 3	• Lab 5: Designing a combinational Logic circuit. • Lab 6: The realization of the Boolean equation.
Week 4	• Lab 9: Half Binary Subtractor. • Lab 10: Full Binary Subtractor.
Week 5	• Lab 11:Binary comparator
Week 6	• Lab 12: 2's Complement Adder- Subtractor
Week 7	• Lab 13: Flip-Flop.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Thomas L. Floyd, Digital Fundamentals, 11th Edition, Pearson Education 2015	Yes
Recommended Texts	1- Introduction to Digital Logic with Laboratory Exercises/James Feher, 2009.	No

	2- M. Morris Mano, Michael D. Ciletti, Digital Design, 5th edition, Pearson Education 2013.	
Websites	Digital Systems: From Logic Gates to Processors: https://www.coursera.org/learn/digital-systems	

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.

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Department of Electrical Engineering Techniques

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**ENGINEERING DRAWING**		Module Delivery	
Module Type	**Basic**		Theory Lecture ☒Lab ☐Tutorial ☐Practical ☒Seminar	
Module Code	**ATU23013**			
ECTS Credits	**5**			
SWL (hr/sem)	**125**			
Module Level	1	Semester of Delivery	1	
Administering Department	Electrical Engineering Techniques	College	Al-Furat Al-Awsat Technical University Technical College /Al-Mussaib	
Module Leader	AMER ADIL	e-mail	AMER.MAHMOOD@atu.edu.iq	
Module Leader's Acad. Title	Asst. Lecturer	Module Leader's Qualification	M.Sc.	
Module Tutor	None	e-mail	E-mail	
Peer Reviewer Name	None	e-mail	E-mail	
Scientific Committee Approval Date	01/06/2023	Version Number	1.0	

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To explore further and confirm the reference of engineering drawing to the varied design applications found in engineering and technology in general. 2. To further the ability to communicate information by engineering drawings. 3. To develop knowledge to two dimensional (2D) computer-aided drawing(CAD). n Further and/or Higher Education who are required to learn how to use the computer-aided design (CAD) software package AutoCAD®
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning types of engineering lines and their uses and how to draw 2. Drawing geometric shapes such as square, rectangular, parallelogram and circle 3.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: ● Part A – AutoCAD interface Setup, save, limits, grid, object snap and ortho mode [3 hrs.] ● Part B- Coordinate method Direct distance method, Absolute coordinate, Relative coordinate, Polar coordinate[3hrs] ● Part C Draw menu Line, polyline, rectangle, arc, circle, ellipse and hatch [12hrs] ● Part D Modify and Properties menu Copy, move, offset, erase, extend, trim and array, line shape and line size [9 hrs.] ● Part D Projection Front, side and top ortho projections [6 hrs.] ● Part E stereoscopic shapes Method for drawing stereoscopic shapes[6hrs] Revision problem classes [8 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Drawing engineering is an engineers language and consider a means to communicate between them and designers 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	4.13
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)	5 and 10	LO #1, #2
	Assignments	8	10% (10)	2 and 12	LO #3
	Projects / Lab.	18	10% (10)	Continuous	All
	Report	0	10% (10)		
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1 - 3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
1	Introducing AutoCAD
2	Drawing settings
3 ,4 ,5 ,6	Drawing Tools: Line, Circle, Arc, Ellipse, Donut, Polygon, Rectangle, Point, Multiline, Pline, Spline, Xline.
7 ,8, 9	Modify Tools Erase, Undo, Redo, Explode, Move, Copy, Rotate, Mirror, Array, Align, Scale, Stretch, Lengthen, Trim, Extend, Break, Join, Chamfer, Fillet.
10	Display Control: Zoom, Pan, Redraw, Clean Screen.
11	Dimension - Linear, Aligned, Radius, Diameter, Center Mark, Angle, Arc length, Continuous, Baseline, Tolerance, Dimension Space, Dimension Break, Jogged radius, Ordinate dimensions.

12	Annotation Tools Text, Style, Mtext, Scale text, Spell,
13	Hatching Objects
14	Exercises drawing
15	Final Examination

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	ENGINEERING GRAPHICS FOR First Year Student Specialized Scientific Programs (SSP) Faculty of Engineering Alexandria University Prepared By Assoc. Prof. / Raafat El sayed Shaker Ismail Introduction to AutoCAD 2011. 2D and 3D Design by Alf Yarwood	Yes
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme
مخطط الدرجات

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Fail Group (0 – 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
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MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	DIFFERENTIAL MATHEMATICS	Module Delivery	
Module Type	BASIC	✓ Theory Lecture Lab ✓ Tutorial Practical ✓ Seminar	
Module Code	ATU23014		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	1
Administering Department	DEPARTMENT OF ELECTRICAL ENGINEERING TECHNIQUES	College	Al-Furat Al-Awsat Technical University Technical College /Al-Mussaib
Module Leader	Ahmed Mahdi	e-mail	ahmed-hamza@atu.edu.iq
Module Leader's Acad. Title	Ass.prof.	Module Leader's Qualification	M.Sc.
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Review Committee Approval	21/06/2023	Version Number	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

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

Module Objectives أهداف المادة الدراسية	**To teach the students:** 1-Derivatives of trigonometric functions 2- Partial differentiation and Total differential 3- limit and derivative concepts 4- The Fundamental Theorem of Calculus,
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning about the complex numbers. 2. Learning the Functions of several variables. 3. Learning the Lines and planes in space, Tangent and normal in the plane
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: ❖ Complex Numbers– For most students the assumptions I've made above about their exposure to complex numbers is the extent of their exposure. Problems tend to arise however because most instructors seem to assume that either students will see beyond this exposure in some later class or have already seen beyond this in some earlier class.

	Students are then suddenly expected to know more than basic arithmetic of complex numbers but often haven't actually seen it anywhere and have to quickly pick it up on their own in order to survive in the class. [13 hrs] ❖ Revision problem classes [6 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in exercises, while improving and expanding their mathematical reasoning skills.

Student Workload (SWL)
الحمل الدراسي للطالب

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	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	10% (10)	4,6 ,8,10,11	LO #1, 2, and 4
	Assignments	12	10% (10)	Continuous	All
	Projects / Lab.	0	0		
	Report	0	0		
Summative assessment	Midterm Exam	2 hr	20% (20)	8	LO # 1-6
	Final Exam	3 hr	60% (60)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Equation of the straight line, Trigonometric functions and their sketches. Domain, Range, Inverse of functions, Absolute value, limits, Limits applications, Polar coordinates, Conic sections**
Week 2	**Differential calculus:** **Methods of differentiation, Some applications of differentiation**
Week 3	**Derivatives of trigonometric functions, inverse trigonometric**
Week 4	**Derivatives of Logarithmic and exponential functions**
Week 5	**Methods of differentiation, Some applications of differentiation.** **Rates of change, Velocity and acceleration Differentiation of parametric equations, implicit functions**
Week 6	**Partial differentiation, Total differential, rates of change and small changes Maxima, minima and saddle points for functions of two variables**
Week 7	**Hyperbolic functions, Relation between the hyperbolic functions and exponential functions**
Week 8	**Derivative of hyperbolic functions**

Week 9,10	**Differentiation II (maxima, minima and points of inflection; curve sketching; parametric, implicit and logarithmic differentiation; Maclaurin's series; Taylor's series)**
Week 11,12	**Theory of matrices and determinants. Properties of matrix operations, matrix transpose, matrix inverse, Applications to linear equations, Cramer's Rule. Eigen values and eigenvectors**
Week 13,14	**Complex Numbers & Applications: Argand's Diagram, De'Moivre's theorem and its application to find roots of algebraic equations. Hyperbolic Functions, Inverse Hyperbolic Functions, Logarithm of Complex Numbers, Separation into Real and Imaginary parts, Application to problems in Engineering.**
Week 15	**Final exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Advance Engineering Mathematics, Alan Jeffrey, 2002**	Yes
Recommended Texts	**Calculus II &Calculus III, Paul Dawkins, 2007**	No
Websites	https://tutorial.math.lamar.edu/Classes/CalcIII/CalcIII.aspx https://tutorial.math.lamar.edu/Classes/CalcII/CalcII.aspx	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.

Ministry of Higher Education and Scientific Research -
Al-Furat Al-Awsat Technical University
Technical College /Al-Mussaib
Department of Electrical Engineering techniques

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	ENGINEERING WORKSHOPS		Module Delivery	
Module Type	**Basic**		Theory Lecture ✓ Lab ☐Tutorial ✓ Practical ✓ Seminar	
Module Code	**ATU23015**			
ECTS Credits	**5**			
SWL (hr/sem)	***125***			
Module Level	1	Semester of Delivery	1	
Administering Department	DEPARTMENT OF ELECTRICAL ENGINEERING TECHNIQUES	College	**Northern Technical University** Engineering Technical College/Mosul	
Module Leader	Adnan Nief	e-mail		
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Master	
Module Tutor		e-mail	E-mail	
Peer Reviewer Name	Name	e-mail	E-mail	
Scientific Committee Approval Date	1/06/2023	Version Number	1.0	

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

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

Module Objectives	

أهداف المادة الدراسية	1. Students will learn occupational safety in workshops and how to acts in the event of an electric shock. 2. Student will learn types of electrical conductors and methods of electrical installation. 3. Student will learn how use the contactor in some practical application. 4. Studying types of capacitors, inductances, semicondctors.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Important: Write at least 6 Learning Outcomes, better to be equal to the number of study weeks. 1. Principles of industrial security and occupational safety within the electricity workshops. 2. Dimensional measuring devices (MICROMETER). 3. characteristics of good installations, Types of electrical installations. 4. Practical electrical installation. 5. What is the electric coils, The different types of capacitor 6. Examine the types of semiconductors. 7. Instruct the student on how to design electronic circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Occupational Safety Learn about safety principles in electrical shops and how to act when a shock occurs.[6hr] Part B – Tools Learn about tools used in workshops and how to use a micrometer to measure the diameter of conductors.[6hr] Part-C- Electrical installations[18hr] Methods of electrical installations and how to connect the contactors Part-D-Electronics:[15hr] Types of capacitors , semiconductors (Diodes, transistors), Electronic circuits.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Understanding: Occupational safety, methods of installations. 2-Practical experience: Installation, micrometers, electronic circuits.

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	77	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.1
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	6	10% (10)	5 and 10	LO #1, #2 and7
	Assignments	6	10% (10)	2 and 12	LO #3, #4 and #6
	Projects / Lab.	20	10% (10)	Continuous	All
	Report	8	10% (10)	2 and 12	LO #3, #4 and #6, #7
Summative assessment	Midterm Exam	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1:Principles of industrial security and occupational safety within the electricity workshops, general safety rules and protection against electric shock.
Week 2	Lab 2: Learn about the tools used in electrical work shops.
Week 3	Lab 3: Dimensional measuring devices (MICROMETER)
Week 4	Lab 4: Electrical installations, Systems conductors insulated, How to equip the house with electric power.
Week 5	Lab 5: characteristics of good installations, Types of electrical installations, Bus-Bar
Week 6	Lab 6: Practical electrical installation(one way switch control lamp, one way switch control two lamps series, one way switch control two lamps parallel).
Week 7	Lab 7:Practical electrical installation (two ways switch control parallel lamps, two lamps parallel with reciprocating control with two way switch, Staircase lamp)
Week 8	Lab 8: : Means of controlling motors (Contactor) The idea of its work and its construction.

Week 9	Lab 9 : Using contactor to operate a three phase motor.
Week 10	Lab 10: Types of fuses used in electrical circuits, the current that each types bears..
Week 11	Lab 11: What is the electric coil, how does it work and what are its types according to the type of cores.
Week 12	Lab 12: The different types of capacitor in terms of the type of insulator used between the plates of the capacitor, the voltage that the capacitor bears, reading capacitor values using different methods.
Week 13	Lab 13: Examine the types of semiconductors (diode, transistor, etc) and knowing the unemployed ones.
Week 14	Lab 14: Instruct the student on how to design electronic circuits on printed board and install electronic components on it (simple circuit)
Week 15	Lab 15: Review.

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		Yes
Recommended Texts		No
Websites	https://uotechnology.edu.iq/training/units/kahrabaa/kahrabaminhaj/minhaj1.html http	

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.

Ministry of Higher Education and Scientific Research - Iraq
Northern Technical University
Engineering Technical College/Mosul
Department of Electric Techniques Engineering

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**Arabic Language**	Module Delivery	
Module Type	SUPLEMENT	✓ Theory Lecture Lab Tutorial Practical ✓ Seminar	
Module Code	ATU13		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery	1
Administering Department	DEPARTMENT OF COMPUTER TECHNIQUES ENGINEERING	College	NORTHERN TECHNICAL UNIVERSITY ENGINEERING TECHNICAL COLLEGE/MOSUL
Module Leader	**Dr. Bashar N. Ahmed**	e-mail	basharnadeem@ntu.edu.iq
Module Leader's Acad. Title	Prof.	Module Leader's Qualification	PHD
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Review Committee Approval	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 Objectives أهداف المادة الدراسية	ينشأ الطالب على حب اللّغة العربيّة لغة القرآن الكريم. التعرّف على مواطن الجمال في اللّغة العربيّة وآدابها، وأن يكتسب الطالب القدرة على دراسة فروع اللّغة العربيّة. تعريف الطالب بألفاظ اللّغة العربيّة الصحيحة وتراكيبها وأساليبها السليمة بطريقة مشوقة وجذابة. أن يستغل الطالب وقت فراغه بالقراءة والاطلاع والرجوع إلى المكتبة . تمكين الطالب من القراءة الصحيحة، وأن يكتسب القدرة على استعمال اللغة استعمالاً صحيحاً في الاتّصال مع الآخرين؛ كالسرعة وجودة الإلقاء وحسن التعبير، وتعويده حسن الاستماع لما يسمع مما ييسّر له أموره ويعينه على قضاء حوائجه. تنمية الذوق الأدبي لدى الطالب حتى يدرك النواحي الجمالية في أساليب الكلام ومعانيه وصوره. تعويد الطالب التعبيرات السليمة الواضحة عن أفكاره وما يقع تحت حواسه نطقاً وكتابة وحسن استخدام علامات الترقيم. تنمية قدرة ومهارة الطالب الإملائية والخطية بحيث يستطيع الكتابة الصحيحة من جميع النواحي. إيقاظ وعي الطالب لإدراك شرف الكلمة وتوجيهه؛ للمحافظة على طهارتها ونقائها حتى لا تستعمل إلا في الخير. مساعدة الطالب على فهم التراكيب المعقدة والأساليب الغامضة .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. معرفة القواعد النحوية والصرفية. 2- التعريف بأبرز المصنفات اللغوية والأدبية. 3- تحديد المشكلات اللغوية والأدبية لدى الدارسين. 4- القراءة المعاصرة للنصوص اللغوية والأدبية. 5- قراءة النصوص الأدبية وكتابتها وفق المعايير النحوية والصرفية 6- تعزيز الثقة بالنفس والجرأة والفصاحة 7- المنافسة والتميز في سوق العمل.

Indicative Contents المحتويات الإرشادية	❖ مقدمة عن الأخطاء اللغوية التاء المربوطة والتاء المفتوحة (4 ساعات) ❖ تطبيقات الأخطاء اللغوية الشائعة واقسام الكلام (6 ساعات) ❖ همزة الوصل والقطع والهمزة المتوسطة والمتطرفة قواعد كتابة الالف الممدودة والمقصورة الحروف الشمسية والقمرية والضاد والظاء (12 ساعة) ❖ المشاكل والمعوقات ونقاشات (6 ساعات)

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	1- .تبسيط المعلومات وتنظيمها 2- .تسهيل عملية استرجاع المعلومات 3- ربط المفاهيم الجديدة بالمكتسبات السابقة 4- .إيجاد العلاقة بين المفاهيم 5 - تسهيل تذكر المعارف والمعلومات

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	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	6	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	3	10% (10)	Continuous	All
	Projects / Lab.	0	10% (10)		
	Report	5	10% (10)		LO,#6 ,#7 and #9
Summative assessment	Midterm Exam	2 hr	20% (20)	7	LO # 1-7
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	مقدمة عن الأخطاء اللغوية
Week 2	التاء المربوطة والتاء المفتوحة
Week 3	همزة الوصل والقطع
Week 4	الهمزة المتوسطة والمتطرفة
Week 5	قواعد كتابة الالف الممدودة والمقصورة
Week 6	الحروف الشمسية والقمرية

Week 7	الضاد والظاء
Week 8	العـــدد
Week 9	المفاعيل
Week 10	أقسام الكلام
Week 11	معاني حروف الجر
Week 12	تطبيقات الأخطاء اللغوية الشائعة
Week 13	النون والتنوين
Week 14	مقدمة عن الأخطاء اللغوية
Week 15	الامتحان النهائي

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	الكامل في اللغة والادب لابي عباس المبرد	Yes
Recommended Texts	أخطاء لغوية شائعة لخالد بن هلال بن ناصر العبري	No
Websites	https://www.eshamel.ne https://www.ektebsa7.com	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required
Note:				

NB 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.

Ministry of Higher Education and Scientific Research - Iraq
Northern Technical University
Engineering Technical College/Mosul
Department of Electrical Engineering Techniques

MODULE DESCRIPTOR FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Mechanics**			Module Delivery	
Module Type	Core			☒Theory ☒Lecture ☐Lab Tutorial ☐Practical ☒Seminar	
Module Code	**ATU23021**				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	1		Semester of Delivery	2	
Administering Department	Electrical Engineering Techniques		College	Engineering Technical College	
Module Leader	**Fatin M. Shehab**		e-mail	fatin.m.alobaid@ntu.edu.iq	
Module Leader's Acad. Title	**Lecturer**		Module Leader's Qualification	MASTER	
Module Tutor	**Fatin M. Shehab**		e-mail	E-mail	
Peer Reviewer Name	None		e-mail	None	
Scientific Committee Approval Date	June /01/2023		Version Number	1.0	
Relation with other Modules العلاقة مع المواد الدراسية الأخرى					
Prerequisite module	None		Semester		
Co-requisites module	None		Semester		

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	Module Objectives for Engineering Mechanics/Statics: 1. Understand the fundamental concepts and principles of Statics, including motion, forces, and acceleration. 2. Apply kinematic equations to analyze the motion of particles and rigid bodies in various scenarios. 3. Determine the relationship between forces, mass, and acceleration using Newton's laws of motion.

	4. Apply the principles of work and energy to analyze and solve dynamic problems. 5. Analyze and calculate linear and angular momentum, and apply the principle of impulse and momentum to dynamic systems. 6. Understand and apply the principles of vibrations and oscillations in mechanical systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Apply fundamental concepts of engineering mechanics/statics to analyze and solve problems related to the equilibrium of rigid bodies. 2. Demonstrate a deep understanding of vector mathematics and its application in statics, including vector addition, subtraction, dot product, and cross product. 3. Apply the principles of static equilibrium to solve problems involving forces and moments acting on rigid bodies in two and three dimensions. 4. Analyze and calculate the internal forces, such as axial forces, shear forces, and bending moments, in statically determinate structures using methods such as the method of sections and the method of joints. 5. Utilize free-body diagrams to model and analyze the forces acting on a structure or a rigid body, and determine the resultant forces and moments at specific points. 6. Analyze and calculate the centroid and moment of inertia of various two-dimensional shapes, including rectangles, triangles, and circles, and apply these concepts to determine the stability and strength of structures. 7. Apply the concepts of friction and its effects on the equilibrium of bodies in statics, including calculating static and kinetic friction forces and determining the angle of friction. 8. Analyze and calculate the forces in trusses and frames, including the method of joints and the method of sections, and determine the stability and structural integrity of these systems. 9. Apply the principles of equilibrium to solve real-world engineering problems, such as determining the stability of structures, calculating the forces on supports and connections, and analyzing the behavior of mechanical systems. 10. Communicate effectively, both orally and in writing, to present and explain the analysis, results, and solutions of engineering mechanics/statics problems. By achieving these module learning outcomes, students will develop a strong foundation in engineering mechanics/statics and be equipped with the necessary knowledge and skills to analyze and solve a wide range of engineering problems involving static equilibrium and structural stability.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Statics • Definition and scope of statics • Fundamental concepts and principles • Importance of statics in engineering 2. Vectors and Vector Analysis • Vector representation and operations • Vector components and coordinate systems

	• Vector addition, subtraction, and scalar multiplication 3. Forces and Moments • Forces and their characteristics • Resultant and equilibrium of forces • Moment of a force and its properties • Couples and their effects 4. Equilibrium of Rigid Bodies • Free body diagrams and force analysis • Equations of equilibrium in two and three dimensions • Solving equilibrium problems using scalar and vector approaches • Applications to simple systems and structures 5. Truss Structures • Introduction to truss analysis • Method of joints and method of sections • Determination of member forces and support reactions 6. Friction • Laws of friction and frictional forces • Types of friction and their characteristics • Calculation of frictional forces and moments • Applications to inclined planes, wedges, and screws 7. Center of Gravity and Centroids • Definitions and properties of center of gravity and centroids • Determination of center of gravity and centroids of simple shapes • Composite bodies and distributed loads 8. Moments of Inertia • Moment of inertia and its physical significance • Calculating moments of inertia for simple shapes • Parallel-axis and perpendicular-axis theorems • Application of moments of inertia in engineering analysis

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	3.2

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	127	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	8.46
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	6	15% (15)	5,7,9 and 13	LO #2 , #3 , #5 and #8
	Assignments	12	15% (15)	2,6,8,10 and 14	LO #1 ,#4 ,#6 ,#7 and #10
	Projects / Lab.				
	Report	8	10% (10)	5,7,9 and 13	LO #2 , #3 , #5 and #10
Summative assessment	Midterm Exam	2hr	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
1	• Static science – Definitions
2	• Forces ,Curers (bi-axis)
3	•Force components
4,5	•Composition •Resolution of forces
6,7	•Moment of a force
8	•Coupling
9	Equilibrium of planar forces
10	•Free-body diagram
11,12	•Centroid & center of gravity (for area & bodies)
13	•Moment of inertia
14	•Direct stress & direct strain and their relation •Shearing forces and bending moment ،s diagrams.
15	• Final Examination

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Mechanics/ Statics, Fourteen Edition, R.C. Hibbeler	yes

	Engineering Mechanics Volume 1 Statics Seventh Edition J. L. Meriam L. G. Kraige Virginia Polytechnic Institute and State Universit Engineering Mechanics, Lectures, Notes and Solutions, University of AL Qadisiyah Roads & Transport Department by Alaa J. Alnsrawy	
Recommended Texts	1- Engineering Mechanics , Ferdinand L. Singer 2- Engineering Mechanics, Meriam 3- Engineering Mechanics/ Statics, Arthur P. Boresi & Richard J. Schmidt	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.

Ministry of Higher Education and Scientific Research - Iraq
Northern Technical University
Engineering Technical College/Mosul
Department of Electric Techniques Engineering

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	**Human Rights and Democracy**	Module Delivery	
Module Type	SUPLEMENT	✓ Theory Lecture Lab Tutorial Practical ✓ Seminar	
Module Code	ATU11		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	1	Semester of Delivery	2
Administering Department	DEPARTMENT OF ELECTRI TECHNIQUES ENGINEERING	College	NORTHERN TECHNICAL UNIVERSITY ENGINEERING TECHNICAL COLLEGE/MOSUL
Module Leader	**Dr. Bashar N Ahmed**	e-mail	.basharnadeem@ntu.edu.iq
Module Leader's Acad. Title	Prof.	Module Leader's Qualification	PHD
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Review Committee Approval	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 Objectives أهداف المادة الدراسية	تهدف الديمقراطية وحقوق الانسان للحفاظ على كرامة الفرد وحقوقه الأساسية وتعزيزها كما تحقيق العدالة الاجتماعية وتشجيع التنمية الاقتصادية والاجتماعية للمجتمع وتماسكه فضلا عن توطيد الأمان الوطني وإرساء مناخ مؤات للسلام الدولي وذلك لان حقوق الانسان والديمقراطية مرجعاً أساسياً للجميع لحماية حقوق الإنسان؛ وهي توفر بيئة لحماية حقوق الإنسان وإعمالها إعمالاً فعلياً. واليوم، بعد مضي فترة على تحقيق الديمقراطية في مختلف أنحاء العالم، يبدو أن العديد من النظم الديمقراطية تتراجع. ويظهر أن بعض الحكومات تتعمد إضعاف إجراء عمليات تحقق مستقلة بشأن سلطاتها، والقضاء على أي نقد، وتفكيك الرقابة الديمقراطية وضمان حكمها لمدة طويلة، مع أثر سلبي على حقوق الشعب.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1 - فهم ومعرفة وأدراك حقوقه التي اقرها الله له وللبشر جميعاً وبالتالي فهي هبه وليس مكسب من أحد ولا يحق لأي شخص انتزاعها. 2- يعبر الطالب بأسلوبه الخاص عن هذه الحقوق ويدافع عنها. 3- تعليل الظواهر واعطاء التفسيرات لما يحدث امامه من انتهاك لحقوق الانسان وحرياته من خلال تحديد اوجه النقص او الثغرات الموجودة في ضوء المعلومات المتوفرة لديه 4- فهم اهم النظم السياسية والتي تعد ضمانه لحقوق الانسان وحرياته السياسية ومحاولة تطبيقه على ارض الواقع الا وهو النظام الديمقراطي.

Indicative Contents المحتويات الإرشادية	❖ حقوق الانسان في التاريخ المعاصر والحديث: الاعتراف الدولي بحقوق الانسان منذ الحرب العالمية الأولى وعصبة الامم المتحدة (4 ساعات) ❖ حقوق الانسان، تعريفها، اهدافها وحقوق الانسان في الحضارات القديمة وخصوصا حضارة وادي الرافدين (6 ساعات) ضمانات واحترام وحماية حقوق الانسان على الصعيد الدولي: - دور الأمم المتحدة ووكالاتها المتخصصة في توفير الضمانات - دور المنظمات الاقليمية (الجامعة العربية، الاتحاد الأوربي، الاتحاد الافريقي، منظمة الدول الأمريكية، منظمة آسيان) ❖ دور المنظمات الدولية الاقليمية غير الحكومية والرأي العام في احترام وحماية حقوق الانسان (12 ساعة) ❖ المشاكل والمعوقات ونقاشات الطلبة (6 ساعات)

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	-استراتيجية التفكير حسب قدرة الطالب 2-استراتيجية مهارة التفكير العالية 3-استراتيجية التفكير الناقد في التعلم 4-العصف الذهني

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	67	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.46
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	6	10% (10)	5, 10	LO #1, 2, and 3
	Assignments	6	10% (10)	Continuous	All
	Projects / Lab.	0	0		
	Report	7	10% (10)	5, 10	LO #1, 2, and 4
Summative assessment	Midterm Exam	2 hr	20% (20)	7	LO # 1-3
	Final Exam	3 hr	60% (60)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	حقوق الانسان، تعريفها، اهدافها حقوق الانسان في الحضارات القديمة وخصوصا حضارة وادي الرافدين
Week 2	حقوق الانسان في الشرائع السماوية مع التركيز على حقوق الانسان في الإسلام

Week 3	حقوق الانسان في التاريخ المعاصر والحديث : الاعتراف الدولي بحقوق الانسان منذ الحرب العالمية الأولى وعصبة الامم المتحدة
Week 4	الاعتراف الاقليمي بحقوق الانسان : الاتفاقية الاوربية لحقوق الانسان 1950 ، الاتفاقية الامريكية لحقوق الانسان 1969 ، الميثاق الافريقي لحقوق الانسان 1981 ، الميثاق العربي لحقوق الانسان 1994
Week 5	حقوق الانسان في التاريخ المعاصر والحديث : الاعتراف الدولي بحقوق الانسان منذ الحرب العالمية الأولى وعصبة الامم المتحدة
Week 6	حقوق الانسان في الدساتير العراقية بين النظرية والواقع
Week 7	حقوق الانسان الاقتصادية والاجتماعية والثقافية و حقوق الانسان المدنية والسياسية
Week 8	حقوق الانسان الحديثة : الحقائق في التنمية ، الحق في البيئة النظيفة ، الحق في التضامن ، الحق في الدين
Week 9	ضمانات احترام وحماية حقوق الانسان على الصعيد الوطني ، الضمانات في الدستور والقوانين الضمانات في الرقابة الدستورية ، الضمانات في حرية الصحافة والرأي العام ، دور المنظمات غير الحكومية في احترام وحماية حقوق الانسان
Week 10	ضمانات واحترام وحماية حقوق الانسان على الصعيد الدولي : - دور الأمم المتحدة ووكالاتها المتخصصة في توفير الضمانات - دور المنظمات الاقليمية (الجامعة العربية ، الاتحاد الأوربي ، الاتحاد الافريقي ، منظمة الدول الأمريكية ، منظمة آسيان) دور المنظمات الدولية الاقليمية غير الحكومية والرأي العام في احترام وحماية حقوق الانسان
Week 11	مصطلح الديمقراطية ، نشأته، دلالته، تاريخ الديمقراطية.
Week 12	الاسلام والديمقراطية ومساوئ الحكم الاستبدادي .
Week 13	الانتقادات الموجهة للديمقراطية، ومحاسن النظام الديمقراطي.
Week 14	الأنظمة الديمقراطية في العالم/الديمقراطية في العالم الثالث/ المشاكل التي تواجه البلدان العربية في التحول الديمقراطي
Week 15	**الامتحان النهائي**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	حقوق الانسان والديمقراطية – المفاهيم والمرتكزات للدكتور سماح مهدي العلياوي والدكتور سلمان كاظم البهادلي	Yes
Recommended Texts	الديمقراطية وحقوق الانسان في الاسلام للدكتور راشد الغنوشي	No
Websites	https://www.neelwafurat.com https://studies.aljazeera.ne	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.

Ministry of Higher Education and
Scientific Research - Iraq
Al-Furat Al-Awsat Technical University
Technical College /Al-Mussaib
Department of Electrical Engineering Techniques

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	ENGLISH LANGUAGE	Module Delivery	
Module Type	SUPLEMENT	✓ Theory ✓ Lecture Lab Tutorial Practical Seminar	
Module Code	ATU10		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	Semester of Delivery	2
Administering Department	DEPARTMENT OF ELECTRICAL ENGINEERING TECHNIQUES	College	NORTHERN TECHNICAL UNIVERSITY ENGINEERING TECHNICAL COLLEGE/MOSUL
Module Leader	Noor Salah	e-mail	dgjhueg20@gmail.com
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Review Committee Approval	14/06/2023	Version Number	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	1
Co-requisites module	None	Semester	

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

Module Objectives أهداف المادة الدراسية	Unit one: Introduce yourself and others using am/are/is and my/your. Practice saying hello and goodbye in different situations. Unit two: Talk about your hobbies, interests and activities using he/she/they and his/her. Practice asking and answering questions. Unit three: Describe yourself and others using adjectives and nouns. Practice giving personal information. Unit four: Talk about your family and friends using possessive adjectives, possessive 's and has/have. Practice describing relationships and appearance. Unit five: Talk about your daily routine and habits using present simple with I/you/we/they, a and an. Practice telling the time and date. Unit six: Talk about your work or school life using present simple with he/she, questions, negatives and adverbs of frequency. Practice expressing likes and dislikes. Unit seven: Talk about your favorite things using question words, pronouns and this/that. Practice making comparisons and preferences. Unit eight: Talk about your home and neighborhood using there is/are and prepositions of place. Practice describing location and giving directions. Unit nine: Talk about your past experiences using was/were born and past simple with irregular verbs. Practice telling stories and biographies. Unit ten: Talk about your recent holidays or events using past simple with

	regular and irregular verbs, questions, negatives and ago. Practice narrating events in chronological order. Unit eleven: Talk about your abilities and skills using can/can't and adverbs. Practice making requests and offers. Unit twelve: Talk about your shopping habits and needs using some/any, like/would like and thank you. Practice ordering food and buying things.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Unit one: Student will be able to introduce himself and others in a polite and friendly way using basic grammar and vocabulary. Unit two: Student will be able to talk about his hobbies, interests and activities in simple sentences using subject pronouns and possessive adjectives. Unit three: Student will be able to describe himself and others using adjectives and nouns in positive and negative sentences. Unit four: Student will be able to talk about his family and friends using possessive adjectives, possessive 's and has/have in statements and questions. Unit five: Student will be able to talk about his daily routine and habits using present simple with I/you/we/they, a and an in affirmative and negative sentences. Unit six: Student will be able to talk about his work or university life using present simple with he/she, questions, negatives and adverbs of frequency in different contexts. Unit seven: Students will be able to talk about their favorite things using question words, pronouns and this/that in short answers and comparisons. Unit eight: Students will be able to talk about their home and neighborhood using there is/are and prepositions of place in descriptions and directions. Unit nine: Student will be able to talk about his past experiences using was/were born and past simple with irregular verbs in statements and questions. Unit ten: Student will be able to talk about his recent holidays or events using past simple with regular and irregular verbs, questions, negatives and ago in narratives and sequences. Unit eleven: Student will be able to talk about his abilities and skills using can/can't and adverbs in statements and questions. Student will also be able to make requests and offers using can/can't. Unit twelve: Students will be able to talk about their shopping habits and needs using some/any, like/would like and thank you in statements and questions. Student will also be able to order food and buy things using polite language.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part A – General meeting and introduction. This section provides an overview of Hello, Am/Are/Is, My/Your, This is with Practice in Work, Your World, He/She/They, His/Her, Questions. [6 hrs] • Part B Every day. Vocabulary related to different topics. Possessive adjectives, Possessive's, Has/have, Adjective+ noun. Present simple I/you/we/they, A and an [10 hrs] • Part C Time and event. Present simple, Questions and negatives, Adverbs of frequency. Question words, Pronouns, This and that. There is/are..., Prepositions [8 hrs] • Revision problem classes [4 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	**Building relationships and appreciating their culture:** Teachers should take the time to learn about their students' cultures and backgrounds. **Using actions and gestures to show what to do:** Teachers can use nonverbal cues such as pointing, gesturing, and facial expressions to help students understand what they are trying to communicate. **Planning lessons and using language objectives:** Teachers should plan lessons that are appropriate for their students' language proficiency levels. **Provide opportunities for students to work in pairs or small groups:** Working in pairs or small groups can help students who are learning English as a new language practice their speaking skills in a less intimidating environment. **Use visuals such as pictures, diagrams, and graphic organizers:** Visuals can help students who are learning English as a new language understand complex concepts more easily.

	Provide opportunities for students to use technology: Technology can be used to support English-language learners by providing access to online resources such as videos, podcasts, and interactive activities. **Encourage students to read widely:** Reading widely can help students who are learning English as a new language improve their vocabulary and comprehension skills 2.

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	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	4	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	8	10% (10)	2, 12	LO # 3-12
	Projects / Lab.				
	Report				
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-8
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
1	Unit one: hello, Am/are/is, my/your, This is with practice in work.
2	Unit two: your world, He/she /they, his/her, Questions.
3	Unit three: all about.
4	Unit four: family and friends, Possessive adjectives, Possessive's, Has/have, Adjective+ noun.
5	Unit Five: the way I live, Present simple l/you /we /they, A and an.
6	Unit six: every day, Present simple he/she, Questions and negatives, Adverbs of frequency.
7	Unit seven: my favorites, Question words, Pronouns, This and that
8	Unit eight: where I live, There is /are..., Prepositions
9	Unit nine: times past, Was /were born, Past simple -irregular verbs.
10	Unit ten: we had a great time!, Past simple regular & irregular, Question, Negatives and Ago.
11	Unit eleven: Can /can't, Adverbs, Requests, I can do that.
12	Unit twelve: please I'd like..., Some and any, Like and would like and thank you.
13	Unit thirteen: here and now, Present continuous, Present simple & present continuous.
14	Unit fourteen: it's time to go!, Future plans, Revision writing email and informant letter.
15	Final Examination

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	New Headway Beginner Fourth Edition	Yes
Recommended Texts	New Headway Beginner Workbook	Online

Websites	https://elt.oup.com/student/headway/beg/?cc=global&selLanguage=en

APPENDIX:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
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	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

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Ministry of Higher Education and Scientific Research - Iraq
Northern Technical University
Engineering Technical College/Mosul
Department of Electrical Engineering Techniques

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	AC ELECTRICAL CIRCUITS	Module Delivery	
Module Type	CORE	✓ Theory Lecture ✓ Lab Tutorial Practical ✓ Seminar	
Module Code	ATU23024		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	2
Administering Department	DEPARTMENT OF ELECTRICAL ENGINEERING TECHNIQUES	College	NORTHERN TECHNICAL UNIVERSITY ENGINEERING TECHNICAL COLLEGE/MOSUL
Module Leader	Alya Hamid Ali	e-mail	alya.hamid@ntu.edu.iq
Module Leader's Acad. Title	Assist. Professor	Module Leader's Qualification	Master
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Review Committee Approval	14/06/2023	Version Number	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	EET100	Semester	1
Co-requisites module	None	Semester	

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

Module Objectives أهداف المادة الدراسية	1-Understand the fundamental concepts and principles of alternating current (AC) circuits. 2-Gain knowledge of the mathematical tools and techniques used to analyze AC circuits, including phasors, complex numbers, and impedance. 3-Develop the ability to solve AC circuit problems using circuit analysis techniques such as mesh analysis, nodal analysis, and Thevenin's theorem.. ect. 4-Learn how to calculate and analyze voltage and current phasors in AC circuits, including their amplitudes, phases, and frequency relationships. 5-Explore the behavior and characteristics of AC circuit elements, such as resistors, capacitors, and inductors, and understand their roles in AC circuit analysis. 6-Investigate the concept of impedance in AC circuits and its relationship to resistance, reactance, and frequency.

	7-Study the principles of AC power and power factor, including real power, reactive power, apparent power, and power factor correction. 8- Gain a comprehensive understanding of three-phase AC systems, including the generation, transmission, and distribution of power in three-phase circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Knowledge Acquisition: Students will acquire a comprehensive understanding of the fundamental concepts and principles of alternating current (AC) circuits. 2-Circuit Design and Analysis: Students will gain the ability to design and analyze AC circuits, applying their knowledge of impedance, power factor, and component characteristics. They will learn to calculate voltage and current magnitudes, phase differences, and power relationships in AC circuits. 3-Phasor Diagram Interpretation: Students will be able to construct and interpret phasor diagrams to visualize and analyze the behavior of voltages and currents in AC circuits. 4-Three-Phase Systems: Students will acquire understanding of three-phase AC systems, including balanced and unbalanced configurations. Laboratory Skills: Students will develop practical skills in using circuit simulation software and laboratory equipment to design, analyze, and verify the performance of AC circuits.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part A – Inductance & Capacitance in Electric circuits. General concept of capacitance (charge and voltage, capacitors in series and parallel) General concept of inductance (inductive and non-inductive circuits, capacitors in series and parallel) [4 hrs] • Part B Alternating Quantities. Ac systems, waveforms, terms and definitions. Average and R.M.S values of current and voltage. [8 hrs] • Part C Single - phase of AC Circuits. AC in resistive circuits, current and voltage in inductive circuits, current and voltage in capacitive circuits. Concept of complex impedance and admittance, AC series and parallel circuits. RL, RC and RLC circuit analysis and phasor representation. [14 hrs] • Part D Power in AC circuits. Power in resistive circuits. power in inductive and capacitive circuits ,power in circuit with resistance and reactance. Power factor, its practical importance, improvement of power factor, measurement of power in a single – phase AC circuits. [8 hrs] • Part E Three – phase circuit analysis. Basic concept and advantages of three – phase circuit. Phasor representation of star and delta connection. Phase and line quantities. Voltage and current computation in 3-phase balance and unbalance circuits. Real and Reactive power computation, measurement of power and power factor in 3-phase system. [20 hrs] • Revision problem classes [6 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1-Conceptual Understanding: Explain the differences between AC and DC circuits,

	introduce the concept of impedance, reactance, and phasors, and highlight the significance of frequency and phase in AC circuits. 2-Mathematical Foundations: Provide a solid mathematical foundation for AC circuits. Teach students the use of complex numbers and phasor notation to analyze AC circuits. 3-Problem-Solving Skills: Dedicate adequate time to problem-solving exercises and examples. 4-Laboratory Experiments: Incorporate laboratory experiments to reinforce theoretical concepts. Allow students to build and analyze AC circuits using oscilloscopes, function generators, and AC power sources. 5-Simulation Tools: Introduce simulation software tools that allow students to simulate AC circuits and observe their behavior. 6-Review and Assessment: Regularly review key concepts and provide formative assessments to gauge students' understanding. Offer constructive feedback on their performance to help them identify areas for improvement.

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	6.12
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	6	10% (10)	5, 10	, 2, 4
	Assignments	6	10% (10)	2, 12	1, 3,
	Projects / Lab.	9	10% (10)	Continuous	All
	Report	12	10% (10)	Continuous	All
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-4
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
1,2,3,4,5,6	AC circuits with steady-state sinusoidal excitation: Basic concepts of frequency, angular frequency, phase shift, amplitude, peak, peak-to-peak, and root-mean-square values. Mathematical representation of sinusoidal voltages and currents, phasor representation of alternating voltages and currents, complex number representation of voltage and current phasors, the j operator and its application in circuit analysis. Complex impedance, admittance, resistance, reactance, conductance and susceptance. Solution of simple circuits by combining impedances in series and parallel.

	General circuit analysis using j notation. Resonance: Analysis and applications of series and parallel resonant circuits, bandwidth and Q factor.
7,8,9	AC power absorbed by a resistor, inductor and capacitor. Relationships between power, reactive power and VA, power factor, principle of conservation of power and reactive power, reactive power absorbed by capacitors and inductors, power factor correction, complex power in terms of phasor voltages and currents.
10,11	Poly phase and three phase system , Delta connection, Wye connection.
12,13	The power in balance phase circuit. Unbalance Wye and delta connected load, the rotating magnetic field.
14	Magnetically coupled circuits.
15	Final Examination

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
1	Lab.1:Operating of oscilloscope (CRO)
2	Lab.2:Utilization of oscilloscope for measuring voltage (The Sine wave)and calculate average, RMS value and time period.
3	Lab.3: Alternating voltage applied in a pure resistance circuit.
4	Lab.4: Alternating voltage applied in a pure inductive circuit.
5	Lab.5: Alternating voltage applied in a pure capacitive circuit.
6	Lab.6: Series R-L circuit
7	Lab.7: Series R-C circuit
8	Lab.8: Series R-L-c circuit
9	Lab.9: Parallel R-L circuit
10	Lab.10: Parallel R-C circuit
11	Lab.11: Parallel R-L-C circuit
12	Lab.12: Balanced 3-phase circuit star connection
13	Lab.13: Balanced 3-phase circuit delta connection.
14	Lab.14: Unbalanced 3-phase circuit star connection
15	Lab.15: review

Learning and Teaching Resources

مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Charles K. Alexander, Matthew N.O. Sdiku Fundamentals of Electrical Engineering, 4th Edition, 2009	Yes
Recommended Texts	Tony R. Kuphaldt, Lessons In Electric Circuits, Volume II - AC 5th edition, 2002	No
Websites	AC circuits https://byjus.com/physics/ac-circuit/	

APPENDIX:

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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note:

NB 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.

Ministry of Higher Education and Scientific Research - Iraq
Northern Technical University
Engineering Technical College/Mosul
Department of Electrical Engineering Techniques

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	COMPUTER PRINCIPLE	Module Delivery	
Module Type	BASIC	✓ Theory Lecture ✓ Lab Tutorial ✓ Practical ✓ Seminar	
Module Code	ATU12		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	2
Administering Department	DEPARTMENT OF ELECTRICAL ENGINEERING TECHNIQUES	College	NORTHERN TECHNICAL UNIVERSITY ENGINEERING TECHNICAL COLLEGE/MOSUL
Module Leader	Salar Jamal Rashid	e-mail	salar.jamal@ntu.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Review Committee Approval	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 Objectives أهداف المادة الدراسية	1-Understanding the Fundamentals: The primary objective of a computer principal course is to provide students with a solid foundation in the fundamental principles of computer work. This includes concepts such as Hardware, Software and new technologies in computer area. 2-Analyzing the work of Components: Students will learn how does computer parts work and the parts of each of them. They will understand their behavior in normal condtion and be able to calculate their effects on the overall performance of work. 3-Computer Specifications: Students will become familiar with important properties of each computer components and be able to install the proper hardware/software for their computer. 4-Laboratory Skills: The course includes hands-on laboratory experiments to provide students with practical experience of using Microsoft Office progmars suck as Word, PowerPoint, Excel and Access.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1-Fundamental Knowledge: Students will acquire a solid understanding of the fundamental concepts and principles of computer hardware components, including CPU, RAM, Storage Devices, Input and output devices. 2-Copmputer performance Skills: Students will be able to buy their own PC/Laptop in a manner that allow to use the full capability of the computer with less price.

	3-Computer Software Skill: Students will be able to install computer drivers and the essential programs. 4-Through hands-on laboratory experiments, students will be able to write reports, homework and posters by using Word program, on the other hand they will be able to prepare presentations using PowerPoints program. Also, they will be able to use Excel and Access programs to solve equations and draw curves.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: • Part A – Introduction to Computer. Constituent the field of using computer, types of computers and their differences, The advantages and disadvantages of computers [8 hrs] • Part B Computer Components. CPU, RAM, Storage Devices, Input and Output devices [14 hrs] • Part C Office programs . Microsoft Word, Microsoft PowerPoint, Microsoft Excel and Microsoft Access. [32 hrs] • Revision problem classes [6 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	1-Hands-on Experiments: Engage students in practical experiments to deepen their understanding of circuits. 2-Videos: seeing videos for best understanding of components work. 3-Group Reports: Assign collaborative reports for new computer technology. 4-Interactive Discussions: Encourage student participation and critical thinking through open-ended questions. 5-Assessment Variety: Use diverse assessment methods to gauge student understanding. 6-Office Hours and Support: Offer individualized assistance through office hours or online support.

Student Workload (SWL)
الحمل الدراسي للطالب

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	6	10% (10)	5, 10	LO #1, 2, 4
	Assignments	6	10% (10)	2, 12	LO # 3, 4
	Projects / Lab.	16	10% (10)	Continuous	All
	Report	8	10% (10)	2, 12	4
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-3
	Final Exam	3 hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
1	Introduction to computer
2	Hardware and Software
3	Central Processing Unit
4	Memory
5	Storage Devices
6	Motherboard
7	Operating System
8	Windows Desktop
9	Installing and removing programs
10	Utility programs
11	Internet
12	Cloud services
13	Artificial Intelligence Websites and Programs
11	Artificial Intelligence Websites and Programs (Contd.)
12	Virtual Reality
13	Augmented Reality
14	Smart Websites
15	Final Examination

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
1	LAB 1: INTRODUCTION TO MICROSOFT OFFICE PROGRAM
2	LAB 2: FILE AND HOME TABS IN MICROSOFT WORD
3	LAB 3: INSERT TAB IN MICROSOFT WORD
4	LAB 4: DESING AND LAYOUT TABS IN MICROSOFT WORD
5	LAB 5: HOME AND INSERT TAB IN MICROSOFT POWERPOINT
6	LAB 6: TRANSITIONS TAB IN MICROSOFT POWERPOINT
7	LAB 7: ANIMATIONS TAB IN MICROSOFT POWERPOINT
8	LAB 8: HOME TAB IN MICROSOFT EXCEL
9	LAB 9: INSERT TAB IN MICROSOFT EXCEL
10	LAB 10: WRITING FORMULAS IN MICROSOFT EXCEL
11	LAB 11: CREATING TABLES IN MICROSOFT ACCESS
12	LAB 12: CREATING FORMS IN MICROSOFT ACCESS
13	LAB 13: CREATING REPORTS IN MICROSOFT ACCESS
14	LAB 14: REVIEW

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Fundamentals of Computer Work	Yes
Recommended Texts	Fundamentals of Computer Work	No

Websites	Youtube

APPENDIX:

GRADING SCHEME مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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	C - Good	جيد	70 - 79	Sound work with notable errors
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Note:

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Ministry of Higher Education and Scientific Research - Iraq
Al-Furat Al-Awsat Technical University
Technical College /Al-Mussaib
Department of Electrical Engineering techniques

MODULE DESCRIPTOR FORM
نموذج وصف المادة الدراسية

Module Information
معلومات المادة الدراسية

Module Title	DIFFERENTIAL MATHEMATICS	Module Delivery	
Module Type	BASIC	✓ Theory Lecture Lab ✓ Tutorial Practical ✓ Seminar	
Module Code	ATU23014		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	1
Administering Department	DEPARTMENT OF ELECTRICAL ENGINEERING TECHNIQUES	College	Al-Furat Al-Awsat Technical University Technical College /Al-Mussaib
Module Leader	Ahmed Mahdi	e-mail	ahmed-hamza@atu.edu.iq
Module Leader's Acad. Title	Ass.prof.	Module Leader's Qualification	M.Sc.
Module Tutor	None	e-mail	None
Peer Reviewer Name	None	e-mail	None
Review Committee Approval	21/06/2023	Version Number	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

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

Module Objectives أهداف المادة الدراسية	**To teach the students:** 1-Derivatives of trigonometric functions 2- Partial differentiation and Total differential 3- limit and derivative concepts 4- The Fundamental Theorem of Calculus, 5-Indefinite Integrals and the Net Change Theorem.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learning about the complex numbers. 2. Learning the Functions of several variables. 3. Learning the Lines and planes in space, Tangent and normal in the plane 4. Learning the Triple integrals in rectangular coordinates 5. Double Integral in rectangular and polar form, Areas and volumes 6. Applications (Surface Area, Green's theorem and Stokes' theorem
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: ❖ Complex Numbers– For most students the assumptions I've made above about their exposure to complex numbers is the extent of their exposure. Problems tend to arise

	however because most instructors seem to assume that either students will see beyond this exposure in some later class or have already seen beyond this in some earlier class. Students are then suddenly expected to know more than basic arithmetic of complex numbers but often haven't actually seen it anywhere and have to quickly pick it up on their own in order to survive in the class. [13 hrs] ❖ Vector Fields – In this section we introduce the concept of a vector field and give several examples of graphing them. We also revisit the gradient that we first saw a few chapters ago. Line Integrals – Part I – In this section we will start off with a quick review of parameterizing curves. This is a skill that will be required in a great many of the line integrals we evaluate and so needs to be understood. We will then formally define the first kind of line integral we will be looking at : line integrals with respect to arc length. Line Integrals – Part II – In this section we will continue looking at line integrals and define the second kind of line integral we'll be looking at : line integrals with respect to x, y, and/or z. We also introduce an alternate form of notation for this kind of line integral that will be useful on occasion. Line Integrals of Vector Fields – In this section we will define the third type of line integrals we'll be looking at : line integrals of vector fields. We will also see that this particular kind of line integral is related to special cases of the line integrals with respect to x, y and z. [20 hrs] ❖ Part D: Multiple Integrals - In this chapter will be looking at double integrals, i.e. integrating functions of two variables in which the independent variables are from two dimensional regions, and triple integrals, i.e. integrating functions of three variables in which the independent variables are from three dimensional regions. Included will be double integrals in polar coordinates and triple integrals in cylindrical and spherical coordinates and more generally change in variables in double and triple integrals.[20 hrs] ❖ Revision problem classes [6 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in the delivery of this unit is to encourage students to participate in exercises, while improving and expanding their mathematical reasoning skills.

Student Workload (SWL)
الحمل الدراسي للطالب

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	32	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	5	10% (10)	4,6 ,8,10,11	LO #1, 2, and 4
	Assignments	12	10% (10)	Continuous	All

	Projects / Lab.	0	0		
	Report	0	0		
Summative assessment	Midterm Exam	2 hr	20% (20)	8	LO # 1-6
	Final Exam	3 hr	60% (60)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	**Equation of the straight line, Trigonometric functions and their sketches. Domain, Range, Inverse of functions, Absolute value, limits, Limits applications, Polar coordinates, Conic sections**
Week 2	**Differential calculus:** **Methods of differentiation, Some applications of differentiation**
Week 3	**Derivatives of trigonometric functions, inverse trigonometric**
Week 4	**Partial differentiation, Total differential, rates of change and small changes Maxima, minima and saddle points for functions of two variables**
Week 5	**Theory of matrices and determinants. Properties of matrix operations, matrix transpose, matrix inverse, Applications to linear equations, Cramer's Rule. Eigen values and eigenvectors**
Week 6	**Derivatives of Logarithmic and exponential functions**
Week 7	**Hyperbolic functions, Relation between the hyperbolic functions and exponential functions**
Week 8	**Derivative of hyperbolic functions**
Week 9	**Sigma Notation, Areas and Distances, The Definite Integral. The Fundamental Theorem of Calculus, Indefinite Integrals and the Net Change Theorem, The Substitution Rule**
Week 10	**Trigonometric Integrals, Trigonometric Substitution, Partial Fractions and Improper Integrals**
Week 11,12	**Integration using Tables and Computer Algebra Systems CAS, Numerical Integration (Trapezoidal Approximation, Midpoint Approximation, Simpson's Approximation, and Error Bounds)**
Week 12	**Areas between Curves, Volume, Volumes by Cylindrical Shells Average Value of a Function (Mean Value Theorem), Arc Length**
Week 13	**Applications to Physics and Engineering and Probability**
Week 14	**Final exam**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	**Advance Engineering Mathematics, Alan Jeffrey, 2002**	Yes
Recommended Texts	**Calculus II &Calculus III, Paul Dawkins, 2007**	No
Websites	https://tutorial.math.lamar.edu/Classes/CalcIII/CalcIII.aspx https://tutorial.math.lamar.edu/Classes/CalcII/CalcII.aspx	

APPENDIX:

GRADING SCHEME مخطط الدرجات				
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