Academic Program and Course Description Guide

2024

Introduction:

The educational program is a well-planned set of courses that include procedures and experiences arranged in the form of an academic syllabus. Its main goal is to improve and build graduates' skills so they are ready for the job market. The program is reviewed and evaluated every year through internal or external audit procedures and programs like the External Examiner Program.

The academic program description is a short summary of the main features of the program and its courses. It shows what skills students are working to develop based on the program's goals. This description is very important because it is the main part of getting the program accredited, and it is written by the teaching staff together under the supervision of scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the subjects and paragraphs of the previous guide in light of the updates and developments of the educational system in Iraq, which included the description of the academic program in its traditional form (annual, quarterly), as well as the adoption of the academic program description circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna Process as the basis for their work.

In this regard, we can only emphasize the importance of writing an academic programs and course description to ensure the proper functioning of the educational process.

Concepts and terminology:

Academic Program Description: The academic program description provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the students to achieve, proving whether they have made the most of the available learning opportunities. It is derived from the program description.

Program Vision: An ambitious picture for the future of the academic program to be sophisticated, inspiring, stimulating, realistic and applicable.

Program Mission: Briefly outlines the objectives and activities necessary to achieve them and defines the program's development paths and directions.

Program Objectives: They are statements that describe what the academic program intends to achieve within a specific period of time and are measurable and observable.

Curriculum Structure: All courses / subjects included in the academic program according to the approved learning system (quarterly, annual, Bologna Process) whether it is a requirement (ministry, university, college and scientific department) with the number of credit hours.

Learning Outcomes: A compatible set of knowledge, skills and values acquired by students after the successful completion of the academic program and must determine the learning outcomes of each course in a way that achieves the objectives of the program.

Teaching and learning strategies: They are the strategies used by the faculty members to develop students' teaching and learning, and they are plans that are followed to reach the learning goals. They describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: ...... **University of Wasit**

Faculty/Institute: ....**College of Engineering**

Scientific Department: ....**Electrical Engineering Department**

Academic or Professional Program Name: **Bachelor of Science in Electrical Eng.**

Final Certificate Name: .. **Bachelor of Science in Electrical Eng.**

Academic System: **Bologna for the 1st & 2nd stages**, **APET for the third & fourth**

Description Preparation Date: **1/9/2024**

File Completion Date: 4/9/2024

Signature:

Head of Department Name:

Asst. Prof. Dr. Ismail Sharhan Baqer

Date: 5/9/2024

Signature:

Scientific Associate Name:

Asst. Prof. Dr. Hussein Razzaq Sabah

Date: 5/9/2024

The file is checked by:

Department of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Department:

Asst. Prof. Dr. Haider Majid Hassan

Date: 5/9/2024

Signature:

Approval of the Dean

Prof. Dr. Ali Nasser Helou

1. Program Vision

The vision of the Department of Electrical Engineering at Wasit University is to become a distinguished department among similar scientific departments at the international level, to be a leader at the local and global levels in the fields of electrical engineering and its applications, and to participate effectively with community agencies.

2. Program Mission

The mission of the Department of Electrical Engineering at the University of Wasit is to meet the needs of the local community for engineering personnel and to provide high-quality programs in the field of higher education and scientific research.

3. Program Objectives

The program aims to achieve several objectives, including:

1. Developing the engineering student's ability to deal professionally and scientifically enough to solve problems in various fields of electrical engineering, no matter how complex. The program initially aims to familiarize electrical engineering students with the principles of operation and design of various measuring and analysis devices.

2. Designing the operating systems for these devices and how to utilize them to conduct scientific research to advance academic achievement.

3. Working to meet the labor market's needs for this scientific expertise, contributing to the development of qualified national research and academic competencies.

4. Building a sound personality for engineering students through various activities that help them be creative in their professional lives.

5. Encouraging scientifically qualified individuals to continue their studies in master's programs and other programs.

4. Program Accreditation

Does the program have program accreditation? And from which agency?

nothing

5. Other external influences

Is there a sponsor for the program?

nothing

6. Program Structure

Program Structure	Number of Courses	Credit hours	Percentage	Reviews*
Institution Requirements	8	%3	%3	
College Requirements	8	%3	%3	
Department Requirements	50	232	%96	
Summer Training	——	——	——	
Other				

* This can include notes whether the course is basic or optional.

7. Program Description

Year/Level	Course Code	Course Name	Credit Hours	
			theoretical	practical
	UoWEE12345	Human Rights and Democracy	2	–
	UoWEE12346	Digital Technology I	1	2
	UoWEE12347	Mathematics I	3	–

First stage\1st semester	UoWEE12348	Electrical Engineering Fundamentals I and Lab I	3	**2**
	UoWEE12349	Electronics Physics	3	–
	UoWEE12350	Computer Fundamentals and Programming	1	**2**
	UoWEE12352	Arabic Language I	2	**2**
		total	15	**8**
First stage\2nd semester	UoWEE12353	English Language	2	–
	UoWEE12354	Digital Technology II	1	**2**
	UoWEE12355	Mathematics II	3	–
	UoWEE12356	Electrical Engineering Fundamentals II and Laboratory II	3	**2**
	UoWEE12357	Engineering Drawing and AutoCAD	3	**2**
	UoWEE12358	Mechanical Engineering	3	–
	UoWEE12360	C++ and Matlab Programming	3	**2**
		total	**18**	

Program Description				
Year/Level	**Course Code**	**Course Name**	**Credit Hours**	
			theoretical	practical
2nd stage\1st semester	UoWEE12361	Engineering Mathematics I	3	0
	UoWEE12362	Electromagnetic Fields I	2	0
	UoWEE12363	Electrical Circuits I	2	0
	UoWEE12364	Electronic Circuits I	2	2
	UoWEE12365	Electrical Machines I	2	2
	UoWEE12366	Computer Engineering	4	3
	UoWEE12367	English Language III	1	0
		Total	**16**	
2nd stage\2nd semester	UoWEE12368	Engineering Mathematics II	3	7
	UoWEE12369	Electromagnetic Fields II	2	0
	UoWEE12370	Electrical Circuits 2	2	0
	UoWEE12371	Electronic Circuits II	2	0
	UoWEE12372	Electrical Machines II	2	2
	UoWEE12373	Embedded Systems and Programmable Logic Controllers	4	2
	UoWEE12374	English Language IV	1	3
		Total	**16**	0

8. Expected learning outcomes of the program

Knowledge

Learning Outcomes 1	a) Comprehensive knowledge of theoretical and applied sciences (mathematics, physics, and computer science), probability and statistics applicable to EE.
	b) Capability to apply knowledge of mathematics, science, and engineering to resolve engineering problems to meet a requirement that is posed by society.
	c) Solid background in the fundamentals of the field, with social sensitivity, inspiration and critical thinking, which is needed for a successful career in engineering.
	d) Knowledge of basic electrical and electronic components and their use in analog circuits and digital circuits.
	e) In depth knowledge in the field of communication systems and networks, biomedical engineering, electric energy systems, intelligent systems and control, and waves, antennas, and optics.
	f) Extent of knowledge in the areas of circuits, electronics, digital logic, signals and systems, computer organization and microprocessors, control systems, electromagnetism, communication systems, and power systems.
	g) Knowledge of modern issues and ability to use EE principles to report the technological challenges of the future.
	h) Broad education necessary to understand the impact of engineering solutions in a global/societal field.

Skills

Learning Outcomes 2	a) Skills in using software packages and writing computer programs to solve engineering problems.
	b) Skills in identifying, formulating, and solving engineering problems using techniques, skills and modern engineering tools necessary for engineering practice.
	c) Skills in developing and using models for the analysis and design of components and systems.
	d) Basic component and systems level understanding and their integration.

	e) Skills in designing a system, component, or process to meet desired needs.
	f) Skills in incorporating new knowledge that will allow them to design, evaluating and composing new products or services.
	g) Skills in troubleshooting engineering problems.
	h) Skills in designing and conducting experiments as well as analyzing and interpreting data.
	i) Skill to function on multidisciplinary teams and to communicate effectively. Also, ability to perform in leadership roles.
Ethics	
Learning Outcomes 4	a) Understanding of professional and ethical responsibility.
	b) Robust self-improvement and self-evaluation incentives to obtain particular knowledge in areas of interest in their future career.
	c) Recognition of the need for and the skill to engage in lifelong learning.

9. Teaching and Learning Strategies

a) Students learn by tackling complex, real-world engineering projects, which develops skills in design, implementation, teamwork, communication, and decision-making.

b) Analyzing real-world engineering scenarios helps students understand the application of theory, the complexities of engineering challenges, and various stakeholder perspectives.

c) E-learning and Digital tools for interactive content, recorded lectures, discussion forums, and other e-learning materials can transform theoretical concepts into engaging content.

d) Group work prepare students for the interdisciplinary and team-oriented nature of professional engineering.

e) By means of simulation software, students try virtually experiment with circuits, systems, and phenomena without physical hardware, improving practical understanding.

10. Evaluation methods

Weekly, monthly, daily and end of year exams.

11. Faculty

Faculty Members

Academic Rank		Specialization		Special Requirements/Skills (if applicable)		Number of the teaching staff	
		General	Special			Staff	Lecturer
Prof.	Muayad Sajit	Elec. Eng.	Embedded Systems			✔	

Asst. Prof.	Asaad Ali	Elec. Eng.	General Electrical			✓	
Lecturer	Firas Naji	Elec. Eng.	Materials			✓	
Asst. Lecturer	Ibtihal Razzaq	Elec. Eng.	General Electrical			✓	
Asst. Lecturer	Maha Akram	Elec. Eng.	General Electrical			✓	
Asst. Lecturer	Nebras Hazem	Elec. Eng.	General Electrical			✓	
Lecturer	Ali Khalaf	Elec. Eng.	General Electrical			✓	
Lecturer	Sameer Faleh	Mech. Eng.	Materials			✓	
Asst. Lecturer	Ahmed Abdul Amir	Elec. Eng.	General Electrical			✓	
Lecturer	Nour Sabah	Elec. Eng.	General Electrical			✓	
Asst. Prof.	Mohammed Abdul Khabeer	Mech. Eng.	Applied Electrical			✓	
Asst. Lecturer	Ahmed Sattar	Elec. Eng.	Informatics			✓	
Lecturer	Salem Mohammed	Elec. Eng.	Informatics			✓	
Asst. Lecturer	Nuha Adnan	Elec. Eng.	General Electrical			✓	
Asst. Lecturer	Zahraa Hassan	Elec. Eng.	General Electrical			✓	
Asst. prof.	Manaf Kazem	Elec. Eng.	Medical Devices			✓	

Asst. Lecturer	Humam Munim	Elec. Eng.	General Electrical			✓	
Asst. prof.	Faisal Diab	Elec. Eng.	Power			✓	
Asst. prof.	Amjad Yousef	Elec. Eng.	Communications			✓	
Lecturer	Riyadh Abd Rabbo	Elec. Eng.	Electronics			✓	
Asst. Lecturer	Safa Nouri	Elec. Eng.	General Electrical			✓	
Prof.	Hassan Fahd	Elec. Eng.	General Electrical			✓	
Lecturer	Nasreen Khalil	Elec. Eng.	General Electrical			✓	
Asst. Lecturer	Duaa Ali	Elec. Eng.	General Electrical			✓	
Asst. Prof.	Ismail Sharhan	Elec. Eng.	Communications			✓	
Lecturer	Bassem Khalaf	Elec. Eng.	Communications			✓	
Prof.	Haider Diab	Elec. Eng.	Communications			✓	
Asst. Prof.	Ali Asaad	Elec. Eng.	Artificial Intelligence			✓	
Asst. Prof.	Mohammed Abdul Redha	Elec. Eng.	Power			✓	
Prof.	Muayad Sajit	Elec. Eng.	Embedded Systems			✓	

Professional Development
Mentoring new faculty members
Urging new faculty members to work on developing the scientific curriculum and lecture delivery methods, and to deliver the scientific material to the recipient in as smooth a manner as possible.
Professional development of faculty members
Encouraging faculty to develop the scientific aspect by developing work in scientific laboratories to support this aspect among students is a scientific specialty.

12. **Acceptance Criterion**
The Department of Electrical Engineering at Wasit University accepts intermediate school graduates from the science stream who have passed the general examinations with a GPA of 80 or higher.

13. **The most important sources of information about the program**
• Curriculum and prescribed books from the Ministry of Higher Education and Scientific Research. • Websites recommended by specialized professors. • Non-curricular books recommended by specialized professors.

14. Program Development Plan
The Department of Electrical Engineering at Wasit University, in coordination with the Department Head, the Department Council, and the Department's Scientific Committee, has a plan to develop the program and provide the necessary requirements for this process, whether from a practical or theoretical perspective.

Program Skills Outline

Year/Level	Course Code	Course Name	Basic or optional	Knowledge				Skills				Ethics			
				A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
1st /	UoWEE12361	Human Rights and Democracy	Basic	+	+	+	+	+	+		+	+	+		+
	UoWEE12362	Digital Technology	Basic	+	+	+	+	+	+		+	+	+		+
	UoWEE12363	Mathematics	Basic	+	+	+	+	+	+		+	+	+	+	+
	UoWEE12364	Electrical Engineering Fundamentals	Basic	+	+	+	+	+	+	+	+	+	+	+	+
	UoWEE12365	Electronics Physics	Basic	+	+		+	+		+	+	+	+	+	+
	UoWEE12366	Computer Fundamentals and Programming	Basic	+	+		+	+		+	+	+	+	+	+
	UoWEE12367	Arabic Language	Basic	+	+		+	+		+	+	+		+	+
		Engineering Drawing and AutoCAD	Basic	+	+		+	+		+	+	+		+	+
	UoWEE12368	Mechanical Engineering	Basic	+	+	+		+	+	+	+	+		+	+
	UoWEE12369	English Language	Basic	+	+	+		+	+		+	+		+	+
2nd	UoWEE12370	Engineering Mathematics	Basic												
	UoWEE12371	Electromagnetic Fields	Basic	+	+	+		+	+		+	+	+	+	+
	UoWEE12372	Electrical Circuits	Basic	+	+	+		+	+		+	+	+	+	+
	UoWEE12373	Electronic Circuits	Basic	+	+			+	+		+	+	+	+	+
	UoWEE12374	Electrical Machines	Basic	+	+		+	+	+	+	+			+	+
	UoWEE12361	Computer Engineering	Basic	+	+		+		+	+	+			+	+
	UoWEE12362	English Language	Basic	+	+		+		+	+	+			+	+
	UoWEE12363	Embedded Systems (FPGA)	Basic	+	+	+	+		+	+	+	+	+	+	+
3rd	UoWEE12389	Numerical Analysis	Basic	+	+	+	+		+	+	+	+	+	+	+
	UoWEE12390	Electrical Machines	Basic	+			+	+	+	+	+			+	+

MODULE DESCRIPTION FORM

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نموذج وصف المادة الدراسية

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Module Information				
معلومات المادة الدراسية				
Module Title	**Basics of Electrical Engineering I and Lab I**		**Module Delivery**	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UoW12348			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	1	**Semester of Delivery**		1
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Name	**e-mail**	E-mail	
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems.

	6. To perform mesh and Nodal analysis.
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. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.** **Part A - Circuit Theory** DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] **Part B - Analogue Electronics** Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs]

	Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs] Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	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	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	112	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Basic concept and units:** Electricity & atomic structure of substance, current and current density current flow.
Week 2	Electric circuit, E.M.F & potential difference, international system of unit, abbreviation for multiples & sub- multiples.
Week 3	Quantities derived from SI units, units of force-energy-torque and power
Week 4	Relation between energy and heat, electric units, specific heat capacity.
Week 5	Efficiency and percentage efficiency, electromechanical equivalent of element.
Week 6	**Analysis of D.C circuits**: Ohms law, resistivity & conductivity, temperature effect, internal resistance of a source, open circuit & short circuit, equivalent resistance.
Week 7	Series – parallel – Series- parallel – delta and star connections, equivalent voltage source.
Week 8	Series – parallel – circulating current method, floating source method & grouping of E.M.F sources, double subscript, power calculation in D.C circuit, introduction to network theorems, types of sources
Week 9	Independent and dependent voltage and their transformation, Kirchhoff's laws, KVL –KCL.
Week 10	Maxwell's circulating current (mesh analysis), nodal analysis, superposition theorem, Thevenin's theorem, Norton's theorem.
Week 11	Maximum power transfer theorem, Mill man's theorem, substitution theorem, reciprocity theorem.
Week 12	**Alternation quantities:** Magnetic fields, magnetic fields due to electric current, magnetic fields in a coil, force in current carrying conductor across a magnetic field, left hand rule.
Week 13	Magnitude of the force, electromagnetic induction, Faraday 's law, right hand rule, magnitude of induced e.m.f magnitude of e.m.f in a coil.
Week 14	Generation of single-phase voltage, waveforms – instantaneous value and real value, relation between time and angle, max – average & r.m.s values of alternating and sinusoidal voltage and current, form factor and peak factor.
Week 15	Phasor quantities, voltage and current relations in pure resistive inductive and capacitive circuits.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Laboratory procedures and safety Laboratory regulations, laboratory safety practices measurement terms, error precision, resolution, and accuracy.
Week 2	Lab 2: Power supply, digital mustimeter Power supply, digital mustimeter, measuring voltage, measuring current.
Week 3	Lab 3: Resistors and Ohm's law Ohm's law, color codes, nominal value, actual value within tolerance.
Week 4	Lab 4: Kirchhoff's law Kirchhoff's voltage law (KVL), Kirchhoff's current law (KCL).
Week 5	Lab 5: Current and voltage divider rule Series connection, parallel connection, voltage divider rule (VDR), current divider rule (CDR).
Week 6	Lab 6: Equivalent Resistance circuits Series circuits, parallel circuits, series-parallel circuits.
Week 7	Lab 7: Simulation of a D.C. motor, Computer simulation of a D.C. circuit. design of ammeter, voltmeter and ohmmeter Voltage design, full-scale deflection current voltage divider, ammeter design, ohmmeter design, logarithmic scale.

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	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				
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 and Lab II**	**Module Delivery**
Module Type	Core	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	**UoW12356**	
ECTS Credits	**7**	
SWL (hr/sem)	**175**	

Module Level	1	**Semester of Delivery**		1
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	امجد يوسف	**e-mail**	E-mail	
Module Leader's Acad. Title		**Module Leader's Qualification**	Ph.D.	
Module Tutor	امجد يوسف	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents	
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	7. To perform mesh and Nodal analysis.
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. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of sinusoid and phasors in an electric circuit. 9. Discuss the various properties of resistors, capacitors, and inductors. 10. Explain the two Kirchoff's laws used in circuit analysis. 11. Identify the capacitor and inductor phasor relationship with respect to voltage and current.
Indicative Contents المحتويات الإرشادية	**Indicative content includes the following.** **Part A - Circuit Theory** DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Introduction to mesh and nodal analysis. [15 hrs] AC circuits I – Time dependent signals, average and RMS values. Capacitance and inductance, energy storage elements, simple AC steady-state sinusoidal analysis. [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] RL, RC and RLC circuits - Frequency response of RLC circuits, simple filter and band-pass circuits, resonance and Q-factor, use of Bode plots, use of differential equations and their solutions. Time response (natural and step responses). Introduction to second order circuits. [15 hrs] Revision problem classes [6 hrs] **Part B - Analogue Electronics** Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, current and voltage division, input resistance, output resistance, coupling and decoupling capacitors, maximum power transfer, RMS and power dissipation, current limiting and over voltage protection. [15 hrs]

	Components and active devices – Components vs elements and circuit modeling, real and ideal elements. Introduction to sensors and actuators, self-generating vs modulating type sensors, simple circuit interfacing. [7 hrs]
	Diodes and Diode circuits – Diode characteristics and equations, ideal vs real. Signal conditioning, clamping and clipping, rectification and peak detection, photodiodes, LEDs, Zener diodes, voltage stabilization, voltage reference, power supplies. [15 hrs]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	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	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	112	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10

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

	Delivery Plan (Weekly Syllabus)
	المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Analysis of single-phase A.C. circuits
Week 2	Resistance, reactance and impedance, conductance - susceptance and admittance,
Week 3	the phasor diagram series – parallel - and series / parallel circuits, power calculation in A.C. circuits
Week 4	power factor & power factor correction.
Week 5	Complex number & its application to A.C. circuit:
Week 6	Equivalent impedance: Series – parallel – Series/parallel – delta and star connections, introduction to network theorems, Kirchhoff 's law: KVL-KCL, Maxwell 's circulating currents (mesh analysis),
Week 7	Nodal analysis, super position theorem, thevenin's theorem, Norton 's theorem, maximum power transfer theorem,
Week 8	Mill man's theorem, substitution theorem, reciprocity theorem, power calculation (complex power).
Week 9	Resonance: Series resonance: quality factor – selectivity – half power – frequency and bandwidth. Parallel resonance quality factor – selectivity – half power – frequency and bandwidth, Series/ parallel resonance circuits.
Week 10	Magnetic circuit: Magnetic field, direction of magnetic field, characteristics of lines of magnetic field, magnetic field due to electric current,
Week 11	magnetic field in a coil, force in current carrying conductor across a magnetic field, left hand rule, magnitude of the force, electromagnetic induction,
Week 12	Faraday 's law, right hand rule, magnitude of induced e.m.f. magnitude of e.m.f. in a coil, mmf a magnetic field strength, Magnetic constants, reluctance, Magnetic leakage and fringing,
Week 13	Magnetic factors, Magnetic circuit: Series – parallel and Series/ parallel, Kirchhoff 's laws for magnetic circuit, hysteresis and factors effect on its loop, hysteresis loss and eddy current loss,
Week 14	Condition for minimum volume of a permanent magnet, load line of a permanent magnet, force between two magnetic poles, magnetic pull between two iron surfaces.

	Delivery Plan (Weekly Lab. Syllabus)

	المنهاج الاسبوعي للمختبر	
	Material Covered	
Week 1	Lab 1 ; Bridge circuit, balanced circuit, null detector device, Wheatstone bridge, and rheostat.	
Week 2	Lab 2: Superposition and Thevenin/Norton theorem	
Week 3	Lab 3: maximum power transfer theorem.	
Week 4	Lab 4: Oscilloscope and function generator	
Week 5	Lab 5: cathode-ray tube, setting up a function generator, measuring time, measuring frequency, measuring amplitude	
Week 6	Lab 6: Frequency Domain Analysis Frequency domain,	
Week 7	Lab 7: time shift, phase shift, magnitude.	
Week 8	Lab 8 Average and R.M.S. value	
Week 9	Lab 9 root mean square (r.m.s) value. Average value,	
Week 10	Lab 10 Sinusoidal A. C. analysis	
Week 11	Lab 11 Equation for sinusoidal current	
Week 12	Lab 12 angular frequency, phase angle.	
Week 13	Lab 13 Maximum power transfer in A.C. circuit.	
Week 14	Lab 14 Maximum power transfer, ideal voltage source, gain.	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	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

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	**C++ & MATLAB Programming**		**Module Delivery**	
Module Type	Core		☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	UoW12360			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	1	**Semester of Delivery**		1
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Name	**e-mail**	E-mail	
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023	**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 understand C++ & MATLAB languages and main structure for C++ MATLAB programs. Data type in C++ MATLAB programs and variable. Entering function direct entering.

	• To understand Entering function indirect entering, Arithmetic operation and priority for processing. • To understand If statement, Arithmetic operation (use in condition) , Logic operation (use in condition) (If-else) statement, • To understand If statement entire (switch-case) statement (For-loop) statement, (For-loop) entire loop (while) statement, (Do-while) statement One dimension array , Two dimension array Using string for text, Function main structure Function without return value • To understand Recursively call for function, Function with array Pointer.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Recognize Entering function indirect entering, Arithmetic operation and priority for processing. • Recognize C++ & MATLAB If statement, Arithmetic operation (use in condition) , Logic operation (use in condition) (If-else) statement, • If statement entire (switch-case) statement (For-loop) statement, (For-loop) entire loop (while) statement, One dimension array , Two dimension array Using string for text, Function main structure Function without return value • Recursively call for function, Function with array Pointer.

Indicative Contents
المحتويات الإرشادية
	Part A – C++
	  Entering function indirect entering, Arithmetic operation and priority for processing. If statement, Arithmetic operation (use in condition) , Logic operation (use in condition) (If-else) statement,
	[65 hrs]
	Part B – Matlab
	  If statement entire (switch-case) statement (For-loop) statement, (For-loop) entire loop (while) statement, (Do-while) statement One dimension array , Two dimension array Using string for text, Function main structure Function without return value
	  Recursively call for function, Function with array Pointer.
	[60 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.

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	**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**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction of Computer component of computer, type of H/W, and S/W
Week 2	What is program and instruction and programming languages?
Week 3	Introduction of C++ & MATLAB languages and main structure for C++ MATLAB programs.
Week 4	Data type in C++ MATLAB programs and variable. Entering function direct entering.
Week 5	Entering function indirect entering. Arithmetic function and <math.h> Arithmetic operation and priority for processing
Week 6	If statement (the condition statement)
Week 7	Arithmetic operation (use in condition)
Week 8	Logic operation (use in condition) (If-else) statement,
Week 9	If statement entire (switch-case) statement (For-loop) statement ,

Week 10	(For-loop) entire loop (while) statement, (Do-while) statement One dimension array ,
Week 11	Two dimension array Using string for text,
Week 12	Function main structure Function without return value
Week 13	Exponential function Recursively call for function,
Week 14	Function with array
Week 15	Pointer, Review
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Introduction
Week 2	Lab 2: C++ environment
Week 3	Lab 3: main structure for C++
Week 4	Lab 4: environment of MATLAB program
Week 5	Lab 5: Arithmetic operation and priority
Week 6	Lab 6: If statement
Week 7	Lab 7: Arithmetic operation
Week 8	Lab 8 Logic operation
Week 9	Lab 9 If statement entire (switch-case)
Week 10	Lab 10 (For-loop) entire loop (while) statement, (Do-while) statement
Week 11	Lab 11 Two dimension array
Week 12	Lab 12 Function main structure
Week 13	Lab 13 Recursively call for function,
Week 14	Lab 14 Function with array
Week 15	Lab 15 Pointer

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Bielajew, Alex F. *Introduction to Computers and Programming using C++ and MATLAB.* Department of	Yes

	Nuclear Engineering and Radiological Sciences, University of Michigan, 2002.	
Recommended Texts	Gschwind, Hans W. *Design of digital computers: an introduction*. Springer-Verlag, 2013.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="5" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="3" align="center"><b style="color:red">Digital Techniques I</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="3" align="center">Core</td><td rowspan="4">☒ Theory
☐ Lecture
☒ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="3" align="center">UoW12346</td></tr>
<tr><td>ECTS Credits</td><td colspan="3" align="center">4</td></tr>
<tr><td>SWL (hr/sem)</td><td colspan="3" align="center">100</td></tr>
<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td colspan="2">1</td></tr>
<tr><td>Administering Department</td><td>Type Dept. Code</td><td>College</td><td colspan="2">Type College Code</td></tr>
<tr><td>Module Leader</td><td>أ.د. مؤيد ستار ساجت علي</td><td>e-mail</td><td colspan="2">E-mail</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Professor</td><td>Module Leader's Qualification</td><td colspan="2">Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>احمد عبد الامير ناصر حسين</td><td>e-mail</td><td colspan="2">E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td>م.د. رياض عبد ربه عباس عمير</td><td>e-mail</td><td colspan="2">E-mail</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>
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<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>
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Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	To summarize the design and analysis of modern digital circuits by familiarizing students with modern hierarchy of digital hardware and introducing them the state-of-the-art computer hardware design methodologies.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• To understand the difference between digital and analogue systems/signals. • To learn conversions between various number systems . • To perform arithmetic operations in binary numbers • To learn basic and universal logic functions (NOT, AND, OR, and etc (. • To apply boolean algebra in simplification of logic functions . • To use Karnaugh map for digital function optimization . • To learn programmable logic basics, types, and programming. • To use pin-outs and data-sheets of IC packages to implement digital circuits
Indicative Contents المحتويات الإرشادية	Part A - Statics Theory [20 hrs] Part B – Dynamics. [10 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	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	37	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Digital Techniques and Basic Definitions
Week 2	System of numbers and general number formula
Week 3	Binary, octal, decimal & hexadecimal numbers.
Week 4	Numbers base conversion
Week 5	Arithmetic operation in different number systems
Week 6	Complements and binary codes
Week 7	Logic functions
Week 8	Boolean algebra: Basic definitions, basic theorem & properties, Boolean functions
Week 9	Simplification of logic expression by using Boolean algebra
Week 10	Midterm exam
Week 11	Examples of simple logic circuits
Week 12	The Karnaugh Map: SOP Minimization
Week 13	Simple logic circuit designs
Week 14	**Canonical & standard forms digital logic gates**
Week 15	**Error detection circuits**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Basics: lab equipment and rules
Week 2	Lab 1: Basics: lab equipment and rules
Week 3	Lab 2: Basic logic gates by using ICs and VHDL
Week 4	Lab 2: Basic logic gates by using ICs and VHDL
Week 5	Lab 3: Boolean algebra
Week 6	Lab 3: Boolean algebra
Week 7	Midterm exam
Week 8	Lab 4: Simplification of logic functions using Boolean algebra
Week 9	Lab 4: Simplification of logic functions using Boolean algebra
Week 10	Lab 5: Universal gates
Week 11	Lab 5: Universal gates
Week 12	Lab 6: Karnaugh map
Week 13	Lab 6: Karnaugh map
Week 14	Lab 7: Demonstration of projects
Week 15	Review

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Digital Fundamentals, 11th Ed.by Thomas L. Floyd	Yes
Recommended Texts	Digital Design, with an Introduction to the Verilog HDL. 5th Ed. By M. Morris Mano & Michael D. Ciletti.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			

Module Title	**Digital Techniques II**	**Module Delivery**
Module Type	Core	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	UoW12354	
ECTS Credits	4	
SWL (hr/sem)	100	

Module Level	1	**Semester of Delivery**		1
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	امجد يوسف	**e-mail**	E-mail	
Module Leader's Acad. Title	امجد يوسف	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023	**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 enable the students to understand and formalize more complex topics in digital electronics design and to introduce the concept of multiple functionality circuits the ability to perform data manipulation and storage utilization.
Module Learning Outcomes	1. To understand the difference between combinational and sequential circuits 2. To perform basic arithmetic operations using combinational circuits 3. To use multiplexers and decoders as function generators 4. To construct simple storage units from basic logic gates

مخرجات التعلم للمادة الدراسية	5. To understand the uses of physical characteristics of electronic devices 6. To perform data movement and manipulation 7. To use flip-flops in the design of simple sequential circuits 8. To use VHDL to realize the designs 9. To implement VHDL designs on FPGA boards

Indicative Contents
المحتويات الإرشادية
	Class rules:
	1- Class and lab attendance is mandatory.
	2- Late submission of assignments/project is not allowed.
	3- In-person and online lectures are all considered.
	4- Quiz/Assignment solutions will be provided via class page.
	5- Assignments are submitted through class page only.
	6- Students work with their assigned group leader (TA) only.
	7- Changing groups is prohibited.
	Basic combinational circuits
	    1. Design of half adder.
	    2. Distinguish between half-adders and full-adders
	    3. Cascading full-adders to implement multibit ripple binary adders
	    4. Use the comparator to determine the relationship between binary numbers
	    5. Use cascaded comparators to compare larger numbers
	    6. Implement a basic binary decoder, encoder, multiplexer, and demultiplexer
	    7. Implement BCD-to-7-segment by using decoder
	    8. Use multiplexers as a function generator
	    9. Explain the meaning of parity
	    10. Use parity generators and checkers to detect bit errors in digital systems
	    11. Describe a simple data communications system
	    12. basic data storage circuits:
	    13. Use logic gates to construct basic latches
	    14. Explain the difference between an S-R latch and a D latch
	    15. Recognize the difference between a latch and a flip-flop
	    16. Use propagation delay to design edge detector
	    17. Explain flip-flops types: J-K, D, and T flip-flops
	    18. Explain some basic flip-flops applications: frequency division, memory cell, etc.
	    19. Data movement:
	    20. Identify the basic forms of data movement in shift registers
	    21. Explain how serial in/serial out, serial in/parallel out, parallel in/serial out, and
	    22. parallel in/parallel out shift registers operate
	    23. Describe how a bidirectional shift register operates
	    24. Use a shift register as a time-delay device
	    25. Use a shift register to implement a serial-to-parallel data converter
	    26. Counter and sequential circuit design:
	    27. Explain the modulo-n up/down counters
	    28. Explain the use of state diagram
	    29. Explain the use of asynchronous inputs to modify state diagram
	    30. Design of asynchronous counters
	    31. Design of synchronous counters

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. This in addition to group assignments and mini projects.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	68	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	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	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Adders arithmetic operation
Week 2	Half & full adders & subtractors
Week 3	Binary ripple and cascade adders
Week 4	Decoders, encoders, comparator
Week 5	Multiplexers & DE multiplexers
Week 6	Even and odd party logic and code conversion.
Week 7	Midterm exam

Week 8	Latches: SR, D, etc
Week 9	Master slave FF and edge detector
Week 10	Flip flops (JK, D, T , etc.)
Week 11	Shift registers
Week 12	Asynchronous counters
Week 13	Sequential logic design
Week 14	**Synchronous counters**
Week 15	**Review of lectures**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: implementation of half adder from basic logic gates
Week 2	Lab 2: implementation of full adder from basic logic gates
Week 3	Lab 3: implementation of decoder from basic logic gates
Week 4	Lab 4: implementation of parity checker/generator
Week 5	Lab 5: implementation of full adder by using decoder as a function generator
Week 6	Lab 6: implementation of flip-flops
Week 7	Lab 7: implementation of shift register

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Digital Fundamentals, 11th Ed.by Thomas L. Floyd	Yes
Recommended Texts	Digital Design, with an Introduction to the Verilog HDL. 5thEd. By M. Morris Mano & Michael D. Ciletti.	Yes
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		

Module Title	**Electronic Physics**	Module Delivery
Module Type	Core	☒ Theory
Module Code	UoW12349	☐ Lecture
ECTS Credits	7	☒ Lab
SWL (hr/sem)	175	☒ Tutorial ☐ Practical ☐ Seminar

Module Level	1	Semester of Delivery	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	م.د. باسم خلف جار الله سعيد	**e-mail**	E-mail
Module Leader's Acad. Title		**Module Leader's Qualification**	Ph.D.
Module Tutor	م.م. نور صباح محمد علي	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

Relation with other Modules		
العلاقة مع المواد الدراسية الأخرى		

Prerequisite module	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 an understanding of Electronic Physics, to understand the principle of Electronic Physics Energy levels and atomic structure: The atom, models, wave nature of light, dual nature of matter, wave function energy-band theory of metals. Insulators and semiconductors. 2. understanding Mobility and conductivity, energy distribution of electrons 3. understanding Semiconductors materials (Si, Ge and compound Semiconductors), Extrinsic Semiconductors, Fermi-level in semiconductor, diffusion and carrier life time, 4. understanding Rectifiers, zener diodes voltage regulators

	5. understanding principle and operation of semiconductor laser, metal electronic ballistics semiconductor diode. 6.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize basic of the Electronic Physics, to understand the principle of Electronic Physics Energy levels and atomic structure: The atom, models, wave nature of light, dual nature of matter, wave function energy-band theory of metals. Insulators and semiconductors. 2. Recognize basic of the Mobility and conductivity, energy distribution of electrons 3. Recognize basic of the Semiconductors materials (Si, Ge and compound Semiconductors), Extrinsic Semiconductors, Fermi-level in semiconductor, diffusion and carrier life time, 4. Recognize basic of the Rectifiers, zener diodes voltage regulators 5. Recognize basic, principle and operation of semiconductor laser, metal electronic ballistics semiconductor diode.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Energy levels and atomic structure: The atom, models, wave nature of light, dual nature of matter, wave function 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, brag's law and x-ray diffraction, electronic ballistics. Electrical Conduction in metals: Mobility and conductivity, energy distribution of electrons, Fermi level, work function. [67 hrs] Part B – Semiconductors: Semiconductors materials (Si, Ge and compound Semiconductors), Extrinsic Semiconductors, Fermi-level in semiconductor, diffusion and carrier life time, Hall Semiconductor p-n Junction; P-n Junction in equilibrium, current-voltage characteristics, charge-control description of a diode transition and diffusion capacitances, diode switching times, diode models, small-signal model and load line concept introduction to heterojunctions and double heterojunctions. [54 hrs] Part C - Diode circuit application: 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, principle and operation of semiconductor laser, metal electronic ballistics semiconductor diode. Preparatory week before the final Exam [54 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	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	112	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Energy levels and atomic structure: The atom, models, wave nature of light, dual nature of matter, wave function
Week 2	energy-band theory of metals.
Week 3	Insulators and semiconductors, crystal structure, ionic, covalent and metallic bonding, energy band of crystals.
Week 4	Internal structure of materials cell, packing miller indices,
Week 5	crystal planes and directions, brag's law and x-ray diffraction, electronic ballistics.
Week 6	Electrical Conduction in metals: Mobility and conductivity, energy distribution of electrons, Fermi level, work function.
Week 7	Semiconductors: Semiconductors materials (Si, Ge and compound Semiconductors), Extrinsic Semiconductors, Fermi-level in semiconductor, diffusion and carrier life time, Hall effect.
Week 8	Semiconductor p-n Junction ; P-n Junction in equilibrium, current-voltage characteristics,
Week 9	charge-control description of a diode transition and diffusion capacitances, diode switching times,
Week 10	diode models, small-signal model and load line concept
Week 11	introduction to heterojunctions and double heterojunctions.
Week 12	Diode circuit application: Rectifiers, zener diodes voltage regulators
Week 13	clipping circuits, clamping circuits and wave form generation. Other types of Semiconductor diodes
Week 14	Varactor diode, tunnel diode, photodiode and photovoltaic (solar) cell, light emitting diode,
Week 15	principle and operation of semiconductor laser, metal electronic ballistics semiconductor diode.
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1:

Week 2	Lab 2:
Week 3	Lab 3;
Week 4	Lab 4:
Week 5	Lab 5:
Week 6	Lab 6:
Week 7	Lab 7:

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	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

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	**Engineering Drawing & AutoCAD**		**Module Delivery**	
Module Type	B basic		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UoW12357			
ECTS Credits	4			
SWL (hr/sem)	100			
Module Level	1	**Semester of Delivery**		1
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Name	**e-mail**	E-mail	
Module Leader's Acad. Title		**Module Leader's Qualification**		
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	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 develop problem solving skills and understanding of standards information Tools, sheets, sketching, ISO standards, lines, titles, scales, tables. • understanding of Geometrical constructions: Bisection line, Bisection an angle, pentagon, hexagon, polygon, Arc, Ellipse Projection: Introduction, First angle projection, • understanding of the production of engineering drawings, dimensions, sections. Isometric drawing (pictorial): Introduction, isometric projection, dimensions, sections. • understanding of Electrical drawing: Introduction, isometric projection, dimensions, sections. Menus toolbar, Zoom, grid, snap, limits, units, • Lines, circle, point, Arc, Ellipse, rectangles, ray, redraw, Copy, move, rotate, scale, erase, Break, mirror, array, trim, extend, Dimensions, hatch, blocks,Insert, layers, print, text.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Recognize of standards information Tools, sheets, sketching, ISO standards, lines, titles, scales, tables. • Recognize of Geometrical constructions: Bisection line, Bisection an angle, pentagon, hexagon, polygon, Arc, Ellipse Projection: Introduction, First angle projection, • Recognize of dimensions, sections. Isometric drawing (pictorial): Introduction, isometric projection, dimensions, sections. • Recognize of drawing: Introduction, isometric projection, dimensions, sections. Menus toolbar, Zoom, grid, snap, limits, units, Lines, circle, point, Arc, Ellipse, rectangles, ray, redraw, Copy, move, rotate, scale, erase, Break, mirror, array, trim, extend, Dimensions, hatch, blocks,Insert, layers, print, text.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Tools, sheets, sketching, ISO standards, lines, titles, scales, tables. Geometrical constructions: Bisection line, Bisection an angle, pentagon, hexagon, polygon, Arc Ellipse Projection: Introduction, First angle projection, the production of engineering drawings [33 hrs] Part B- dimensions, sections.Isometric drawing (pictorial): Introduction, isometric projection, dimensions, sections. Electrical drawing: Introduction, isometric projection, dimensions, sections. [33 hrs] Part C – Menus , toolbar, Zoom, grid, snap, limits, units, Lines, circle, point, Arc, Ellipse, rectangles, ray, redraw, Copy, move, rotate, scale, erase, Break, mirror, array, trim, extend, Dimensions, hatch, blocks,Insert, layers, print, text. [34 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	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	22	**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**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Introduction and standards information**
Week 2	**Tools, sheets, sketching, ISO standards, lines, titles, scales, tables.**
Week 3	**Geometrical constructions:** **Bisection line, Bisection an angle, pentagon, hexagon, polygon, Arc**
Week 4	**Ellipse Projection: Introduction, First angle projection,**
Week 5	**the production of engineering drawings, dimensions, sections.**
Week 6	**Isometric drawing (pictorial): Introduction, isometric projection,**
Week 7	**dimensions, sections. Electrical drawing:**
Week 8	**Introduction, isometric projection, dimensions, sections.**
Week 9	**Introduction, Menus**
Week 10	**toolbar, Zoom, grid, snap, limits, units,**
Week 11	**Lines, circle, point, Arc, Ellipse, rectangles, ray, redraw,**
Week 12	**Copy, move, rotate, scale, erase, Break,**
Week 13	**mirror, array, trim, extend,**
Week 14	**Dimensions, hatch, blocks,**
Week 15	**Insert, layers, print, text.**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: AutoCAD Overview
Week 2	Lab 2: ISO standards, lines, titles, scales, tables.
Week 3	Lab 3: Bisection line, Bisection an angle
Week 4	Lab 4: Ellipse Projection
Week 5	Lab 5: isometric projection
Week 6	Lab 6: Electrical drawing
Week 7	Lab 7: isometric projection, dimensions
Week 8	Lab 8 Menus
Week 9	Lab9 Zoom, grid
Week 10	Lab10, snap, limits
Week 11	Lab11 Lines, circle, point, Arc, Ellipse, rectangles, ray, redraw

Week 12	Lab12 Copy, move, rotate, scale, erase, Break,
Week 13	Lab13 mirror, array, trim, extend,
Week 14	Lab14 hatch, blocks,
Week 15	Lab15 layers, print, text.

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Jeyapoovan, T. Engineering Graphics using AUTOCAD. Vikas Publishing House, 2006.	
Recommended Texts	KHAN, ZAHID A., and MUKHTAR AHMAD. *ENGINEERING DRAWING: WITH PRIMER ON AUTOCAD.* PHI Learning Pvt. Ltd., 2004.	
Websites	https://www.bing.com/search?q=Engineering+Graphics+Using+Autocad&form=ANNTH1&refig=b0a83f87d786447e89e97b3df5e86246	

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	**B basic**	☒ Theory
Module Code	**UoW12353**	☐ Lecture ☐ Lab
ECTS Credits	**2**	☐ Tutorial
SWL (hr/sem)	**50**	☐ Practical ☐ Seminar

Module Level	1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	امجد يوسف	**e-mail**	E-mail
Module Leader's Acad. Title		**Module Leader's Qualification**	Ph.D.
Module Tutor	اسعد علي	**e-mail**	E-mail
Peer Reviewer Name	Name	**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	This module provides all the language and skills students need to improve their English, with grammar, vocabulary, and skills work in every unit. The aim is represented by the module's trusted methodology combines solid grammar and practice, vocabulary development, and integrated skills.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Demonstrate understanding of academic texts and summarize them orally and in writing. 2. Demonstrate an ability to write with a fair degree of accuracy in a variety of genres. 3. cope effectively with everyday situations everywhere in English 4. Demonstrate learner independence and be aware of their own linguistic strengths and weaknesses. 5. Participate in discussions/seminars on a variety of subject related, academic and general topics.
Indicative Contents المحتويات الإرشادية	12.5 hrs : Reading Skills 12.5 hrs : Writing Skills 12.5 hrs : Listening Skills 12.5 hrs : Speaking Skills

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	Reading a range of pre-intermediate level articles on selected general topics. Writing a topic (informal emails, e.g.,) to classmates to discuss group work. Writing and submitting an assignment to a lecturer, Writing slides for presentations. Listening to authentic material at the beginner level to develop listening skills and comprehension. For Speaking, students may self-select and discuss topics with classmates on a group project. Typical topics that could be used at this level in the teaching of vocabulary include The World Around Us (Countries, Nationality, Language, Physical world, Weather, etc.). It may be appropriate for students to select grammar points for discussion in class, or for the lecturer to select them as they arise in students' writing. Grammar points that typically arise at this level include present simple and past simple; present continuous; question forms and auxiliary verbs; comparison; word order; prepositions; basic phrasal verbs.

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	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	

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

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Unit.1 Hello!
Week 2	Unit.2 Your world
Week 3	Unit.3 All about you
Week 4	Unit.4 Family and friends
Week 5	Unit.5 The way I live
Week 6	Unit.6 Every day+ Quiz
Week 7	Unit.7 My favorites
Week 8	Unit.8 Where I live
Week 9	Unit.9 Times past
Week 10	Unit.10 We had a great time!+ Quiz
Week 11	Unit.11 I can do that!
Week 12	Unit.12 Please and thank you +Midterm exam
Week 13	Unit.13 Here and now
Week 14	Unit.14 It's time to go!
Week 15	Presentation (seminars)

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts	New headway beginner student book	yes
Recommended Texts	Murphy R (English Grammar in Use)	
Websites	https://apoyanblog.files.wordpress.com/2017/08/new_headway_beginner_-_student	

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	**Freedom and Human Rights**	**Module Delivery**	
Module Type	**B basic**	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**UWO4**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		
Module Level	1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	اسماعيل شرهان باقر كرم	**e-mail**	E-mail
Module Leader's Acad. Title		**Module Leader's Qualification**	PhD
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name	م.د. باسم خلف جار الله سعيد	**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 Aims أهداف المادة الدراسية	Cognitive goals 1- Acquiring the skill of distinguishing between states' relations with their citizens. 2- Dealing with the concept of human rights. 3- Acquisition of knowledge in dealing with problems affecting those rights. 4- Gaining knowledge of the origins and roots of human rights. 5- Reaching knowledge of the practical application of human rights. 6- Developing the student's ability to perform assignments and deliver them on time. 7- Logical thinking to find solutions to the problems facing students in society, especially with the increase in societal problems such as domestic violence, electronic extortion, and the spread of drug abuse. The Iraqi and the extent of his demand for the maintenance and preservation of those rights. 8- View the data on the Iraqi constitution and the extent to which it is required to maintain and preserve those rights.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Graduating a generation that is aware, educated, and aware of its duties as an individual in society and the state, and its rights in exchange for those duties. 2- Developing in society a culture of respect for the other, regardless of his beliefs, personal inclinations, attitudes, and societal behaviors. 3- Referring first and foremost to the law regarding any offensive phenomena that may prevail in the work environment. 4- Developing the student's ability to dialogue and discussion. 5- It has a major role in analyzing emerging problems in society. 6- It contributes to increasing students' knowledge of how to prepare scientific reports.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1- Developing the student's ability to deal with societal problems. 2- Developing the student's ability to deal with the analysis of laws and the mechanisms of their application. 3- Developing the student's ability to deal with the multiple means available in the work environment. 4- Developing the student's ability to dialogue and discussion. 5- Developing the student's ability to employ his study tools as practical tools in the work environment. 6- Developing the ability to harmonize between the different conditions that prevail in the work atmosphere in proportion to the ability of the labor market to absorb the different conditions.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1- Managing the lecture in such a way that the student feels the importance of time. 2- Assigning the student some group activities and duties. 3- Allocate a percentage of the grade for group activities. 4- Developing the topic of group campaigns that shed light on negative societal phenomena and the role of students as active individuals in society. 5- Active participation in the classroom is evidence of the student's commitment and responsibility. 6 Commitment to the deadline for submitting the assignments and reports required of the student to submit them. 7- Quarterly

<table>
<tr><td colspan="4" style="text-align:center">Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا</td></tr>
<tr><td>Structured SWL (h/sem)
الحمل الدراسي المنتظم للطالب خلال الفصل</td><td>33</td><td>Structured SWL (h/w)
الحمل الدراسي المنتظم للطالب أسبوعيا</td><td>5</td></tr>
<tr><td>Unstructured SWL (h/sem)
الحمل الدراسي غير المنتظم للطالب خلال الفصل</td><td>17</td><td>Unstructured SWL (h/w)
الحمل الدراسي غير المنتظم للطالب أسبوعيا</td><td>3</td></tr>
<tr><td>Total SWL (h/sem)
الحمل الدراسي الكلي للطالب خلال الفصل</td><td>50</td><td></td><td></td></tr>
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Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	The nature of human rights.
Week 2	Human rights in Islam.
Week 3	Human rights in modern political thought.
Week 4	Human rights in contemporary political thought.
Week 5	Human rights in international conventions
Week 6	Human rights in the Iraqi constitution in force

Week 7	Midterm exam +Human rights violations in multiple experiences with the Universal Declaration of Human Rights
Week 8	Legal rights in the International Covenant on Civil and Political Rights
Week 9	Types of rights mentioned in the Iraqi constitution in force with the provisions of the Iraqi constitution related to rights and freedoms
Week 10	The historical development of the concept of democracy in the civilization of the Mesopotamia Greek civilization and Roman civilization.
Week 11	The difference between freedom and democracy
Week 12	Islamic views in the democratic system of government
Week 13	Forms of democracy and conditions for the success of the democratic system
Week 14	Elements and pillars of the democratic system
Week 15	Preparatory week before the final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Human rights book, Dr. Taha Hamid Hassan	no
Recommended Texts	Human rights book, Dr. Hamid Hanoun	no
Websites	Human rights book by Dr. Riyad Al-Hadithi https://www.google.com/search?q=https%	

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
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Fail Group (0 – 49)	**FX – Fail**	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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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">Fundamentals of computer Science</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">B basic</td><td rowspan="4">☒ Theory
☐ Lecture
☒ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">WUO3</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">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>Type Dept. Code</td><td>College</td><td>Type College Code</td></tr>
<tr><td>Module Leader</td><td>سالم محمد حسين سالم</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Module Leader's Acad. Title</td><td></td><td>Module Leader's Qualification</td><td>Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>علي خلف نوار</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td>Name</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/06/2023</td><td>Version Number</td><td>1.0</td></tr>
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<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>

<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.   Giving the student a general idea of computer material at a study environment, library, and at home.</td></tr>
</table>

	2. Understanding the basic rules for dealing with and managing computers (computer basics, computer components, computer and software licenses, operating systems, ...), With the aim of preparing the student to enter the programs he needs in the department. 3. Giving the student knowledge about the office applications as basic principles for students in the College of Engineering.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowing computer peripherals, their connections and Windows system. 2. Distinguish between the important tabs in the Word program. 3. The ability to write an entire paragraph with formatting. 4. Understand the basics of power point program. 5. Understand the excel sheet program.
Indicative Contents المحتويات الإرشادية	Part A (9 hr) Introduction to computer principles. Part B (12 hr) MS Word program. Part C (12 hr) MS Excel program. Part D (12 hr) MS Power Point program.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	1. Using computers and display screens to explain lectures to students to increase students' mental comprehension. 2. Practical applications in the computer lab of what was explained in the theoretical lecture. 3. Using direct questions in the classroom as brainstorming skills. 4. Encouraging students to solve class and homework assignments and to perform specialized reports.

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	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

<table>
<tr><td colspan="6" align="center">**Module Evaluation**
تقييم المادة الدراسية</td></tr>
<tr><td></td><td></td><td>**Time/Number**</td><td>**Weight (Marks)**</td><td>**Week Due**</td><td>**Relevant Learning Outcome**</td></tr>
<tr><td rowspan="4">**Formative assessment**</td><td>**Quizzes**</td><td>2</td><td>10% (10)</td><td>5, 10</td><td>LO #1, 2, 10 and 11</td></tr>
<tr><td>**Assignments**</td><td>2</td><td>10% (10)</td><td>2, 12</td><td>LO # 3, 4, 6 and 7</td></tr>
<tr><td>**Projects / Lab.**</td><td>1</td><td>10% (10)</td><td>Continuous</td><td>All</td></tr>
<tr><td>**Report**</td><td>1</td><td>10% (10)</td><td>13</td><td>LO # 5, 8 and 10</td></tr>
<tr><td rowspan="2">**Summative assessment**</td><td>**Midterm Exam**</td><td>2 hr</td><td>10% (10)</td><td>7</td><td>LO # 1-7</td></tr>
<tr><td>**Final Exam**</td><td>2hr</td><td>50% (50)</td><td>16</td><td>All</td></tr>
<tr><td colspan="2">**Total assessment**</td><td colspan="2" align="center">100% (100 Marks)</td><td></td><td></td></tr>
</table>

<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>Part1: Chapter One: Computer Fundamentals, Computer Components.</td></tr>
<tr><td>**Week 2**</td><td>Part1: Chapter Two: Computer Safety and software Licenses.</td></tr>
<tr><td>**Week 3**</td><td>Part1: Chapter Three: Main operating systems</td></tr>
<tr><td>**Week 4**</td><td>Part2: Chapter One: Introduction to Microsoft word + Quizzes1</td></tr>
<tr><td>**Week 5**</td><td>Part2: Chapter Two: Insert Objects to Microsoft word, Editing Documents</td></tr>
<tr><td>**Week 6**</td><td>Part2: Chapter Three: writing the equations</td></tr>
<tr><td>**Week 7**</td><td>Part2: Chapter Four: Formatting Pages</td></tr>
<tr><td>**Week 8**</td><td>Part3: Chapter One: Introduction to Microsoft Excel+ Quizzes</td></tr>
<tr><td>**Week 9**</td><td>Part3: Chapter Two: Additional Tasks in Microsoft word+ Midterm Exam</td></tr>
<tr><td>**Week 10**</td><td>Part3: Chapter Three: Additional Tasks in Microsoft word+ Assignments</td></tr>
<tr><td>**Week 11**</td><td>Part3: Chapter Four: Additional Tasks in Microsoft word</td></tr>
<tr><td>**Week 12**</td><td>Part4: Chapter One: Introduction to Power Point+ Quizzes3</td></tr>
<tr><td>**Week 13**</td><td>Part4: Chapter Two: Insert Objects and Add Animations in Microsoft Power Point+ Project</td></tr>
<tr><td>**Week 14**</td><td>Part4: Chapter Three: Additional Tasks in Microsoft Excel Cont.</td></tr>
<tr><td>**Week 15**</td><td>Part4: Chapter Four: Additional Tasks in Microsoft Excel Cont.</td></tr>
</table>

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Microsoft app.
Week 2	Lab 2: Microsoft app.
Week 3	Lab 3: Microsoft app.
Week 4	Lab 4: Microsoft app.
Week 5	Lab 5: Microsoft app.
Week 6	Lab 6: Microsoft app.
Week 7	Lab 7: Microsoft app.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	اساسات الحاسوب وتطبيقاته المكتبية	Yes
Recommended Texts		No
Websites	https://www.tutorialspoint.com/word/word_move_text.htm	

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
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX – Fail**	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td><strong style="color:red">Mathematics I</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td>Core</td><td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☐ Lab
☐ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td>COE01</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>1</td><td>Semester of Delivery</td><td>1</td></tr>
<tr><td>Administering Department</td><td>Type Dept. Code</td><td>College</td><td>Type College Code</td></tr>
<tr><td>Module Leader</td><td>م.د. علي اسعد طيب لطيف</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Professor</td><td>Module Leader's Qualification</td><td>Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>م.م. فراس ناجي عبيد ملاغي</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td>Name</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/06/2023</td><td>Version Number</td><td>1.0</td></tr>
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<table>
<tr><td colspan="3">Relation with other Modules
العلاقة مع المواد الدراسية الأخرى</td></tr>
<tr><td>Prerequisite module</td><td>None</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	• Providing the students with a sufficient knowledge on doing calculations, interpreting results, and dealing with different mathematical functions and their graphs . • Providing the students with the necessary skills on dealing with transcendental functions (trigonometric, inverse trigonometric, exponential, and power, natural logarithm, hyperbolic, inverse hyperbolic functions). • Strengthen the students' knowledge on the principles of derivatives, their concept and applications in engineering. • Providing the students with a sufficient knowledge on the principles of integral (definite and indefinite), its meaning, mathematical techniques such as Trapezoidal and Simpson approximation of integrals and eventually the engineering applications of it. • Improvement of the students' skills on the dealing with complex equations and numbers in simple and different mathematical ways. • Awarding students the necessary skills of connecting the academic mathematics with real worlds engineering problems. • How to solve integrals and differentials equations with different coordinates. • Analyze equations using the matrix method. • Developing students' skills in the calculation of the area between curves, surface area of revolution, volume of revolution, length of curve.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Realize the importance of studying mathematics and its relationship to engineering sciences . • Defining and understanding functions such as the trigonometric and transcendental functions and their graph. • The students will have the ability for dealing with limits and how to check the continuity of the functions. • Define and find the relationship between Limits, Continuity and derivatives. • The students will be able to solve a wide variety of mathematical derivative problems using different mathematical methods and understand their applications. • The students will be able to solve a wide variety of mathematical integration problems using substitution and integration by parts. • To be able to use the fundamental theorem of calculus to evaluate definite integral and calculate the areas, volumes, lengths of plane curves. • Learn about mathematical analysis methods, mathematical equations and formulas, and how to apply them in engineering. • Solving complex functions. • Solving integrals and differentials equations with different coordinates. • Solving different equations using the matrix method. • Solving complex equations and numbers in simple and different mathematical ways.
Indicative Contents المحتويات الإرشادية	**Part A (16hr(** Functions: types (such as Algebraic, Trigonometry, Hyperbolic and their inverse ,(**Part A (16hr(** Functions: types (such as Algebraic, Trigonometry, Hyperbolic and their inverse), Domain and range, and Graphing of equations. **Part B (10 hr(** Limits and continuity of functions **Part C (20 hr(** Derivative: principles, their rules such as chain rule, its applications for different functions including Trigonometric, Inverse trigonometric, hyperbolic, and Logarithmic and exponential functions. **Part D (12 hr(** Integrals: its rules, methods of solve different functions (Trigonometric, Inverse trigonometric, hyperbolic, and Logarithmic and exponential functions), and its applications such as Areas between curves, Volumes of revolution, Length of the

	curve, Surface Area of revolution. Methods of Integration: Trigonometric Substitution, Quadratics, Partial Fractions, Integration by parts, Further Substitutions.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	- Class lectures with using illustration means. - Encouraging the students to participate in solving exercises in class to improve students' skills . - Training students on solving home works - Practicing in class questions and discussions - Doing quizzes and exams - In class questions and discussions to improve their understanding and critical thinking skills. - Supportive videos will also be available.

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	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	62	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
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**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Brief Review:
Week 2	Domain and range of functions
Week 3	Functions and their graphs.
Week 4	Functions and their graphs
Week 5	Limits and continuity of functions
Week 6	Limits and continuity of functions.
Week 7	Mid term
Week 8	Derivatives of functions - Rules of derivatives. - Chain rule. - Implicit derivatives. - Higher derivatives.
Week 9	Derivatives of functions - Rules of derivatives. - Chain rule. - Implicit derivatives. - Higher derivatives.
Week 10	Inverse trigonometric functions - Properties, Derivatives Rules.
Week 11	Hyperbolic functions - Properties, Derivatives Rules
Week 12	Application of Derivatives. - Velocity and acceleration. - Equation of tangent.
Week 13	Integrals - Integration formulas - Integration of logarithmic and exponential functions.
Week 14	Integration of Trigonometric, Inverse trigonometric, and Hyperbolic functions
Week 15	Integration of Trigonometric, Inverse trigonometric, and Hyperbolic functions
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?

Required Texts	Thomas' Calculus: (George B. Thomas, Maurice D. Weir and Joel R. Hass , 2011, 12th Edition)	Yes
Recommended Texts	1. Matrix Methods and Differential Equations A Practical Introduction by Wynand S. Verwoerd. 2. Advanced Engineering Mathematics by Erwin Kreyszig 8th Edition. 3. Essential Engineering Mathematics by Michael Batty 2011.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td align="center">Mathematics II</td><td colspan="2">Module Delivery</td></tr>
<tr><td>Module Type</td><td align="center">B basic</td><td colspan="2" rowspan="4">☒ Theory
☐ Lecture
☐ Lab
☐ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td align="center">UoW12355</td></tr>
<tr><td>ECTS Credits</td><td align="center">5</td></tr>
<tr><td>SWL (hr/sem)</td><td align="center">125</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>Type Dept. Code</td><td>College</td><td>Type College Code</td></tr>
<tr><td>Module Leader</td><td>امجد يوسف</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Module Leader's Acad. Title</td><td></td><td>Module Leader's Qualification</td><td>Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>امجد يوسف</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td>Name</td><td>e-mail</td><td>E-mail</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	• Understand Approximation Integral: Trapezoidal, Simpson. Vector Algebra: • Understand Vectors in space (i,j,k) unit vectors , • Understand Scalar Product, Vector Product. Complex numbers • Invented number systems, the Argand diagram, Addition, Subtraction, Product, Quotient, Power and Roots • Understand Demover's theorem. Polar Coordinates • Understand Polar Coordinate system, Graphs of polar equations, • Plane area in polar Coordinates • Understand Matrices and determinants: solution of Equations (Cramer's rule).
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize Integral: Trapezoidal, Simpson. Vector Algebra Recognize Vectors in space (i,j,k) unit vectors , Scalar Product, Vector Product. Complex numbers 2. Recognize Invented number systems, Addition, Subtraction, Product, Quotient, Power and Roots 3. Recognize Demover's theorem, Polar Coordinate system, Graphs of polar equations, Plane area in polar Coordinates 4. Matrices and determinants: solution of Equations (Cramer's rule).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Understand Approximation Integral: Trapezoidal, Simpson. Vector Algebra: Understand Vectors in space (i,j,k) unit vectors , Understand Scalar Product, Vector Product. Complex numbers Invented number systems, the Argand diagram, Addition, Subtraction, Product, Quotient, Power and Roots . [62 hrs] Part B - Understand Demover's theorem. Polar Coordinates Understand Polar Coordinate system, Graphs of polar equations, Plane area in polar Coordinates Understand Matrices and determinants: solution of Equations (Cramer's rule). . [63 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	93	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	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	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Approximation Integral: Trapezoidal,
Week 2	Simpson. Vector Algebra: Representation of Vectors in space (i, j, k) unit vectors ,
Week 3	Scalar Product, Vector Product . Complex numbers
Week 4	Invented number systems, the Argand diagram, Addition, Subtraction,
Week 5	Product, Quotient, Power and Roots

3

Week 6	Demover's theorem. Polar Coordinates
Week 7	The Polar Coordinate system
Week 8	Graphs of polar equations,
Week 9	Plane area in polar Coordinates
Week 10	Matrices and Determinants: Definitions,
Week 11	Properties, Inverse of a matrix,
Week 12	Solution of Equations (Cramer's rule).
Week 13	Solution of Equations (Cramer's rule).
Week 14	Review of lectures
Week 15	Review of lectures

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	calculus	Yes
Recommended Texts	calculus and solution	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering	

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

<table>
<tr><td colspan="4" align="center">Module Information
معلومات المادة الدراسية</td></tr>
<tr><td>Module Title</td><td colspan="2" align="center">Mechanical Engineering</td><td>Module Delivery</td></tr>
<tr><td>Module Type</td><td colspan="2" align="center">S support</td><td rowspan="4">☒ Theory
☐ Lecture
☒ Lab
☒ Tutorial
☐ Practical
☐ Seminar</td></tr>
<tr><td>Module Code</td><td colspan="2" align="center">UoW12358</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>Type Dept. Code</td><td>College</td><td>Type College Code</td></tr>
<tr><td>Module Leader</td><td>Name</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Professor</td><td>Module Leader's Qualification</td><td>Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>Name (if available)</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td>Name</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/06/2023</td><td>Version Number</td><td>1.0</td></tr>
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<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></tr>
<tr><td>Co-requisites module</td><td>None</td><td>Semester</td></tr>
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<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>To understand Principles of Statics: Force system, unit system, resultant of coplanar forces.components of force in space, moment of a force moment of couples,
To understand Principles of Free body diagram, coplanar system</td></tr>
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	analysis of trusses, friction Nature of friction, theory of friction coefficient of friction, centroids & center of gravity _centroids of area centroids determined by integration • To understand moments of inertia, radius of gyration, moment of inertia of composite area • To understand Principles of Kinetics of particle, rectilinear motion curvilinear motion rectangular components of curvilinear motion, normal and tangential component of acceleration.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize Force system, unit system, resultant of coplanar forces. Components of force in space, moment of a force moment of couples, 2. Recognize Principles of Free body diagram, coplanar system analysis of trusses, friction Nature of friction, theory of friction coefficient of friction, centroids & center of gravity _centroids of area centroids determined by integration 3. Recognize moments of inertia, radius of gyration, moment of inertia of composite area 4. Principles of Kinetics of particle, rectilinear motion curvilinear motion rectangular components of curvilinear motion.
Indicative Contents المحتويات الإرشادية	Part A - Statics Theory : Force system, unit system, resultant of coplanar forces. Components of force in space, moment of a force moment of couples, To understand Principles of Free body diagram, coplanar system, analysis of trusses, friction Nature of friction, theory of friction coefficient of friction, centroids & center of gravity _centroids of area centroids determined by integration [40 hrs] Part B – Dynamics moments of inertia, radius of gyration, moment of inertia of composite area To understand Principles of Kinetics of particle, rectilinear motion curvilinear motion rectangular components of curvilinear motion, normal and tangential component of acceleration. [35hrs]

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>
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<td>Structured SWL (h/w)
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<td>Unstructured SWL (h/w)
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<td>Total SWL (h/sem)
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Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Statics:** Force system, unit system, parallelogram law.
Week 2	forces and components, resultant of coplanar forces.
Week 3	components of force in space, moment of a force
Week 4	moment of couples, equilibrium
Week 5	Free body diagram, coplanar system
Week 6	analysis of trusses, friction

Week 7	Nature of friction, theory of friction
Week 8	coefficient of friction, centroids & center of gravity _centroids of area
Week 9	centroids determined by integration
Week 10	moments of inertia
Week 11	radius of gyration, moment of inertia of composite area
Week 12	**Dynamics:** Kinetics of particle, rectilinear motion
Week 13	curvilinear motion
Week 14	rectangular components of curvilinear motion,
Week 15	normal and tangential component of acceleration, kinetics (Force, mass, acceleration).
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	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	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	

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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information		
معلومات المادة الدراسية		
Module Title	**Arabic Language**	**Module Delivery**
Module Type	**B basic**	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar
Module Code	**WUO1**	
ECTS Credits	**2**	
SWL (hr/sem)	**50**	

Module Level	1	**Semester of Delivery**	1
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	زينب دايخ مطر خباط	**e-mail**	E-mail
Module Leader's Acad. Title		**Module Leader's Qualification**	MSc
Module Tutor		**e-mail**	E-mail
Peer Reviewer Name		**e-mail**	E-mail
Scientific Committee Approval Date	01/06/2023	**Version Number**	1.0

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

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims	1- المهارة اللغوية للطلبة و تمكينهم من التعبير عن أفكارهم و مشاريعهم باللغة العربية و بطلاقة.

أهداف المادة الدراسية	Linguistic proficiency of students by enabling them to express their ideas and projects in fluent Arabic.
	2- تجنب الطلبة التحدث باللغة الدارجة او الكلمات غير العربية
	Students avoid speaking in colloquial and non-Arabic language in the simplest ways.
	3- كتابة التقارير و المقالات باللغة العربية و بشكل انسيابي و دقيق و منظم.
	Writing reports and articles in fluent, concise and well-organized Arabic.
	4- استخدام قواعد اللغة العربية بشكل صحيح لان اللغة هي الأداة الأساسية للتواصل بين افراد المجتمع.
	Use Arabic grammar correctly; Because language is the primary tool of communication between members of society.
	5- قراءة و فهم النصوص الاكاديمية باللغة العربية.
	Reading and understanding academic texts in Arabic.
	6- تطوير قابلية الطلبة على أداء المهام و تقديمها في الوقت المطلوب.
	Developing the student's ability to perform assignments and submit them on time.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	عند الانتهاء من هذا الفصل، سيكون الطلاب قادرين على: 1- إجادة القراءة والكتابة والتحدث باللغة العربية. 2- استخدام اللغة العربية للتواصل بفعالية في الأوساط الأكاديمية والمهنية. 3- التعرف على التعبيرات اللغوية والأدبية. 4- إظهار فهم لأهمية مهارات اللغة العربية للنجاح في الهندسة. 5- تطبيق مهارات التفكير النقدي وحل المشكلات في مواقف العالم الحقيقي. 6- يساهم في زيادة معرفة الطلاب بكيفية إعداد التقارير العلمية. Upon completion of this course, students will be able to: 1- Demonstrate proficiency in reading, writing, and speaking to Arabic. 2-Use Arabic to communicate effectively in academic and professional settings 3- Gain an understanding of linguistic and literary expressions 4-Demonstrate an understanding of the importance of Arabic language skills for success in engineering 5-Apply critical thinking and problem-solving skills to real-world situations 6- It contributes to increasing students' knowledge of how to prepare scientific reports.
Indicative Contents المحتويات الإرشادية	القواعد (12 ساعة) الاملاء (8 ساعة) الادب (6 ساعة) (مهارات عامة (4ساعة

Learning and Teaching Strategies	
استراتيجيات التعلم والتعليم	
Strategies	· تقديم المحاضرات النظرية وتحديد المعلومات الأكثر أهمية من خلال استخلاص الكلمات المفتاحية والأفكار. · يتم منح الطلاب فرصًا لإنتاج اللغة، وتلقي تعليقات مباشرة لتحسين مهاراتهم اللغوية. · Present theoretical lectures and determine the information that is most significant by extracting keywords and ideas. Students are given opportunities to produce language, and receive direct feedback to improve their language skills.

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

2

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

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Grammar: Speech and what it consists of: the noun, the verb, and the letter. First: the verb and its parts, its signs, and the past tense. القواعد:- الكلام وما يتكون منه: الاسم، والفعل، والحرف. أولاً: الفعل وأجزاؤه، وعلاماته، والفعل الماضي.
Week 2	Grammar: subject and the news, types of subject and its rulings, definition of the news and its types. القواعد: المبتدأ والخبر، أنواع المبتدأ وأحكامه، تعريف الخبر وأنواعه.
Week 3	Grammar: Inna and its sisters, the five verbs. القواعد: إن و أخواتها، الأفعال الخمسة.
Week 4	Grammar: Plural of the sound masculine and the attached to it. And Introducing the sources of the Arabic language. قواعد : جمع المذكر السالم والملحق به. التعريف بمصادر اللغة العربية..
Week 5	Grammar: the number قواعد: العدد.
Week 6	Grammar: the verbal sentence, the subject and its deputy القواعد: الجملة الفعلية والفاعل ونائبه

Week 7	Spelling: Rules for writing Hamza> الاملاء: قواعد كتابة الهمزة
Week 8	Spelling: Common linguistic errors. And punctuation marks. الاملاء: الأخطاء اللغوية الشائعة, وعلامات الترقيم
Week 9	Mid exam
Week 10	Spelling: The difference between ḍād, dha, sīn and sūf املاء: الفرق بين الضاد والظاء والسين وسوف
Week 11	Spelling: The rules for writing an alif at the end of a word. الاملاء: كتابة قواعد كتابة الالف في نهاية الكلمة
Week 12	Literature: The poet Badr Shaker Al-Sayyab, his life and collections, an analysis of the poem (Jikur and the City), and a reading and analysis of a prose text by Ibn Uyaynah the Sufi. الأدب: الشاعر بدر شاكر السياب, حياته ودواوينه, وتحليل قصيدة (جيكور والمدينة), وقراءة وتحليل نص نثري لابن عُيينه الصوفي
Week 13	Literature: The poet Nazik Al-Malaika, her life and poetry, an analysis of the poem (Strangers) and a reading of the prose text of the sermon of the pious by Imam Ali - peace be upon him - الأدب: الشاعرة نازك الملائكة, حياتها ودواوينها, وتحليل قصيدة (غرباء) وقراءة نص نثري خطبة المتقين للإمام علي – عليه السلام-
Week 14	**Qur'anic texts, lessons in Islamic education, interpretation and rhetorical miracles.** النصوص القرآنية دروس في التربية الإسلامية والتفسير والإعجاز البلاغي
Week 15	**Public lecture and discussions** محاضرة و مناقشات عامة

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	Explanation of Ibn Aqeel on the Alfiyyah of Ibn Malik, edited by Muhyiddin Abdul Hamid شرح ابن عقيل على ألفية ابن مالك، تحقيق محيي الدين عبد الحميد.	Yes
Recommended Texts	Arabic language for non-specialization departments اللغة العربية للاقسام غيرالمختصة	No
Websites		

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	**Electrical Circuits I**		**Module Delivery**	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**UoW12359**			
ECTS Credits	**7**			
SWL (hr/sem)	**175**			
Module Level	1	**Semester of Delivery**		1
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Name	**e-mail**	E-mail	
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023	**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 Principles of Electrical Circuits
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how Electrical Circuits work.
Indicative Contents المحتويات الإرشادية	<u>Part A -</u> Basic Definitions [20 hrs] <u>Part B –</u> Electrical Circuits I: [10 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	37	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	30	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	A Review of Ac Waveforms and Analysis of AC- Circuits
Week 2	Definition of Ac quantities circuit analysis using mesh-Current method,
Week 3	analysis using node-voltage method
Week 4	Resonance in Ac circuits Series resonance, parallel resonance, resonant frequency
Week 5	Quality Factor, parallel resonance, series to parallel coversine and vice-versa.
Week 6	Admittance and Current Locus
Week 7	R,L with variable L locus , R,L with variable R Locus R,C with variable C locus , R,C with variable R locus ,
Week 8	Admittance locus for parallel circuits
Week 9	The Transient Circuits
Week 10	RC, RL, RLC circuits in series and parallel and their complete response in time and S-domain
Week 11	Periodic non-Sinusoidal Signals
Week 12	Effective value for non-Sinusoidal waves, power dissipated in circuits, response of series parallel circuits for periodic non-Sinusoidal waveforms.
Week 13	Two- Port Networks
Week 14	Two-port networks, Z-Y parameters, Analysis of the terminated two-port networks.
Week 15	Review
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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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 DESCRIPTION FORM

نموذج وصف المادة الدراسية

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<td colspan="2">Type College Code</td>
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<tr>
<td>Module Leader</td>
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<td>Module Tutor</td>
<td>Name (if available)</td>
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<tr>
<td>Peer Reviewer Name</td>
<td>Name</td>
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<td>Semester</td>
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Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To understand Principles of Electrical Circuits
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how Electrical Circuits work.
Indicative Contents المحتويات الإرشادية	<u>Part A -</u> Basic Definitions [20 hrs] <u>Part B –</u> Electrical Circuits I: [10 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	37	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	30	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Two- Port Networks
Week 2	Two-port networks, Z-Y parameters,
Week 3	Analysis of the terminated two-port networks
Week 4	Coupling circuits
Week 5	Mutual coupling, coefficient of coupling,
Week 6	equivalent circuits linear and ideal transformers.
Week 7	Polyphaser Circuits
Week 8	Single–phase three wire system, circle, diagram
Week 9	3- phase balance and unbalance system
Week 10	star and delta connections,
Week 11	power in 3- phase circuits.
Week 12	power measurement using wattmeter method Filters
Week 13	Constant k- filters, low pass and high pass filter design,
Week 14	Butterworth and Chebyshev filters, and active filters.
Week 15	Review
Week 16	Preparatory week before the final Exam

<table>
<tr><th colspan="2">Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر</th></tr>
<tr><td></td><td>Material Covered</td></tr>
<tr><td>Week 1</td><td>Lab 1:</td></tr>
<tr><td>Week 2</td><td>Lab 2:</td></tr>
<tr><td>Week 3</td><td>Lab 3:</td></tr>
<tr><td>Week 4</td><td>Lab 4:</td></tr>
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<tr><td>Week 6</td><td>Lab 6:</td></tr>
<tr><td>Week 7</td><td>Lab 7:</td></tr>
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<tr><th colspan="3">Learning and Teaching Resources
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<tr><td></td><td>Text</td><td>Available in the Library?</td></tr>
<tr><td>Required Texts</td><td></td><td>Yes</td></tr>
<tr><td>Recommended Texts</td><td></td><td>No</td></tr>
<tr><td>Websites</td><td colspan="2">https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering</td></tr>
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<table>
<tr><th colspan="5">Grading Scheme
مخطط الدرجات</th></tr>
<tr><td>Group</td><td>Grade</td><td>التقدير</td><td>Marks (%)</td><td>Definition</td></tr>
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

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<tr><td colspan="5" align="center">Module Information
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<tr><td>Module Type</td><td colspan="2" align="center">Core</td><td colspan="2" rowspan="4">☒ Theory
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<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td colspan="2">1</td></tr>
<tr><td>Administering Department</td><td>Type Dept. Code</td><td>College</td><td colspan="2">Type College Code</td></tr>
<tr><td>Module Leader</td><td>Name</td><td>e-mail</td><td colspan="2">E-mail</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Professor</td><td>Module Leader's Qualification</td><td colspan="2">Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>اسعد علي</td><td>e-mail</td><td colspan="2">E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td>Name</td><td>e-mail</td><td colspan="2">E-mail</td></tr>
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Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	To understand Principles of Electrical Machines
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how Electrical Machines work.
Indicative Contents المحتويات الإرشادية	<u>Part A -</u> D.C Machine [20 hrs] <u>Part B –</u> Motors : [10 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	37	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
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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, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
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Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	D.C Machine
Week 2	General principle of rotating electrical machines
Week 3	calculation of induced e.m.f.,
Week 4	energy, power and torque in D.C. machines,
Week 5	construction of D.C. machines and function of commutator.
Week 6	Type of armature windings of m.m.f. per pole.
Week 7	Type of excitation connections,
Week 8	armature reaction, commutation type
Week 9	characteristics of D.C. generators,
Week 10	parallel operation of D.C. generators,
Week 11	losses and efficiency of D.C. machines.
Week 12	Motors: Principle of operation of D.C. motors,
Week 13	calculation of speed
Week 14	calculation of torque.
Week 15	Review
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Lab. **Material Covered**
Week 1	Exp-1: No-Load Characteristics of D.C. Shunt Generator
Week 2	Exp-2: Load Characteristics of D.C. Shunt Generator
Week 3	Exp-3: Magnetization and Load-Characteristics Of D.C Series Generator
Week 4	Exp-4: Load Test of D.C. Shunt-Wound Motor
Week 5	Exp-5: Speed Control of D.C. Shunt-Wound Motor
Week 6	Exp-6: No Load Test and Short Circuit Test of a Single-Phase Transformer
Week 7	
Week 8	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A - Excellent**	امتياز	90 - 100	Outstanding Performance
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MODULE DESCRIPTION FORM

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<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td>1</td></tr>
<tr><td>Administering Department</td><td>Type Dept. Code</td><td>College</td><td>Type College Code</td></tr>
<tr><td>Module Leader</td><td>Name</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Professor</td><td>Module Leader's Qualification</td><td>Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>Name (if available)</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td>Name</td><td>e-mail</td><td>E-mail</td></tr>
<tr><td>Scientific Committee Approval Date</td><td>01/06/2023</td><td>Version Number</td><td>1.0</td></tr>
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<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	To understand Principles of Electrical Machines
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how Electrical Machines work.
Indicative Contents المحتويات الإرشادية	Part A - D.C Machine [20 hrs] Part B – Motors : [10 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	37	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	30	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Motors: Starting of D.C. motors
Week 2	characteristics of D.C. motors and their type,
Week 3	speed control of D.C. motors
Week 4	electrical breaking,
Week 5	testing of D.C. machines.
Week 6	Transformer: Transformer type and constriction, transformer action, Faraday's and Lenz's low transformer general equation, voltage ratio, current ratio power rating equations, volt per turn from general equation volt per turn in terms of power rating.
Week 7	losses in transformer, equations of these losses relating to transformer variables as a functions of frequency and voltage (eddy current loss and hysteresis loss),
Week 8	tapping of transformer,
Week 9	regulation calculations using voltage values ,
Week 10	
Week 11	equivalent circuits of the transformer, leakage reactance, equivalent resistances, reactance and impedances , phasor diagram, short circuits- test and open – circuits test, regulation calculations using short and open circuit test,
Week 12	power rating related to window and core area of transformer, efficiency calculation using short and open circuit tests, max efficiency, all day efficiency, short circuit times as related current rating,

Week 13	transformer polarity, parallel operation of transformers, three- phase transformers, connection of three - phase transformers, importance of connecting transformer neutral to the earth, phasor groups, zigzag transformer,
Week 14	voltage grading of transformer, harmonies in transformer, auto transformer and their types , calculation of power rating of auto transformer.
Week 15	Review
Week 16	Preparatory week before the final Exam

	Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر
	Lab. **Material Covered**
Week 1	**To Determine the Efficiency of Three Phase Transformer by Open Delta Test**
Week 2	**Separation of a Single-Phase Transformer Core Losses**
Week 3	**Parallel Operation of Two Three Phase Transformers**
Week 4	**To Study the Effect of External Rotor Resistance on The Performance of Three Phase Wound Rotor Induction Motor**
Week 5	**Determination of Performance Characteristics of a three Phase Squirrel Cage Induction Motor By Load Test**
Week 6	**Performance Determination of a Three Phase Induction Motor from Circle Diagram**
Week 7	**To Control the Speed of Three Phase Induction Motor By Stator Voltage Variation And Variable Frequency Supply**
Week 8	

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	**Electromagnetic Fields I**		**Module Delivery**	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UoW12358				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	1	**Semester of Delivery**		1
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Name	**e-mail**	E-mail	
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023	**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 Electromagnetic Fields 2. To understand the basics of Electromagnetic Fields
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the principle of Electromagnetic Fields
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A Vector algebra: [15 hrs] Coulombs law and electric field intensity : [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] Gauss 's laws& divergence; [15 hrs] Revision problem classes [6 hrs] Part B - Energy density in electrostatic field [15 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.

<table>
<tr><th colspan="4">Student Workload (SWL)
الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا</th></tr>
</table>

Student Workload (SWL)			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Vector algebra: The Cartesian coordinate system, vector components and unit,
Week 2	vector field, dot product, cross product, circular cylindrical coordinate system, spherical coordinate system.
Week 3	Coulombs law and electric field intensity
Week 4	Coulombs law, electric field intensity- field of a point charges,
Week 5	field due to a continuous volume charge distribution, field of line charge, field of sheet of charge,
Week 6	streamline and sketches of fields, electric flux density.
Week 7	Gauss 's laws& divergence:

Week 8	Electric flux density, Gauss 's law – application of Gauss 's law,
Week 9	differential volume element- divergence, Maxwell 's first equation.
Week 10	Vector operation& divergence theorem
Week 11	Energy & potential energy expended in moving a point charge,
Week 12	the line integral- definition of potential difference & potential, the potential field of point charge.
Week 13	The potential field of system charge, conservative property, potential gradient, the dipole.
Week 14	Energy density in electrostatic field Conductors, dielectrics& capacitance, current & current density
Week 15	, continuity of current metallic conductors, conductor properties & boundary condition, method of image semiconductors, nature of dielectric material.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts		Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings

	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 – 49)	**FX – Fail**	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information					
معلومات المادة الدراسية					
Module Title	**Electromagnetic Fields II**		**Module Delivery**		
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar		
Module Code	UoW12364				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	1		**Semester of Delivery**		1
Administering Department	Type Dept. Code		**College**	Type College Code	
Module Leader	Name		**e-mail**	E-mail	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Name		**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023		**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 Electromagnetic Fields 2. To understand the basics of Electromagnetic Fields
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the principle of Electromagnetic Fields
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A Vector algebra: [15 hrs] Coulombs law and electric field intensity : [15 hrs] AC Circuits II - Phasor diagrams, definition of complex impedance, AC circuit analysis with complex numbers. [10 hrs] Gauss 's laws& divergence; [15 hrs] Revision problem classes [6 hrs] Part B - Energy density in electrostatic field [15 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	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Vector algebra: The Cartesian coordinate system, vector components and unit,
Week 2	vector field, dot product, cross product, circular cylindrical coordinate system, spherical coordinate system.
Week 3	Coulombs law and electric field intensity
Week 4	Coulombs law, electric field intensity- field of a point charges,
Week 5	field due to a continuous volume charge distribution, field of line charge, field of sheet of charge,
Week 6	streamline and sketches of fields, electric flux density.
Week 7	Gauss 's laws& divergence:

Week 8	Electric flux density, Gauss 's law – application of Gauss 's law,
Week 9	differential volume element- divergence, Maxwell 's first equation.
Week 10	Vector operation& divergence theorem
Week 11	Energy & potential energy expended in moving a point charge,
Week 12	the line integral- definition of potential difference & potential, the potential field of point charge.
Week 13	The potential field of system charge, conservative property, potential gradient, the dipole.
Week 14	Energy density in electrostatic field Conductors, dielectrics& capacitance, current & current density
Week 15	, continuity of current metallic conductors, conductor properties & boundary condition, method of image semiconductors, nature of dielectric material.
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
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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">Electronic Circuits I</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"><strong style="color:red">UoW12360</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">7</td></tr>
<tr><td>SWL (hr/sem)</td><td colspan="2" align="center"><strong style="color:red">175</td></tr>
<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td colspan="2">1</td></tr>
<tr><td>Administering Department</td><td>Type Dept. Code</td><td>College</td><td colspan="2">Type College Code</td></tr>
<tr><td>Module Leader</td><td>Name</td><td>e-mail</td><td colspan="2">E-mail</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Professor</td><td>Module Leader's Qualification</td><td colspan="2">Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>Name (if available)</td><td>e-mail</td><td colspan="2">E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td>Name</td><td>e-mail</td><td colspan="2">E-mail</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>
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<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 Principles of Electronic Circuits I
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how Electronic Circuits work.
Indicative Contents المحتويات الإرشادية	<u>Part A -</u> Basic Definitions [20 hrs] <u>Part B –</u> Electronic Circuits : [10 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	37	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	30	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Bipolar Junction Transistors (BJTs)
Week 2	Basic transistor operation,
Week 3	volt-ampere equations for the BJT, regions of operation,
Week 4	BJT configuration (CB, CE, and CC) and the input and output characteristics.
Week 5	Dc biasing of BJT (fixed biased cct.
Week 6	Voltage feedback cct., circuit with emitter resister,
Week 7	voltage divider cct. and CB circuit
Week 8	using npn and pnp BJT.BJT as a switch.
Week 9	Stability factor of BJT & compensation techniques.
Week 10	AC analysis of BJT, as amplifier,
Week 11	small – signal models, (h model).
Week 12	Ac analysis of CE, CB, and CC configurations,
Week 13	AC analysis of BJT using re- model for the same configuration.
Week 14	Review
Week 15	Review
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Lab. **Material Covered**
Week 1	Normal Diode characteristic
Week 2	Zener Diode characteristics
Week 3	HWR, FWR, Bridge, rectifier
Week 4	Clipper Diode Circuit
Week 5	Clamper Diode Circuit
Week 6	Differentiator and Integrator
Week 7	Common Base Characteristics
Week 8	Common Emitter Characteristics

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts		Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	**Electronic Circuits II**		**Module Delivery**	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UoW12366			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	1	**Semester of Delivery**		1
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Name	**e-mail**	E-mail	
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023	**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 Principles of Electronic Circuits I
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how Electronic Circuits work.
Indicative Contents المحتويات الإرشادية	<u>Part A -</u> Basic Definitions [20 hrs] <u>Part B –</u> Electronic Circuits : [10 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	37	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	30	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Field Effect Transistors (FETs)
Week 2	Junction field – effect transistor (JFET)
Week 3	physical operation and static characteristics.
Week 4	Metal – Oxide semiconductor FET (MOSFET),
Week 5	depletion MOSFET D-MOSFET, enhancement E- MOSFET.
Week 6	The main parameters of FET, the operation characteristics for different FET types.
Week 7	DC analysis of FET, the FET as an amplifier.
Week 8	AC analysis of FET,
Week 9	Small – signal FET models,
Week 10	analysis of CS, CD and CG configurations.
Week 11	Multistage Amplifiers
Week 12	Analysis of multistage amplifiers (voltage gain, current gain, etc….)
Week 13	types of multistage amplifiers (cascade, ….etc.).
Week 14	Review
Week 15	Review
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Lab. **Material Covered**
Week 1	Common Collector Characteristics
Week 2	Common Base Amplifier
Week 3	Common Emitter Amplifier
Week 4	Common Collector Amplifier
Week 5	Transistor as Inverter
Week 6	FET-Transistor Characteristics
Week 7	FET Amplifier
Week 8	

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Embedded Systems		**Module Delivery**	
Module Type	Core		☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UoW12373			
ECTS Credits	4			
SWL (hr/sem)	125			
Module Level	1	**Semester of Delivery**		1
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Name	**e-mail**	E-mail	
Module Leader's Acad. Title	Assist Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	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. Advice the student to understand the purpose of studying the Embedded Systems in general. 2. Urging the student to think about how to develop himself in the field of Embedded Systems. 3. Making the student able to deal with the Embedded Systems and how to use their programs.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The student learns the basics of embedded systems. 2. Understand the basics of the hardware and software components of embedded systems. 3. Learn how complex embedded systems work.
Indicative Contents المحتويات الإرشادية	<u>Part A –</u> embedded systems [20 hrs] <u>Part B –</u> PLC [10 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	37	**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**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Embedded Systems Overview**
Week 2	Characteristics of an Embedded System
Week 3	Basic Structure of an Embedded System
Week 4	**Embedded system hardware,** Processors in a System, Types of Processors, Types of Embedded Systems, Real Time Embedded Systems, Networked Embedded Systems
Week 5	**System software**
Week 6	**System software**
Week 7	Design of Embedded Systems, Serial Communication, Parallel Communication, Memory Mapped I/O,
Week 8	Direct Memory Access, Synchronous, Asynchronous and Iso-Synchronous Communication, Serial Communication Protocols
Week 9	Programmable Interface Controllers, Architecture of PIC Microcontroller
Week 10	General Purpose Registers (GPR), Special Function Registers
Week 11	Real Time Operating System
Week 12	VLSI Design and Reconfigurable Architecture
Week 13	**Complex Embedded Systems, Microcontroller Based System Design**

Week 14	Complex Embedded Systems, Microcontroller Based System Design
Week 15	Review
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to PIC trainer - PIC Trainer Hardware -PIC Trainer Software
Week 2	Lab 2: 7-segment display & simple control
Week 3	Lab 3: Traffic lights & sound generator
Week 4	Lab 4: Two-digit counter & logic gates
Week 5	Lab 5: Display and keypad scanner & LCD control
Week 6	Lab 6: Interrupts & timer keypad and display
Week 7	Lab 7: Pic EEPROM access, A-D conversion, & D-A conversion
Week 8-14	Lab 8: Robot Structure

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Peter Marwedel, "Embedded System Design", Springer, Second Edition 2011.	No
Recommended Texts	Tim Wilmshurst, "Designing Embedded Systems with PIC Microcontrollers Principles and applications", Second Edition 2010.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	**Engineering Mathematics I**		**Module Delivery**	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	UoW12357			
ECTS Credits	7			
SWL (hr/sem)	175			
Module Level	1	**Semester of Delivery**		1
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Name	**e-mail**	E-mail	
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023	**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 **Engineering Mathematics II**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize Engineering Mathematics II
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Brief Review of Algebraic and Trigonometric [15 hrs] Part B - . [15 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	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem)	175		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Sequences and Series: i) Sequences
Week 2	Convergence, test of monotone.
Week 3	ii) Series: Geometric Series, nth partial sum, test of convergence, alternating Series.
Week 4	iii) Power series and Tayler´s series Fourier Series:
Week 5	i) Periodic Function.,
Week 6	ii) Fourier series – Euler Formulas.
Week 7	iii) Even and Odd Function, (Half Range Expansion).
Week 8	iv) Application of Electrical Engineering. Partial Differentiation:
Week 9	i) Function of two or more variable.
Week 10	ii) Partial derivatives
Week 11	iii) Directional derivative,
Week 12	iv) Gradient, divergence and curl.
Week 13	v) Tangent plane and normal line.,
Week 14	vi) Maxima, minima and saddle point, Review
Week 15	Review
Week 16	**Preparatory week before the final Exam**

	Learning and Teaching Resources مصادر التعلم والتدريس	
	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A** - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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Fail Group (0 – 49)	**FX** – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks 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

اسم مسؤول المقرر الدراسي: م.م. نبراس حازم عباس

Module Information		
معلومات المادة الدراسية		
Module Title	**Engineering Mathematics II**	**Module Delivery**
Module Type	**Core**	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar
Module Code	**UoW12363**	
ECTS Credits	**7**	
SWL (hr/sem)	**175**	

Module Level	1	**Semester of Delivery**		1
Administering Department	Type Dept. Code	**College**	Type College Code	
Module Leader	Name	**e-mail**	E-mail	
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail	
Peer Reviewer Name	Name	**e-mail**	E-mail	
Scientific Committee Approval Date	01/06/2023	**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 **Engineering Mathematics II**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize Engineering Mathematics II
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - Brief Review of Algebraic and Trigonometric [15 hrs] Part B - . [15 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	109	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	67	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem)	175		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Ordinary Differential Equations:
Week 2	i) First order (variables separable, homogeneous, linear – Bernoulli and exact).
Week 3	ii) Second order (homogeneous and non – homogeneous).
Week 4	iii) Higher order differential equation. Laplace Transform (L.T.):
Week 5	A)Laplace Transform (L.T.):
Week 6	i) Unit step function, ii) Gamma function,
Week 7	iii) Definition of LT, iv) Properties.
Week 8	B) Inverse Laplace Transform:
Week 9	i) Properties, ii) Partial fraction iii) Solution of differential equation using Laplace Transform.
Week 10	C) Applications (Orthogonal Trajectories and Electric Circuit). Multiple Integrals:
Week 11	i) Double integral, ii) Areas and volumes.
Week 12	ii) Double integral in polar coordinates.
Week 13	iii) Evaluation of volume and triple integral.
Week 14	iv) Evaluation of volume and triple integral) Evaluation of surface and surface integrals.

Week 15	Vectors; i) Equations of lines and planes. ii) Product of three or more vectors. iii) Vector function & motion: velocity and acceleration. iv) Tangential vectors, v) curvature and normal vector.	
Week 16	**Preparatory week before the final Exam**	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
Success Group (50 - 100)	**A - Excellent**	امتياز	90 - 100	Outstanding Performance
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Fail Group (0 – 49)	**FX – Fail**	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

Note: Marks 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

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معلومات المادة الدراسية</td></tr>
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<td>Name (if available)</td>
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<td>Name</td>
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<td>01/06/2023</td>
<td>Version Number</td>
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<td>Semester</td>
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<tr>
<td>Co-requisites module</td>
<td>None</td>
<td>Semester</td>
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</table>

Module Aims, Learning Outcomes and Indicative Contents	
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To understand Computer Architecture
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize Computer Architecture.
Indicative Contents المحتويات الإرشادية	Part A – Computer Architecture [20 hrs] Part B – PLC [10 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	37	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	30	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Processors Architecture,** Internal Microprocessor organization, RISC vs CISC Instruction Cycle, Single Cycle Data Path and Control, Instruction-Level Parallelism (Pipelining),
Week 2	Pipelined Data path and Control, Data Hazards, Control Hazards and Exceptions, Processor-Level Parallelism.
Week 3	**Memory Organization and I/O Systems,** Memory Hierarchy, Basic principles of the cache, Virtual Memory, Real Mode Memory Addressing.
Week 4	Protected Mode Memory Addressing, Program-Invisible Registers
Week 5	The Memory Paging Mechanism, Memory Address decoding, Memory Interface (8-bit, 16-bit, 32-bit and 64-bit),
Week 6	Multiprocessor Memory Architectures, I/O Address decoding, I/O Interface (8-bit, 16-bit, 32-bit and 64-bit), Serial and Parallel I/O
Week 7	**Field-Programmable Gate Arrays (FPGAs)**
Week 8	**Interrupts, Bus Interface,** the Peripheral Component Interconnect Express (PCIe) bus, The Universal bus (USB)
Week 9	**Parallel Processors,** SISD, MIMD, SIMD, SPMD, and Vector Multiprocessor vs Multicomputer, Hardware Multithreading, Multicore and Other Shared Memory Multiprocessors.

Week 10	Introduction to Graphics Processing Units, Introduction to Multiprocessor Network Topologies, Cluster Computing, Grid Computing, Cloud Computing
Week 11	**8086 Microprocessor,** Internal architecture of 8086, CPU register, Status flag, ALU buffers, addressing modes,
Week 12	Assembly language, Microprocessor 8086 types of assembler's opcodes,
Week 13	Instruction format 8086 introduction sets, Data transfer group,
Week 14	Arithmetic & logical group, branching group, Stack I /O group, Interrupts and Interrupt control.
Week 15	Review
Week 16	**Preparatory week before the final Exam**

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

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية				
Module Title	**Advanced Electronics I**		**Module Delivery**	
Module Type	Core		☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	UoWEE12382			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	UGIV		**Semester of Delivery**	7
Administering Department	Electrical Eng. Dept.	**College**	College of Engineering	
Module Leader	Basim Khalaf Jarullah	**e-mail**	bkhalaf@uowasit.edu.iq	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.	
Module Tutor	Basim Khalaf Jarullah	**e-mail**	bkhalaf@uowasit.edu.iq	
Peer Reviewer Name	Dr Riyadh Abbas	**e-mail**	riyadhabbas@uowasit.edu.iq	
Scientific Committee Approval Date		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electronics IV	**Semester**	6
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 understand Principles of Electronic Circuits and Design of electronic circuits.**
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**Recognize how Electronic Circuits work.**
Indicative Contents المحتويات الإرشادية	Part A - Basic Definitions [20 hrs] Part B – Electronic Circuits: [10 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	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	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

	Delivery Plan (Weekly Syllabus)
	المنهاج الاسبوعي النظري
	Material Covered
Week 1	Timing circuits: Multidirector
Week 2	Bi-stable, Monostable, and Astable circuits.
Week 3	The 555 Timer circuit design, Schmitt trigger circuit
Week 4	Shift Registers: principles, and applications.
Week 5	Sequence generators principles & design
Week 6	Analysis & Design of Finite State machines
Week 7	Synchronous state machine, steps of the design with its application
Week 8	A synchronous state machine, steps of the design with its application.
Week 9	Digital to Analogue & Analogue to Digital Converters
Week 10	Types of D/A converters (Resistive network, Ladder, MDAC).
Week 11	Types of A/D converters - Voltage to Frequency converters,
Week 12	Voltage to Time converters. and their Applications
Week 13	Sample & Hold circuit
Week 14	Multiplexer
Week 15	Errors. Review
Week 16	Preparatory week before the final Exam

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">Advanced Electronics II</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">UoW12388</td></tr>
<tr><td>ECTS Credits</td><td colspan="2" align="center">7</td></tr>
<tr><td>SWL (hr/sem)</td><td colspan="2" align="center">175</td></tr>
<tr><td>Module Level</td><td>1</td><td>Semester of Delivery</td><td colspan="2">1</td></tr>
<tr><td>Administering Department</td><td>Type Dept. Code</td><td>College</td><td colspan="2">Type College Code</td></tr>
<tr><td>Module Leader</td><td>Name</td><td>e-mail</td><td colspan="2">E-mail</td></tr>
<tr><td>Module Leader's Acad. Title</td><td>Professor</td><td>Module Leader's Qualification</td><td colspan="2">Ph.D.</td></tr>
<tr><td>Module Tutor</td><td>Name (if available)</td><td>e-mail</td><td colspan="2">E-mail</td></tr>
<tr><td>Peer Reviewer Name</td><td>Name</td><td>e-mail</td><td colspan="2">E-mail</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>
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<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>
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Module Aims, Learning Outcomes and Indicative Contents
أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. To understand Principles of Electronic Circuits
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how Electronic Circuits work.
Indicative Contents المحتويات الإرشادية	<u>Part A -</u> Basic Definitions [20 hrs] <u>Part B –</u> Electronic Circuits : [10 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	37	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	30	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1, 2, 10 and 11
	Assignments	2	10% (10)	2, 12	LO # 3, 4, 6 and 7
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Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Logic Families**
Week 2	**General characteristics,**
Week 3	**Different Types of logic circuits families**
Week 4	**interface between TTL & CMOS circuits.**
Week 5	**Semiconductor Memories**
Week 6	**Memories ROM,**
Week 7	**EPROM,**
Week 8	**EEPROM, RAM.**
Week 9	**PLA, some types of array circuits.**
Week 10	**Hardware design of microcomputers and microprocessors.**
Week 11	**Hardware design of microcomputers and microprocessors.**
Week 12	**Hardware design of microcomputers and microprocessors.**
Week 13	**Hardware design of microcomputers and microprocessors.**
Week 14	**Hardware design of microcomputers and microprocessors.**
Week 15	**Review**
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)	
المنهاج الاسبوعي للمختبر	
	Lab. **Material Covered**
Week 1	
Week 2	
Week 3	
Week 4	
Week 5	
Week 6	
Week 7	
Week 8	

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts		Yes
Recommended Texts		No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme				
مخطط الدرجات				
Group	**Grade**	التقدير	**Marks (%)**	**Definition**
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