Ministry of Higher Education and Scientific Research
Scientific Supervision and Evaluation Authority
Department of Quality Assurance and Academic Accreditation
Accreditation Department

Academic Program and Course Description Guide

2025−2024

Introduction:

The educational program is a coordinated and organized package of courses that include procedures and experiences organized in the form of academic vocabulary whose main purpose is to build and refine the skills of graduates, making them qualified to meet the requirements of the labor market, which is reviewed and evaluated annually through internal or external audit procedures and programs such as the external examiner program.

The description of the academic program provides a brief summary of the main features of the program and its courses, indicating the skills that are being worked on to acquire for students based on the objectives of the academic program, and the importance of this description is evident because it represents the cornerstone in obtaining program accreditation and is written jointly by the teaching staff under the supervision of the scientific committees in the scientific departments.

This guide, in its second version, includes a description of the academic program after updating the vocabulary and paragraphs of the previous guide in light of the developments 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 description of the academic program circulated according to the letter of the Department of Studies T 3/2906 on 3/5/2023 regarding the programs that adopt the Bologna track as the basis for their work.

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

Concepts and Terminology:

Academic Program Description: The description of the educational program provides a 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 student to achieve, proving whether he has made the most of the available learning opportunities. It is derived from the description of the program.

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

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 (semester, yearly, Bologna track) whether it is a requirement (ministry, university, college, and scientific department) with the number of study units.

Learning Outcomes: A compatible set of knowledge, skills, and values acquired by the student 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 member to develop the student's teaching and learning, and they are plans that are followed to reach the learning goals–describe classroom and extra-curricular activities to achieve the program's learning outcomes.

Academic Program Description Form

University Name: Al–Furat Al–Awsat Technical University

Faculty/Institute: Technical Engineering College of Najaf

Scientific Department: Communication Techniques Engineering Dpt.

Academic or Professional Program Name: Bachelor in Comm. Techniques Engineering

Final Certificate Name: Bachelor in Communication Techniques Engineering

School System: Bologna System

Date of preparation of the description: 5 / 5 /2025

File filling date: 5 / 5 /2025

Signature :

Scientific Associate Name:

Dr. Asaa'd Awad Abbas

Date: 5 / 25 /2025

Signature :

Head of department:

Dr. Nasir Hussein Salman

Date: 5 / 25 /2025

Checked By:

Division of Quality Assurance and University Performance

Director of the Quality Assurance and University Performance Division:

Name: Dr. Bassam Abdulsahib **Signature:** **Date: 5 / 25 /2025**

Dean Approval

1. Program Vision

The Department of Laser and Electro-Optics Engineering at the Al-Furat Al-Awsat Technical University / Technical Engineering College / Najaf seeks to be a key tributary in the preparation of specialized cadres with high efficiency in communication engineering technologies, which will cover wide sectors of work in the industrial, engineering and medical fields in the public and private sectors The vision of the program has been reviewed by communicating with employers and identifying the needs of the labor market in the private sector in particular and state departments in a way Year.

2. Program Mission

Preparing distinguished engineers in the fields of communication engineering techniques to help build and develop graduates and emerging engineering cadres in the same field in the future and contribute to providing the community with applied scientific research and studies that serve to try to solve developmental and development issues, as well as seeking to enhance the role of the college in building institutions and developing engineering work in order to achieve the concept of comprehensive development within the framework of human and scientific engineering values and concepts.Finally, building and consolidating cooperation relations with all parties working in the communication engineering fields, which are in harmony with the aspirations of the labor market locally and globally.

3. Program Objectives

1. The department seeks to graduate qualified engineers in the disciplines of laser and optoelectronics who can design, analyze, and find appropriate solutions to practical problems and deal with advanced technology with high skill.
2. Preparing qualified graduates to participate in conferences, workshops, and development seminars inside and outside Iraq, and work in research centers.
3. Engage in the preparation of practical research in the field of laser and electro-optics to develop a solution to practical problems and contribute to community service by involving graduates in the labor market and refining their practical skills according to local requirements.
4. Active participation in community development and upgrading the organization of conferences and seminars, as well as continuing education in the field of technical engineering and the adoption of a methodology for continuous improvement in all activities.

4. Program Accreditation

No

5. Other external influences

There is no third party sponsor of the study program. The only official sponsor of the program is only the Al-Furat Al-Awsat Technical University, a public university and one of the formations of the Iraqi Ministry of Higher Education and Scientific Research.

6. Program Structure

Program Structure	Number of Courses	Unit of study	Percentage	Notes*
Requirements of the institution	3	28	10%	
College Requirements	5	26	3%	
Department Requirements	32	134	83%	
Summer Training	2	0		
Other				

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

7. Program Description

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type
UGI	One	1	ATUU113	English 1	لغة انكليزية 1	English	1	0	0	0	3	18	32	50	2	S
		2	ATUU1111	Computer	حاسوب	English	1	2	0	0	3	48	27	75	3	B
		3	ATU11103	Calculus 1	رياضيات 1	English	3	0	0	1	3	63	62	125	5	B
		4	ATU11104	DC electrical circuits	الدوائر الكهربائية المستمر	English	3	2	0	1	3	93	82	175	7	C
		5	ATU11105	Physics and Semiconductor	الفيزياء واشباه الموصلات	English	3	2	0	1	3	93	82	175	7	C
		6	ATU11	Human Rights and Democracy	حقوق الانسان والديمقراطية	Arabic	2	0	0	0	3	33	17	50	2	S
		7	ATU11107	Engineering Drawing	الرسم الهندسي	English	0	4	0	0	3	63	37	100	4	B
						Total	13	10	0	3	21	411	339	750	30.00	

UGI	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr./w) CL (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type
	Two	1	ATUU112	Arabic language	اللغة العربية	Arabic	1	0	0	0	3	18	32	50	2.00	S
		2	ATU11208	Calculus 2	رياضيات 2	English	3	0	0	1	3	63	62	125	5.00	B
		3	ATU11209	AC Electrical Circuits	الدوائر الكهربائية المتناوبة	English	2	2	0	1	3	78	72	150	6.00	C
		4	ATU11210	Digital Logic	الرقمية	English	3	2	0	1	3	93	82	175	7.00	C
		5	ATU11211	Electronic Circuits	الدوائر الالكترونية	English	3	2	0	1	3	93	82	175	7.00	C
		6	ATU11212	Engineering Workshops	معامل	English		3	0		3	48	27	75	3.00	B
						Total	12	9	0	4	18	393	357	750	30.00	

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type
UGII	Three	1	ATU11301	Electronic Circuits Design	تصميم الدوائر الالكترونية	English	2	2	0	1	3	78	72	150	6.00	C
		2	ATU11302	Signals and Systems	الاشارات والانظمة	English	3	2	0	0	3	78	72	150	6.00	C
		3	ATU11303	Electromagnetic static Fields	المجالات الكهرمغناطيسية الث	English	2	0	0	1	3	48	52	100	4.00	C
		4	ATU11304	Mathematical Modeling System	نمذجة الانظمة رياضيا	English	3	0	0	1	3	63	62	125	5.00	B
		5	ATU11305	Digital Circuits Design	تصميم الدوائر الرقمية	English	2	2	0	1	3	78	72	150	6.00	C
		6	ATU11306	Visaul Basic	لغة البرمجة فيشول بيسك	English	1	2	0	0	3	48	27	75	3.00	B
						Total	13	8	0	4	18	393	357	750	30.00	

UGII	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type
	Four	1	ATU222	computer2	حاسوب2	English	1	2	0	0	3	48	27	75	3.00	B
		2	ATU11408	Differential Equations	معادلات تفاضلية	English	4	0	0	0	3	63	112	175	7.00	B
		3	ATUU211	Baath Party crimes	جرائم حزب البعث	Arabic	1	0	0	0	3	18	32	50	2.00	S
		4	ATU11410	Analog Communications	اتصالات تناظرية	English	3	2	0	0	3	78	97	175	7.00	C
		5	ATU11411	Integrated electronic circuits	دوائر إلكترونية متكاملة	English	3	2	0	0	3	78	97	175	7.00	C
		6	ATU221	English 2	لغة انكليزية 2	English	1	0	0	0	3	18	32	50	2.00	S
		7	ATU220	Arabic language	اللغة العربية2	Arabic	1	0	0	0	3	18	32	50	2.00	S
						Total	14	6	0	0	21	321.00	429.00	750.00	30.00	

8. Expected learning outcomes of the program

Knowledge	
− Training students to increase intellectual awareness and the correct way of practical and scientific thinking.	Learning Outcomes 1
Skills	
Increase students' practical skills through laboratory training on the use of tools required to solve experimental problems.	Learning Outcomes 2
− Increase theoretical skills, mechanisms and theories used to solve theoretical problems and train students on the correct methods for solving mathematical problems. − Training students on the correct way to turn the problem at hand into a logical problem and sound thinking to solve the logical problems presented.	Learning Outcomes 3
Values	
− Increasing students' cognitive awareness and supporting it in the mechanisms used to evaluate the results and determine their cognitive level. − Training teaching and technical staff on the approach followed and effective mechanisms in the success of knowledge outputs.	Learning Outcomes 4
− Enable students to work under high pressure and brainstorming conditions while maintaining the required calm in the educational process. − Enabling teaching staff to work under high pressure conditions and adopting accurate scientific and educational output for them.	Learning Outcomes 5

9. Teaching and Learning Strategies

- Using modern means, which are renewed in the amount required by the presidency of the scientific department and the deanship of the college according to the available material resources.
- Using the traditional classical method in the educational process and according to what some teachers see as well as according to the requirements of the knowledge material (pen and blackboard style).
- Using brainstorming, sudden question and improvised answer to train the student to solve the problems presented in front of him and thus be able to make a quick decision with a minimum error rate.

10. Evaluation methods

Several methods are used in evaluating students, including:

- Surprise exam method.
- The style of daily duties.
- The method of periodic weekly reports.
- The method of presenting lectures by students to assess their level of comprehension and comprehension.
- Simplified explanation style.
- Method of solving examples on the board.

11. Faculty

Members

Academic Rank	Degree	Specialization		Employee	
		General	Specific	Permanent	Contract
Prof.	PhD	Electrical Eng.	Control & Computer Eng.	Yes	
Assisit. Prof.	PhD	Communication Eng.	Optical Comm. Eng.	Yes	
	PhD	Electrical Eng.	Mobile Comm. Eng.	Yes	
	PhD	Electrical & Electronic Eng.	Electronic Eng.	Yes	
	PhD	Electrical & Electronic Eng.	Electronic & Systems Eng.	Yes	
	PhD	Electrical Eng.	Electronic & Comm. Eng.	Yes	
	PhD	Information Technology	Programming	Yes	
	PhD	Law	Criminal Law	Yes	
Lect.	PhD	Electrical Eng.	Power & Machines Eng.	Yes	
	PhD	Electrical Eng.	Comm. Eng.	Yes	
	PhD	Electronic & Comm. Eng.	Comm. Eng.	Yes	
	MSc	Electrical Eng.	Comm. Tech. Eng.	Yes	
	MSc	Comm. Tech. Eng.	Electronic Eng.	Yes	
Assist. Lect.	MSc	Comm. Tech. Eng.	Comm. Tech. Eng.	Yes	
	MSc	Comm. Tech. Eng.	Comm. Tech. Eng.	Yes	
	MSc	Comm. Tech. Eng.	Computer Networks Eng.	Yes	
	MSc	Comm. Tech. Eng.	Comm. Tech. Eng.	Yes	
	MSc	Comm. Tech. Eng.	Comm. Tech. Eng.	Yes	
	MSc	Computer Science	Computer Science	Yes	
	MSc	Mechanical Eng.	Applied Mech. Eng.	Yes	
	MSc	Mathematics	Applied Math.	Yes	
	MSc	Arabic language	Arabic language	Yes	

Development

New faculty members Development

The teaching staff is directed to the staff of the department (staff, lecturers and permanent contracts) through several axes:
The first axis: guidance in the sessions of the department council. Where periodic sessions are held for the department council, through which the teaching staff are introduced to the required guidance and informed of ways to apply it.
The second axis: personal guidance. In this axis, and based on the results of the analysis of the data obtained through the questionnaires of students or through the personal review of the head of the department in his usual tours or through field tours conducted by the Dean of the College and the Assistant Dean for Scientific Affairs, Graduate Studies and Student Affairs and the Head of the Department.

Professional development of faculty members

The faculty members in the department are developed on two axes:
Vertical axis: where the teaching and training skills are raised for them by involving them in the various courses held by the Continuing Education Center in the Presidency of the University or the Continuing Education Unit in the college to build a scientific teaching base according to the correct scientific foundations based on the latest rules in the teaching and learning processes acquired by the old teachers in the department and transferred to the new teachers.
Horizontal axis: In this axis, teaching staff are asked to increase their personal scientific space by publishing scientific research in reputable international journals, providing them with all means of moral support, increasing their access to modern software and keeping pace with developments.

12. Acceptance Criterion

The admission system in the department follows the regulations and strategies followed by the Iraqi Ministry of Higher Education by following the regulations and laws that are published in the Central Admission Guide. And the application of the legal regulations for this and to the various categories of students and multiple admission channels, and these instructions, rules and regulations are followed on the morning and evening study programs alike.

13. The most important sources of information about the program

Procedures followed by the Iraqi Ministry of Higher Education and Scientific Research. And the Quality Assurance Council for Iraqi Technical Education and the procedures issued by the Scientific Supervision and Evaluation Authority / Department of Quality Assurance and Academic Accreditation - Accreditation Department. As well as the presidency of the Al-Furat Al-Awsat Technical University / Department of Quality Assurance and University Performance.

14. Program Development Plan

Updating the study program in line with practical knowledge that is in line with the requirements of the labor market.
Training the technical staff in the department to increase scientific, cultural and psychological awareness so that the educational process is adjusted in a consistent manner with the outputs of science and learning.
Increase cultural awareness and brainstorming of students.
Start involving teaching staff in intensive courses to increase cognitive awareness about brainstorming mechanisms.

15. Program Plan

Program Plan																
				Program Outputs												
				Knowledge				Skills				Ethics				
Lev./ Sem.	Code	Subject	Class.	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Level#1/Semecter#1	ATUU113	English 1	S	●				●					●		
	ATUU1111	Computer	B		●					●			●		
	ATU11103	Calculus 1	B			●		●				●			
	ATU11104	DC electrical circuits	C			●				●		●			
	ATU11105	Physics and Semiconductor	C			●				●		●			
	ATU11	Human Rights and Democracy	S	●				●						●	
	ATU11107	Engineering Drawing	B		●					●		●			

Program Plan																
				Program Outputs												
				Knowledge				Skills				Ethics				
Lev./ Sem.	Code	Subject	Class.	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Level#1/Semecter#2	ATUU112	Arabic language	S	●				●					●		
	ATU11208	Calculus 2	B		●				●			●			
	ATU11209	AC Electrical Circuits	C		●					●		●			
	ATU11210	Digital Logic	C		●					●		●			
	ATU11211	Electronic Circuits	C		●					●		●			
	ATU11212	Engineering Workshops	B	●							●		●		

Program Plan																
				Program Outputs												
				Knowledge				Skills				Ethics				
Lev./ Sem.	Code	Subject	Class.	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Level#2/Semecter#1	ATU11301	Electronic Circuits Design	C			●				●		●			
	ATU11302	Signals and Systems	C			●				●		●			
	ATU11303	Electromagnetic static Fields	C			●		●				●			
	ATU11304	Mathematical Modeling System	B		●				●			●			
	ATU11305	Digital Circuits Design	C			●				●		●			
	ATU11306	Visual Basic	B		●					●		●			

Program Plan																
				Program Outputs												
				Knowledge				Skills				Ethics				
Lev./ Sem.	Code	Subject	Class.	A1	A2	A3	A4	B1	B2	B3	B4	C1	C2	C3	C4
Level#2/Semecter#2	ATU222	computer2	B		●					●			●		
	ATU11408	Differential Equations	B			●		●				●			
	ATUU211	Baath Party crimes	S	●				●						●	
	ATU11410	Analog Communications	C			●				●		●			
	ATU11411	Integrated electronic circuits	C			●				●		●			
	ATU221	English2	S		●			●					●		
	ATU220	Arabic language	S	●				●					●		

16.1 Syllabus Description Guide/Level#1/Semister#1/English1

Module Information معلومات المادة الدراسية					
Module Title	**English1**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☒ **Lecture**	
Module Code	ATUU113				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level			**Semester of Delivery**	1	
Administering Department			**College**	NETC	
Module Leader	Mohammed Salim		**e-mail**	E-mail	
Module Leader's Acad. Title	Asst. Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Nasir Hussein Selman		**e-mail**	Coj.nas@atu.edu.iq	
Scientific Committee Approval Date	01/10/2024		**Version Number**	1.0	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1-The aim of this course is to provide English learners with integrated language skills such as reading, listening and writing resulting in a level of basic language knowledge. 2-This course will focus on grammar rules, basic word knowledge and usage, reading comprehension, reading out of the lesson, and Paragraph writing. 3- A student may be able to listen to native speakers and speak English Language. 4- A student may be able to write and have creativity in his writing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Uses expressions of Quantity in elementary level of English. 2- Constructs sentences in Present Perfect Tense, Simple Future Tense and Going to Future Tense both in an oral and written task. 3- Defines basic Modals and employ them in elementary level of communication and writing skills. 4- Translates sentences in elementary level from English to another language. 5- Interprets the texts written in elementary level of English.
Indicative Contents المحتويات الإرشادية	**Language** is a rule-governed behavior. It is defined as the comprehension and/or use of a spoken (i.e., listening and speaking), written (i.e., reading and writing), and/or **other communication symbol system** (e.g., American Sign Language).

	Spoken and written language are composed of receptive (i.e., listening and reading) and expressive (i.e., speaking and writing) components. Spoken language, written language, and their associated components (i.e., receptive and expressive) are each a synergistic system comprised of individual language domains (i.e., phonology, morphology, syntax, semantics, pragmatics) that form a dynamic integrative whole **Phonology** study of the speech sound (i.e., phoneme) system of a language, including the rules for combining and using phonemes. **Morphology** study of the rules that govern how morphemes, the minimal meaningful units of language, are used in a language. **Syntax** the rules that pertain to the ways in which words can be combined to form sentences in a language. **Semantics** the meaning of words and combinations of words in a language.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	1- Uses the available material to increase his efficiency. 2- Constructs sentences in Present Perfect Tense, Simple Future Tense and Going to Future Tense both in an oral and written task. 3-Defines basic Modals and employ them in elementary level of communication and writing skills. 4- Develop and enhance students' language skills to communicate in English properly. 5- Interprets the texts written in elementary level of English.

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	18	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	1.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل			**50**

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Able to identify linking Ideas: Present and Past Irregular Plurals, Consonants, There was/were
Week 2	Identify countable and Uncountable Nouns, Imperatives Healthy Living and
Week 3	Able to identify can for ability Could and Couldn't Skills at work
Week 4	Able to identify can for requests Adjectives and Adverbs
Week 5	Able to identify describing People, Present Continuous and Adjectives
Week 6	Demonstrates knowledge about question for, 'information, prepositions: (at, in, on, to)
Week 7	Mid-term Exam
Week 8	Able to identify (Have to don't have to Housework, home, school & work obligations)
Week 9	**Mid-term Exam**
Week 10	Demonstrates knowledge about Offering and Inviting Why..? Would you like to...? Let's...? Free time activities
Week 11	Able to identify (Be going to + infinitive for plans)
Week 12	Able to identify (Be going to weak forms: Maybe/perhaps)
Week 13	Able to identify {Past Simple have to)
Week 14	Demonstrates knowledge about Transport, Prepositions of movement Address
Week 15	Demonstrates knowledge about (Writing Activities)
Week 16	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Headway book for learning English	Yes
Recommended Texts	Skills in writing and Learning English	No
Websites	https://www.bbc.co.uk/learningenglish/	

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

16.2 Syllabus Description Guide/Level#1/Semister#1/Computer

Module Information
معلومات المادة الدراسية

Module Title	**Computer**	**Module Delivery**	
Module Type	**Basic**	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ATUU1111		
ECTS Credits	**3**		
SWL (hr/sem)	**75**		
Module Level		**Semester of Delivery**	1
Administering Department		**College**	NETC
Module Leader	Salim Mohsen Wadi	**e-mail**	coj.sal@atu.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Objectives أهداف المادة الدراسية	1. Training students on the basics of using the computer and providing them with the necessary skills to deal with the computer with high efficiency. 2. Assisting the student in distinguishing and developing his scientific and artistic abilities. 3. Enriching the student's skills to be able to deal with the computer with high efficiency. 4. Providing students with a way to use other modern technologies related to the educational process.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The computer course introduces students to the fundamentals of computer hardware and software. Additional topics covered are mobile devices, Linux, macOS, virtualization and cloud computing, as well as expanded information about Microsoft Windows operating systems, security, networking, troubleshooting, and the responsibilities of an IT professional. By the end of the course, students will be able to:

	1. Describe the internal components of a computer and assemble a computer. 2. Install and understand computer and mobile device operating systems. 3. Connect to the internet and share resources in a networked environment. 4. Secure SOHO networks, operating systems, and data. • Troubleshoot using system tools and diagnostic software.
Indicative Contents المحتويات الإرشادية	Personal Computer. PC Components. Computer Disassembly. Assemble the Computer. Boot the Computer. Electrical Power. Advanced Computer Functionality. Computer Configuration. Protecting the Environment. Preventive Maintenance. Troubleshooting Process. Network Components and Types. Networking Protocols, Standards, and Services. Network Devices. Network Cables. Device to Network Connection. Basic Troubleshooting Process for Networks. Characteristics of Laptops and Other Mobile Devices. Laptop Configuration. Laptop Hardware and Component Installation and Configuration. Other Mobile Device Hardware Overview. Network Connectivity and Email. Preventive Maintenance for Laptops and other Mobile Devices. Basic Troubleshooting Process for Laptops and other Mobile Devices. Common Printer Features. Printer Type Comparison. Installing and Configuring Printers. Sharing Printers. Maintaining and Troubleshooting Printers. Virtualization. Cloud Computing. Modern Operating Systems. Disk Management. Install Windows. Windows Desktop and File Explorer. Configure Windows with Control Panels. System Administration. Command-Line Tools. Windows Networking. 6 Common Preventive Maintenance Techniques for Operating Systems. Basic Troubleshooting Process for Windows Operating Systems. Mobile Operating Systems. Methods for Securing Mobile Devices. Linux and macOS Operating Systems. Basic Troubleshooting Process for Other Operating Systems. Security Threats. Security Procedures. Securing Windows Workstations. Wireless Security. Basic Troubleshooting Process for Security. Communication Skills and the IT Professional. Operational Procedures. Ethical and Legal Considerations. Call Center Technicians.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

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

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	get started with use of computer
Week 2	Basic use of Windows operating system
Week 3	General view of Microsoft Office tools
Week 4	Getting Started with Microsoft Office Word
Week 5	Microsoft Office Word: Editing a Document and Formatting Text and Paragraphs
Week 6	Microsoft Office Word: Adding Tables and Inserting Graphic Objects
Week 7	Microsoft Office Word: Controlling Page Appearance and Proofing a Document
Week 8	Microsoft Office Excel: Getting Started with Microsoft Office Excel
Week 9	Microsoft Office Excel: Sorting, Selecting and Subtotaling data
Week 10	Microsoft Office Excel: Formulas and Functions
Week 11	Microsoft Office Excel: Worksheet Formatting and Presentation
Week 12	Microsoft Office PowerPoint: Getting Started with Microsoft Office PowerPoint
Week 13	Microsoft Office PowerPoint: Developing a PowerPoint Presentation, Adding Graphical
Week 14	Elements to Your Presentation and Modifying Objects in Your Presentation
Week 15	Microsoft Office PowerPoint: Adding Graphical Elements, tables and charts to Your

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Graham Brown, David Watson "Cambridge IGCSE Information and communication Technology" Microsoft Office 2019 Step by Step. By Joan Lambert, Curtis Frye Part of the Step by Step series.	No
Recommended Texts	Absolute Beginner's Guide to Computer Basics Part of: Absolute Beginner's Guide (34 books) | by Michael Miller | Jan 1, 2009	No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition

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

16.3 Syllabus Description Guide/Level#1/Semister#1/Calculas1

Module Information
معلومات المادة الدراسية

Module Title	**Calculus I**	**Module Delivery**	
Module Type	**Basic**	☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**ATU11103**		
ECTS Credits	**5**		
SWL (hr/sem)	**125**		
Module Level		**Semester of Delivery**	1
Administering Department		**College**	NETC
Module Leader	Ahmed Mohammed Zeki	**e-mail**	Ahmed.alhilli@atu.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of functions and their differentiation. 2. To understand differentiation and its geometric meaning. 3. To understand differentiation applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the meaning of functions and their properties 2. Combining functions. 3. Understanding shifting and scaling of functions. 4. Definition of Trigonometric and exponent functions. 5. Basic understanding of rates of changes and tangent of curves. 6. Limit of functions and limits laws. 7. Continuity of functions. 8. Tangent and derivative of a point. 9. The derivative as a function. 10. Differentiation rules. 11. The chain rule. 12. Implicit differentiation, the inverse function and logarithms 13. Inverse trigonometric functions

	14. Application of derivatives
Indicative Contents المحتويات الإرشادية	• Functions, types of functions, graph of the functions, domain and range of function • Trigonometric function: graph of trigonometric function, range and domain of trigonometric functions, identities. • Limits and Continuity: Properties, limits involving infinity, continuity. • Transcendental functions: Inverse function, graph of inverse function, • Logarithmic and exponential functions, inverse trigonometric functions, • hyperbolic functions, inverse hyperbolic functions. • Derivatives: Definition, rules of derivative, Implicit differentiation, • Applications of derivatives: rate of change problems, • derivative, Linearization, Mean value theorem, Initial value problem.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategies that will be adopted in delivering this module is to encourage students to engage in exercises, while at the same time honing and expanding their critical thinking skills. Teaching methods include interactive lectures, where basic mathematical principles are explained in detail. Regular formative assessments will be conducted to monitor students' understanding of the material, and immediate feedback will be provided to guide their learning process. Emphasis will be placed on linking mathematical concepts to real-world engineering applications to make the learning experience more relevant and engaging.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

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

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Understand the meaning of functions and their properties
Week 2	Combining functions.
Week 3	Understanding shifting and scaling of functions.
Week 4	Definition of Trigonometric and exponent functions.
Week 5	Basic understanding of rates of changes and tangent of curves.
Week 6	Limit of functions and limits laws.
Week 7	Continuity of functions.
Week 8	Tangent and derivative of a point.
Week 9	The derivative as a function.
Week 10	Differentiation rules.
Week 11	The chain rule.
Week 12	Implicit differentiation, the inverse function and logarithms
Week 13	Inverse trigonometric functions
Week 14	Application of derivatives
Week 15	Application of derivatives
Week 16	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas' Calculus 14th edition	Yes
Recommended Texts	Calculus 10th edition by Anton, Bivens, and Davis	Yes
Websites	https://www.lboro.ac.uk/departments/mlsc/student-resources/helm-workbooks/	

Grading Schem

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

16.4 Syllabus Description Guide/Level#1/Semister#1/DC Electrical Circuits

Module Information

معلومات المادة الدراسية

Module Title	**DC Electrical Circuits**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**ATU11104**		
ECTS Credits	**7**		
SWL (hr/sem)	**175**		

Module Level	UGI	**Semester of Delivery**	1
Administering Department		**College**	NETC
Module Leader	Serab Jwyed Musa	**e-mail**	inj.srb@atu.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of circuit theory and circuit analysis 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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how electricity works in electrical circuits. 2. Learn the various terms associated with electrical circuits. 3. Describe electrical power, charge, and current. 4. Define Ohm's law. 5. Learn the basics of circuits connections (series, parallel, and Y-Δ connections). 6. Identify the basic circuit elements and their applications. 7. Explain the basic rules of electric circuits analysis, such as Ohm's law, voltage and current division rules, and Kirchhoff's laws.

	8. Explain circuits analysis methods, such as nodal and mesh analysis. 9. Explain circuits analysis theorems, such as Thevenin's and Norton's theorems, in addition to superposition principle. 10. Explain the principles of maximum power transfer and its relationship to circuits analysis theorems.
Indicative Contents المحتويات الإرشادية	Basic Concepts Current and voltage definitions, passive sign convention and circuit elements, combining resistive elements in series and parallel Basic Laws Series and parallel connections, Ohm's law, Kirchhoff's laws, Voltage and current division rules. Circuit Analysis Methods Nodal analysis and Mesh analysis. Circuit Theorems Thevenin's and Norton's theorems, in addition to superposition principle. Three phase circuit Series and parallel circuit

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

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

Module Evaluation

تقييم المادة الدراسية

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

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Charge, current, voltage, resistance and conductance
Week 2	power and energy. Power sign convention.
Week 3	Basics of Network Elements, Definition of Nodes, Branches, and Loops, type of sources.
Week 4	Series and parallel circuits: series circuits, voltage divider rule, current divider rule.
Week 5	Star-delta transformations.
Week 6	Kirchhoff's Laws.
Week 7	**Mid-term Exam.**
Week 8	Circuit Analysis - Nodal method.
Week 9	Circuit Analysis – Mesh method.
Week 10	Linearity and Superposition.
Week 11	Source Transformations.
Week 12	Thevenin's Theorem.
Week 13	Norton's Theorem.
Week 14	Maximum power transfer theorem.
Week 15	Preparatory week before the final Exam.
Week 16	**Final Exam.**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Laboratory Equipment Training.
Week 2	Lab 2: Measuring voltage, current and resistance.
Week 3	Lab 3: Ohm's law.
Week 4	Lab 4: Series connections.
Week 5	Lab 5: parallel connections.
Week 6	Lab 6: Voltage divider rule.
Week 7	Lab 7: Voltage divider rule.
Week 8	Lab 8: Star-Delta Transformations
Week 9	Lab 9: Kirchhoff's laws.
Week 10	Midterm exam
Week 11	Lab 12: Thevenin's theorem.
Week 12	Lab 11: Norton's theorem.

Week 13	Lab 12: Superposition principle.
Week 14	Lab 13: Maximum power transfer.
Week 15	Final exam

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		

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

16.5 Syllabus Description Guide/Level#1/Semister#1/Physics & Semiconductors

Module Information
معلومات المادة الدراسية

Module Title	**Physics and Semiconductor**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**ATU11105**		
ECTS Credits	**7**		
SWL (hr/sem)	**175**		

Module Level	UGI	**Semester of Delivery**	1
Administering Department		**College**	NETC
Module Leader	Thenaa Hassan Yousaf	**e-mail**	thanaa.yousif.chm@atu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Aims أهداف المادة الدراسية	1. To understand atom models. 2. To Know the Semiconductor materials and their types. 3. To Know the P-N junction and biasing 4. To understand the V/I Characteristics of the diode. 5. To study the Equivalent circuit of the diode and analysis its circuit. 6. To study the diode types and their applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Learn about the structure of the atom. 2. Discuss the energy bands in an atom. 3. Discuss the types of semiconductor materials and how to manufacture them. 4. study generation and recombination of the carrier. 5. How to form the depletion layer.

	6. Recognize the forward and reverse biased of the P-N junction. 7. Learn about Diode Equation. 8. Discussion of the Equivalent circuit of the diode. 9. Discuss the series and parallel diode configuration. 10. Study rectifier circuits, clipper and clamper circuits, and voltage doublers. 11. Study zener diode and application,
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Model of the atom, Bohr's model, atom energy levels, Collisions of Electrons with Atoms, The Photon Nature of Light, energy bands, valance and conduction bands, Insulators, Semiconductors and Metals. [8 hrs] Semiconductors, Types of Semiconductors: Intrinsic and Extrinsic Semiconductors, n-type and P-type semiconductors, majority and minority carriers, Conductivity of Intrinsic and Extrinsic Semiconductors, drift and diffusion currents, electron-hole pair, carrier and life time, generation and recombination of carrier. [12 hrs] P-N junction, formation of depletion layer, junction or barrier voltage, forward and reveres biased P-N junction, Diode Equation, Forward and reverse V/I Characteristics of diode, diode resistance. [11 hrs] Equivalent circuit of diode: Piecewise Equivalent Circuit, Simplified Equivalent Circuit, Ideal Equivalent Circuit, Load line analysis, Examples. Series and parallel diode configuration examples. Half wave rectifier, full wave rectifier, clipper and clamper circuits, voltage doublers. [18 hrs] Types of diodes, zener diode, light emitting diode, [11 hrs]
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 showing the students how the construction members exposed to external loads. This can be done by films or videos or by the ready structural software.

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (hr/sem) (SSWL) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	93/15 =6.2
Unstructured SWL (hr/sem)(USSWL) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	82/15=5.5
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

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

Formative assessment	**Quizzes**	2	10% (10)	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	
	Report	1	10% (10)	13	LO # 5, 8 and 10
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	LO # 1-7
	Final Exam	3 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week	**Syllabus**
Week 1&2	Atoms, electrons and shells, energy levels, valance electron, Ionization, Molecules and Solids - Combination of atoms - Bonding force in solids, material classifications (conductors, insulators, and semiconductors).
Week 3&4	Semiconductor materials: Ge, Si, and GaAs, Covalent bonding, electron and hole current, intrinsic and extrinsic semiconductors. p-type and n-type materials.
Week 5&6	PN-junction and barrier potential. semiconductor diode, characteristics of diode, Silicon diode versus germanium diode, ideal diode versus practical, current-voltage relationship, temperature effect.
Week 7-9	Diode resistance level, Diode equivalent circuits, Diode in DC circuits series and parallel diode configurations, load line analysis, transition and diffusion capacitance, reverse recovery time, diode switching circuit; OR and AND gates.
Week 10-12	Diode in AC circuits; diode rectifiers circuit; Half wave rectifier operation, transformer coupler, full wave rectifiers operation; Bridge and center-tap full wave, capacitor filter.
Week 13&14	Diode clipping circuit, diode clamping circuits. other types of diodes; light emitting diode and Zener diode.
Week 15	Zener diode operation and its applications
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Lab instruments
Week 2	Lab 2: Forward and reverse V/I Characteristics of diode.
Week 3	Lab 3: half wave rectifier.
Week 4	Lab 4: Full wave rectifier with center tap transformer.
Week 5	Lab 5: Full wave (bridge) rectifier.
Week 6	Lab 6: clipper and clamper circuits
Week 7	Lab 7: voltage doubler and voltage triple
Week 8	Lab 8: Zener diode characteristics in forward biasing and reverse biasing.
Week 9	Lab 9: Using a zener diode to stabilize the voltage with a constant and variable resistive load.
Week 10	Lab 10: light emitting diode.
Week 11	Lab 11: characteristics of photo diode.
Week 12	Lab 12: characteristics of varactor diode.
Week 13	Lab 13: characteristics of Schottky diode.
Week 14	Lab 14: characteristics of Lazer diode.

Week 15	Final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electronic Devices And Circuit Theory by R. Boylestad.	Yes
Recommended Texts	Electronic devices electronic flow version by Thomas L. Floyd	Yes
Websites		

APPENDIX:

GRADING SCHEME

مخطط الدرجات

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

16.6 Syllabus Description Guide/Level#1/Semister#1/Human Rights & Democracy

Module Information
معلومات المادة الدراسية

Module Title	**Human Right and Democracy**	**Module Delivery**	
Module Type	**B**	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**ATU11**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		

Module Level	UGI	**Semester of Delivery**	2
Administering Department		**College**	NETC
Module Leader	Hiader abd Al-Jaleel	**e-mail**	
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Objectives أهداف المادة الدراسية	يتعلم الطالب اساسيات حقوق لانسان والديمقراطية ، و كيف يدافع عنها بالطرق القانونية وماهي ضماناتها الداخلية والدولية 1 استحصال المعرفة في مجال الديمقراطية وأنواع أنظمتها واثرها على حقوق الانسان2- . تنمية شخصية الطالب وتعزيز وعيهم في الأنظمة السياسية الديمقراطية وتفاصيلها وكيفية تطبيقها على ارض الواقع واهمية ان يكون فعال في المجتمع 3- . من خلال احترامه لحقوق الاخرين ومعرفه ان الحقوق والحريات تنتهي عند بداية حقوقهم وحرياتهم ويؤدي واجباته بدال من اكتساب الحقوق فقط .تعزيز ثقافة السالم القائمة على العدل والمساواة 4- .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	تمكين الطالب من معرفة اساسيات الدفاع عن حقوقه وحقوق الاخرين بعد معرفتها ومعرفة أهميتها له وللمجتمع بصورة عامة وأيضا معرفه كل - 1 . شخص حدود حقوقه وحريته تمكين الطالب في المشاركة السياسية وذلك من خلال معرفته بأهمية مشاركته في الانتخابات وتأثير هذه المشاركة على سير الانتخابات وتشكيل ٢- – .السلطة فيما بعد .معرفه الطالب ضمانات حقوقه وحرياته وماهي مصادرها ٣ معرفة الفرق بين الحقوق والحريات – ٤ فهم الطالب للقانون الدولي لحقوق الانسان وايضا الدولية والية عملها –5

Indicative Contents المحتويات الإرشادية	الجزء الاول –تعريف حقوق الانسان الجزء الثاني معرف حقوق الانسان في الأديان السماوية

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	ثقافة عامة في مجموعة من المجالات ومنها 2-زيادة وعي الطالب بأهمية معرفه حقوقه وواجباته اتجاه المجتمع وعالقة حقوق الانسان بالنظام الديمقراطي 1 المجال القانوني و السياسي والاجتماعي

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

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

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	**Freedom & Democracy** - An introduction to freedom and democracy in multiple societies and on different ages, its types and how changes in regime occurred **Relativity in freedom** - Freedom is not an absolute idea but it is variable with respect to time, place regime…etc.
Week 2	**General Freedom guaranties** - Freedom has political and legal guaranties. **General freedom divisions** - Natural freedoms, private freedoms, intellectual freedoms, collective freedoms and political freedoms

Week 3	**Individual Freedoms** - Opinion freedom, expression freedom, press freedom…etc. **Democracy & political systems** - Overview about democracy and its history
Week 4	**Democracy types** - Direct and indirect **Dictatorship and its specification** - Overview and specification
Week 5	**Concepts about democracy** - Traditional meaning and modern meaning. **Democracy in Greek Civilization VS. Current democracy**
Week 6	**Current crisis of democracy** - Economical, social, cultural and political difficulties **Civil & political rights** - Which includes life right, personal freedom, possessing, contracting family…etc.
Week 7	**Individual importance and its relation with nation and regime** **Importance and specifications of sovereignty**
Week 8	**Main portions of a country** - People, land, government and sovereignty **Human rights in human history** - Human rights in ancient ages like Mesopotamian, Greek, and Roman civilizations
Week 9	**Human rights in divine religions** - In Christian and Islamic - Overview, properties and types
Week 10	**International confession of human rights** **Territorial confession of human rights** - international and legal resources from international agreements
Week 11	**NGO and its role in the protection of human rights** **Women rights** - In Islamic time
Week 12	**Children Rights** - In old civilizations - In divine religions In international agreement on 1989
Week 13	**Elections and human rights** - Human rights is a concept of free elections
Week 14	**Human rights resources in Iraq** - Basics of human rights in Iraq from the Iraqi constitution, year 2005 **Civil Rights** - Equality, life freedom rights and house and personal privacy
Week 15	**Political & economical rights** - Election rights government critique

	Social & cultural rights - This includes the right of family creation, social and health care, and the right of clean environment
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	حقوق الانسان والطفل والديمقراطية /تأليف ماهر صالح علاوي ورياض عزيز هادي وعلي عبد الرزاق محمد واخرون	No
Recommended Texts	عباس الدليمي / حقوق الانسان الفكر والممارسة	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

16.7 Syllabus Description Guide/Level#1/Semister#1/Engineering Drawing

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Drawing**			**Module Delivery**	
Module Type	**Basic B**			☐Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	ATU11107				
ECTS Credits	**4**				
SWL (hr/sem)	**100**				
Module Level			**Semester of Delivery**	1	
Administering Department			**College**	NETC	
Module Leader	Noor Fadil		**e-mail**	noor.habib@atu.edu.iq	
Module Leader's Acad. Title	Assistant lecturer		**Module Leader's Qualification**	MSc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Nasir Hussein Selman		**e-mail**	Coj.nas@atu.edu.iq	
Scientific Committee Approval Date	01/10/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To present a brief vision of Computer-Aided Design (auto CAD) and the tools of this term. 2. Highlighting the mathematical modeling principles of line, arc, spline, and other segments. Fundamental of electricity element : resistance, inductance, …,etc. 3. Covering the significant programs utilized in the modeling and comparing these programs. 4. Defining the AutoCAD and workbench program's tools and modeling outcomes. 5. Explaining global and local coordinate systems in modeling.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Control of AutoCAD principles as background programming of each segment, such as line or arc. 2. Controlling the main and sub-tools of the AutoCAD program as a professional designer. 3. Contributing to knowing the methodology of drawing accuracy and technology terms. .
Indicative Contents	Part A Introduction to modeling system in AutoCAD:

المحتويات الإرشادية	Drawing planes, Preparing sheet drawings, Line commands, circle commands, Arc commands, Rectangle commands, straight slot commands, Ellipse commands, Spline commands, and 3D sketch planes. Part (B) Fit conceptual: Transition, Clearance, and Interference. Part (C) Bearing, Cams, Gears, and Belts, bolts, Welding conceptual.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	The strategy of this subject is to study the principles of computer-aided design (auto CAD) by employing one of the popular programs. The tools of autocad program contribute to developing the users' skills in 2D and 3D drawing. Besides, this program utilizes the assembly and sheet representation for sketched parts with annotation technologies. Furthermore, this program boosts the modeling of belts, coupling, gears, and cams. Consequently, prepare the students to design advance modeling of electrical and electronic circuits.

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

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

Module Evaluation
تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	4 and 12	
	Assignments	2	10% (10)	3 to 12	
	Projects / Homework	5	10% (10)	6 and 11	
	Report	1	10% (10)	0	
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	
	Final Exam	3hr	25% (25)	15	
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	DDA AND ELECTRICITY Algorithm for line, Bresenham Algorithm for arc, HC-Spline.
Week 2	Bezier spline, Preparing sheet and plane for drawing by SOLIDWORK program.
Week 3	2D and electricity drawing tools.
Week 4	2D and electricity drawing tools, 2D modify tools.
Week 5	3D and electricity drawing tools.

Week 6	3D and electricity drawing tools.
Week 7	3D drawing tools, Mid-Test.
Week 8	3D Modify-Features tools.
Week 9	Surfaces tools.
Week 10	Surfaces tools, Modify-Surfaces tools.
Week 11	Modify-Surfaces tools, Assembly tools.
Week 12	Assembly tools, Drawing Sheet tools.
Week 13	Feet and clearance tools.
Week 14	Bearing, Cams, and Gears tools
Week 15	Belts, Bolts, and Welding tools
Week 16	**Final Exam.**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Radhakrishnan, P., Subramanyan, S. and Raju, V., 2008. CAD/CAM/CIM. New Age International. Bethune, James D. Engineering Design and Graphics with SolidWorks 2016. United States: Pearson, 2016.	Yes
Recommended Texts	.	Yes
Websites	-	

Grading Scheme

مخطط الدرجات

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

16.8 Syllabus Description Guide/Level#1/Semester#2/Arabic Language

Module Information
معلومات المادة الدراسية

Module Title	**Arabic language**	**Module Delivery**	
Module Type	**Suplement**	**Theory**	
Module Code	**ATUU112**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		

Module Level		**Semester of Delivery**	2
Administering Department		**College**	NETC
Module Leader		**e-mail**	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Aims أهداف المادة الدراسية	1- تعريف الطلبة اهم المفاتيح الاساس في التعامل بلغة عربية فصيحة خالية من اي الأخطاء. 2- رفع القدرات التعبيرية للطالب، ومساعدتهم على استخدام العبارة المناسبة بشكل صحيح وواضح. 3- تدريب الطلبة على التنظيم المنطقي للأفكار باللغة العربية الفصحى. 4- جعل الطلبة قادرين على اكتساب خزين لغوي من الكلمات والتعابير الفصيحة.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- تعلم اساليب اللغة العربية . 2- استخدام علامات الترقيم أثناء الكتابة. 3- تعلم كيفية تحليل النصوص الأدبية. 4- التدريب على القراءة الواضحة والالقاء.
Indicative Contents المحتويات الإرشادية	1- توضيح أهمية اللغة العربية وفوائدها للطلبة من غير اختصاص اللغة العربية. 2- تفسير بعض الايات القرنية 3- تحليل بعض القصائد العربية. 4- قواعد اللغة العربية وأهميتها. 5- الأسماء، أنواعها، الضمائر

	6- النكرة والمعرفة. 7- اعراب بعض الايات القرىنية، الابيات الشعرية. 8- علامات الترقيم واهميتها في اللغة العربية. 9- شرح موضوع العدد ، وماهي اقسامه.
Strategies	.المحاضرة والمشاركة - .المناقشة والحوار - .العصف الذهني - .كتابة التقارير عن الموضوع - - السؤال والجواب

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (hr/sem) (SSWL) الحمل الدراسي المنتظم للطالب خلال الفصل	18	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	18/15 =1.2
Unstructured SWL (hr/sem)(USSWL) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	32/15=2.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week	**Syllabus**
1	اللغة: توضيح أهمية اللغة العربية وفوائدها بالنسبة للطالب الجامعي من غير تخصص اللغة العربية.
2	اللغة: تفسير وتحليل عدد من آيات القرآن الكريم.، وبيان اهم الأوجه والبلاغية والنحوية.
3	اللغة: تفسير وتحليل عدد من آيات القرآن الكريم.، وبيان اهم الأوجه والبلاغية والنحوية.
4	اللغة: تفسير وتحليل عدد من آيات القرآن الكريم.، وبيان اهم الأوجه والبلاغية والنحوية.
5	الأدب: تحليل عدد من ابيات الشاعر ابي الطيب المتنبي ، وبيان اهم الأوجه والبلاغية والنحوية في القصيدة
6	الادب: تحليل أحد قصائد الشعر الحر للشاعر العراقي بدر شاكر السياب.
7	الادب: تحليل أحد قصائد الشاعر إيليا أبو ماضي، وبيان اهم الأوجه والبلاغية والنحوية في القصيدة
8	معرفة اقسام الكلام، الاسم والفعل والحرف. القواعد:
9	القواعد: النكرة والمعرفة

10	القواعد: الضمائر
11	القواعد: أسماء الإشارة
12	.الاملاء: علامات الترقيم واهميتها في اللغة العربية
13	الاملاء: شرح موضوع العدد، ومعرفة تميز العدد وماهي اقسام العدد مع الأمثلة وحالات الاعراب
14	الاملاء: احكام كتابة التاء المربوطة والمفتوحة والالف الممدودة والمقصورة
15	.الاملاء: أحكام كتابة الضاد والظاء

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1- القرآن الكريم 2- كتاب البلاغة والتطبيق. 3- كتاب الاملاء الواضح	
Recommended Texts	1- كتاب شرح ابن عقيل على الفية ابن مالك 2- كتب إعراب القرآن وتفسيره	
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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

16.9 Syllabus Description Guide/Level#1/Semester#2/Calculus II

Module Information
معلومات المادة الدراسية

Module Title	**Calculus II**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**ATU11208**		
ECTS Credits	5		
SWL (hr/sem)	125		

Module Level		**Semester of Delivery**	2
Administering Department	Type Dept. Code	**College**	Type College Code
Module Leader	Ahmed Mohammed Zeki	**e-mail**	Ahmed.alhilli@atu.edu.iq
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	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of functions and their integration. 2. To understand integrations and antiderivatives. 3. This course deals with the basic concept of calculus. 4. To understand integral applications.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. The Definite Integral, the Fundamental Theorem of Calculus 2. Indefinite Integrals and the Substitution Method 3. Definite Integral Substitutions and the Area Between Curves 4. Volumes Using Cross-Sections, Volumes Using Cylindrical Shells 5. Arc Length and Areas of Surfaces of Revolution 6. The Logarithm Defined as an Integral 7. Using Basic Integration Formulas 8. Integration by Parts 9. Trigonometric Integrals

	10. Trigonometric Substitutions 11. Integration of Rational Functions by Partial Fractions
Indicative Contents المحتويات الإرشادية	- Integration - Method of integration - Application of definite integrals - Hyperbolic Functions

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

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

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Indefinite Integrals and the Substitution Method, Integration of Trigonometric and Hyperbolic functions
Week 2	Integration methods, 1) Integration by parts
Week 3	Trigonometric Integrals, Integrating powers of Trigonometric functions

Week 4	Integration by Trigonometric substitutions
Week 5	Integration by partial fraction
Week 6	Integration of rational function of sinx and cosx
Week 7	Integration of rational functions contains $\sqrt[n]{x}$
Week 8	Definite Integral, the Fundamental Theorem of Calculus
Week 9	Applications of definite Integral: a) The area under the curve, b) Area between two curves
Week 10	Volumes; Volumes Using Cross-Sections, Volumes Using Cylindrical Shells
Week 11	Complex Numbers, Complex Arithmetic; Argand Diagrams and the Polar Form
Week 12	The Exponential Form of a Complex Number; De Moivre's Theorem
Week 13	Matrices; Introduction to Matrices; Matrix Multiplication
Week 14	Determinants; The Inverse of a Matrix
Week 15	**Matrix solution of equations;** Solution by Cramer's Rule; Solution by Inverse Matrix Method
Week 16	**Preparatory week before the final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Thomas' Calculus 14th edition	Yes
Recommended Texts	Calculus 10th edition by Anton, Bivens, and Davis	Yes
Websites	https://www.lboro.ac.uk/departments/mlsc/student-resources/helm-workbooks/	

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

16.10 Syllabus Description Guide/Level#1/Semester#2/AC Electrical Circuits

Module Information

معلومات المادة الدراسية

Module Title	**AC Electrical Circuits**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☒ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	**ATU11209**		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		

Module Level		**Semester of Delivery**	2
Administering Department		**College**	NETC
Module Leader	Serab Jwyed Musa	**e-mail**	inj.srb@atu.edu.iq
Module Leader's Acad. Title	Assistant Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of AC circuits theory and AC circuits analysis through the application of techniques. 2. To understand voltage, current and power from a given AC circuit. 3. This course deals with the basic concept of AC electrical circuits. 4. To understand Poly Phase Circuits. 5. To understand Resonance circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe the principles of sinusoidal signals and phasors. 2. Explain how sinusoidal signals behave when interact with AC circuits elements. 3. Learn the various terms associated with AC electrical circuits. 4. Learn the behavior of capacitors and inductors when connected to AC sources. 5. Learn the basics of circuits connections (series, parallel, and Y-Δ connections). 6. Describe the operation of RC, RL, and RLC circuits. 7. Explain the basic rules of AC electric circuits analysis, such as Ohm's law, voltage and current division rules, and Kirchhoff's laws. 8. Explain circuits analysis methods, such as nodal and meth analysis methods.

	9.Explain circuits analysis theorems, such as Thevenin's and Norton's theorems, in addition to superposition principle and maximum average power transfer. 10. Explain Poly Phase Circuits. 11. Explain Resonance circuits.
Indicative Contents المحتويات الإرشادية	Basic Concepts Sinusoidal signals and their properties, Phasors, phasor representations, and time domain signals vs phasor domain signals. AC Circuits Elements Resistors, capacitors, and inductors: voltage-current relationship, impedance and admittance, equivalent circuits of capacitors and inductors as a function of signal frequency. Basic Laws, Analysis Methods, and Theorems in AC Series and parallel connections, Ohm's law, Kirchhoff's laws, Voltage and current division rules. Nodal analysis and Mesh analysis. Thevenin's and Norton's theorems, in addition to superposition principle. AC power Analysis Active power, reactive power, apparent power, power triangle, power factor correction. instantaneous and average power, maximum average power transfer. Resonance: Series resonance, quality factor, selectivity, bandwidth, parallel resonance.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Sinusoidal signals and their properties.
Week 2	Phasors: phasor representation, derivatives and integrals of sinusoids in phasor domain,
Week 3	AC Circuits Elements: V-I relationship of resistors, capacitors, and inductors.
Week 4	Series and parallel circuits: series circuits, voltage divider rule, current divider rule.
Week 5	Kirchhoff's Laws.
Week 6	Circuit Analysis – Nodal and mesh methods.
Week 7	**Mid-term Exam.**
Week 8	Superposition principle, and source transformation.
Week 9	Thevenin's and Norton's Theorems.
Week 10	AC Power Analysis: Instantaneous and average power, maximum average transferred power,
Week 11	AC Power Analysis: Active power, reactive power, apparent power, power factor.
Week 12-13	Resonance: Series resonance, quality factor, selectivity, bandwidth, parallel resonance, derive resonance frequency for many circuits
Week 14-15	Basic intro to three phase systems, balance load, unbalance load, power in three phase circuits.
Week 16	**Final Exam.**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Series RL circuits.
Week 2	Lab 2: Series RC circuits.
Week 3	Lab 3: Parallel RL circuits.
Week 4	Lab 4: Parallel RC circuits.
Week 5	Lab 5: Series RLC circuits.
Week 6	Lab 6: Parallel RLC circuits.
Week 7	Lab 7: Superposition theorem
Week 8	Lab 8: Maximum average AC power transfer.
Week 9	Mid-term exam
Week 10	Measure AC Power
Week 11	Lab 11: Maximum average AC power transfer.

Week 12	Series Resonance
Week 13	Parallel Resonance
Week 14	Measure power in three phase circuits
Week 15	Final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- Introductory to circuit analysis by Boylestad.	Yes
Recommended Texts	Fundamentals of Electric Circuits by C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education Electric circuits, Pearson Education by Nilsson, James William Textbook of Electrical Technology-Volume I (Basic Electrical Engineering), by Theraja, B. L. A.	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

16.11 Syllabus Description Guide/Level#1/Semester#2/Digital Logic

Module Information

معلومات المادة الدراسية

Module Title	**Digital Logic**	**Module Delivery**	
Module Type	**Core**		☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**
Module Code	**ATU11210**		
ECTS Credits	**7**		
SWL (hr/sem)	**175**		

Module Level		**Semester of Delivery**	2
Administering Department		**College**	NETC
Module Leader	Huda Hussien Abed	**e-mail**	eng.huda2020@atu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	This course aims to enable the student to: 1. Explain the number systems. 2. Perform arithmetic operations on binary number systems. 3. Define the logic gates. 4. Write the logic expression of the logic circuits. 5. Produce the truth table for the logic expressions. 6. Simplify the Boolean expressions. 7. Understand the functions of combinational logic circuits. 8. Analyze and design various combinational logic circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Represent any given number in different bases (such as bases 2, 8, and 16). 2. Implement the arithmetic operations on binary numbers. 3. Obtain the 1's complement and 2's complement of binary numbers. 4. Identify the logic gates by their logic symbol, write the logic expression, and produce the truth table for the logic gates.

	5. Analyze a logic circuit to determine its logic expression and truth table. 6. Employ theorems of Boolean algebra to simplify logic expressions. 7. Determine the standard SOP expression and standard POS expression from the truth table. 8. Use a Karnaugh map to minimize POS & SOP expressions. 9. Convert nonstandard logic expressions to standard logic expressions. 10. Implement the logic functions using only NAND gates or only NOR gates. 11. Design of various combinational logic circuits such as adders, subtractors, comparators, and code converters.
Indicative Contents المحتويات الإرشادية	Part A - Number Systems Define number systems, convert a decimal number to any radix number, convert a binary number to an octal or hexadecimal number and vice versa, and convert an octal number to a hexadecimal number and vice versa. [1-3 weeks] Part B - Arithmetic operations & logic gates Perform arithmetic operations on binary numbers, convert a binary number to its 1's complement, and 2's complement, Identify the logic gates, write the logic expression, and produce the truth table. [1-2 weeks] Part C - Combinational logic circuit Analyze a combinational logic circuit, draw a logic diagram, theorems of Boolean algebra, DE Morgan's theorem, standard SOP & POS expressions, use a Karnaugh map to minimize POS & SOP expressions, convert nonstandard expressions to standard expressions, implement the logic expressions using only NAND gates or only NOR gates. [1-5 weeks] Part D - Design combinational logic circuits • Arithmetic logic circuits: half-adder and full-adder logic circuits, half-subtractor and full-subtractor logic circuits. [1-2 weeks] • Code converters logic circuits: binary to gray code converter circuit and vice versa, Binary-to-BCD Code circuit, BCD to Excess-3 code converter circuit and vice versa. [1-2 weeks] • Comparators logic circuits: 1-bit & 2-bit comparators logic circuits. [1 week]

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	• Interactive lecturing style, with opportunities for questions. • Encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. • Interactive simulation for the logic circuits. • Make tutorial questions for formative feedback. • Assessments related to students' answers are delivered with scientific comments.

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6.2
Unstructured SWL (h/sem)	82	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.5

الحمل الدراسي غير المنتظم للطالب خلال الفصل			
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)	4 and 10	L #2, #3 and #9, #8
	Assignments	2	10% (10)	7 and 15	L #6, #7 and #13, #14
	Projects / Lab.	1	10% (10)	Continuous	All
	Report	1	10% (10)	12	LO #5, #10 and #12
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - Number Systems: binary, decimal, octal, and hexadecimal numbers.
Week 2	Convert a decimal number to any radix number.
Week 3	Convert a binary number to an octal or hexadecimal number and vice versa, and convert an octal number to a hexadecimal number and vice versa.
Week 4	Perform arithmetic operations on binary numbers, and convert a binary number to its 1's complement, and 2's complement.
Week 5	Identify the logic gates, write the logic expression, and produce the truth table.
Week 6	Analyze a combinational logic circuit, draw a logic diagram, and theorems of Boolean algebra.
Week 7	DE Morgan's theorem, standard SOP expression, and standard POS expression.
Week 8	Mid-term Exam + Construct a Karnaugh map for two, three, and four variables, use a Karnaugh map to minimize POS & SOP expressions.
Week 9	Convert nonstandard expressions to standard expressions, and Use the Karnaugh map to convert between POS and SOP.
Week 10	Use NAND gates to create other logic gates, Use NOR gates to create other logic gates, and implement the logic functions using only NAND gates or only NOR gates.
Week 11	Design half-adder & full-adder logic circuits, and use full-adders to implement a parallel binary adder.
Week 12	Design the half- subtractor & full-subtractor logic circuits, and use full-subtractors to implement a parallel binary subtractor.
Week 13	Explain the concept of code converters, and describe gray code, BCD, and excess-3 code.
Week 14	Design combinational logic circuits that convert from one coding method to another.
Week 15	Design 1-bit, and 2-bit comparators using logic gates, and use the 74HC85 comparator to compare the magnitudes of two 4-bit numbers.

Week 16	**Final Exam.**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Explain the function of a logic gates (AND, OR, NOT, AND, NOR, XOR , and XNOR) using the logical board.
Week 2	Lab 2: Implement the logic gates (AND, OR, & NOT) using diodes, transistors, and resistors.
Week 3	Lab 3: Verify the truth table of logic gates (AND, OR, NOT, NAND, NOR, XOR, &XNOR) by using integrated circuits IC (7408, 7432, 7404, 7400, 7402, & 7486).
Week 4	Lab 4: Boolean's algebraic
Week 5	Lab 5: DE Morgan's theorem.
Week 6	Lab 6: Implement logic gates (AND, OR, NOT, NAND, NOR, XOR & XNOR) using NAND gates only.
Week 7	Lab 7: Implement logic gates (AND, OR, NOT, NAND, NOR, XOR & XNOR) using NOR gates only.
Week 8	Lab 8: Design the half-adder circuit using logic gates.
Week 9	Lab 9: Design the full-adder circuit using logic gates.
Week 10	Lab 10: Design the half-subtractor circuit using logic gates.
Week 11	Lab 11: Design the full-subtractor circuit using logic gates.
Week 12	Lab 12: Design the full subtractor circuit using logic gates.
Week 13	Lab 13: Implement a binary to gray code converter circuit using logic gates.
Week 14	Lab 14: Implement the BCD to Excess-3 code converter circuit using logic gates.
Week 15	Lab 15: Design (1-bit) comparator circuit using logic gates.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1. G. K. Kharate, "Digital Electronics" Oxford university press, 7th edition, ISBN 13: 978-0-19-806183-0, 2013. 2. Thomas L. Floyd, "Digital Fundamentals" Pearson Education, 11th edition, ISBN 10: 1-292-07598-8, 2015. 3. T. Ndjountche "Digital Electronics 1", John Wiley & Sons, 1st edition, ISBN 978-1-84821-984-7, 2016. 4. N. S. Widmer, G. L. Moss, R. J. Tocci, "Digital Systems", Pearson Education Limited e, 12th edition, ISBN 978-0-134-22013-0, 2017. 5. Shuqin Lou, Chunling Yang, "Digital Electronic Circuits" Science Press, 4th edition, ISBN 978-3-11-061466-4, 2019.	NO Yes Yes Yes NO
Recommended Texts	1. A.P. Godse and D.A. Godse, "Digital Logic Circuits" Technical Publications Pune, 4th edition, ISBN: 9788184316506, 2009. 2. R. S. Sedha, "A TEXTBOOK OF DIGITAL ELECTRONICS" S. Chand & Company ltd, ISBN: 81-219-2378-6, 2010. 3. D. P. leach and a. p. malvino, "digital principles and applications", tata mcgraw hill education,7th edition, ISBN:978-0-07-014170-4, 2011. 4. D. P. Kothari, and J. S. Dhillon "digital circuits and design" Pearson education, ISBN 978-93-325-4353-9, 2015.	NO Yes Yes No

	5.S. Salivahanan and S. Arivazhagan, "DIGITAL CIRCUITS AND DESIGN" Oxford university press, 5th edition, ISBN-13 : 978-0199488681, 2018.	NO
Websites	https://www.allaboutcircuits.com/textbook/digital/	

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

16.12 Syllabus Description Guide/Level#1/Semester#2/ Electronic Circuits

Module Information
معلومات المادة الدراسية

Module Title	**Electronic Circuits**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	**ATU11211**		
ECTS Credits	**7**		
SWL (hr/sem)	**175**		
Module Level		**Semester of Delivery**	2
Administering Department		**College**	NETC
Module Leader	Thenaa Hassan Yousaf	**e-mail**	thanaa.yousif.chm@atu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Aims أهداف المادة الدراسية	The student learns about the basic construction and operation of a bipolar transistor. And be able to apply appropriate biasing to secure operation in the active area. 1. Identify the characteristics of a BJT (NPN or PNP) and their response. 2. Student will be able to determine DC and AC load line. of important BJT configurations. 3. Understand the BJT transistor configuration. 4. The student will also be familiar with the saturation and cut-off

	conditions of the BJT. 5. Define the application of BJT transistor. 6. Identify FET, JFETs and MOSFET transistors, construction and characteristics 7. Learns about the basic construction and operation of a multistage amplifiers.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enable to know the concepts of BJT and FET transistors, know about the BJT and FET transistors configurations. 2. Enabling student to design of BJT circuits. 3. Understand the basic operation of transistor and applications 4. Enabling student to test the transistor 5. Enabling student to know the Design of multistage amplifiers.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: Introduction to aviation electronics and its role in aircraft systems. 1. Basic BJT principles, operation and configurations. 2. Basic FET principles, operation and configurations. 3. Basic MOSFET principles, operation and configurations. 4. Multistage amplifiers
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 showing the students how the construction members exposed to external loads .This can be done by films or videos or by the ready structural software.

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (hr/sem) (SSWL) الحمل الدراسي المنتظم للطالب خلال الفصل	93	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	93/15 =6.2
Unstructured SWL (hr/sem)(USSWL) الحمل الدراسي غير المنتظم للطالب خلال الفصل	82	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	82/15=5.5
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	175		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week	**Syllabus**
Week 1&2	Bipolar junction transistor, BJT operation, transistor configurations; common base configuration common emitter configuration, and common collector configuration, DC load line, Limits of operation.
Week 3	Analysis of Fixed bias configuration, voltage divider bias configuration.
Week 4	Collector feedback configuration; saturation level and load line analysis, emitter flower configuration, Design operation.
Week 5	Transistor switching networks, Multiple BJT networks, bias stabilization.
Week 6&7	BJT AC analysis, amplification in AC domain, BJT modeling, the "r e" transistor model, determine the current and voltage gain, two-port system approach, The Hybrid Equivalent Model, cascade system, frequency response of BJT amplifiers.
Week 8-10	Field effect transistors, FET types, FET fixed bias configuration, self-bias configuration, voltage divider configuration, common-gate configuration. FET amplifiers. junction FETs, construction and characteristics of JFETs, transfer characteristics, specification sheets (JFETs).
Week 11&12	MOSFETs, depletion type MOSFET, enhancement type MOSFET, MOSFET Handling. E-MOSFET drain feedback configuration, E-MOSFET voltage divider configuration, Designing FET amplifier networks
Week 13-15	BJT and JFET frequency response, Logarithms, decibel, general frequency consideration, normalization process, low frequency analysis, low frequency response-BJT amplifier with RL, impact Rs on the BJT low frequency response, low-frequency response FET amplifier, Miller effect capacitance, high-frequency response -BJT amplifier, high frequency response- FET amplifier, multistage frequency effect.
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to the lab tools which uses in the experiments
Week 2	Lab 2: BJT Transistor Characteristics.
Week 3	Lab 3: Transistor CE Characteristics.
Week 4	Lab 4: Transistor CB Characteristics.
Week 5	Lab 5: Transistor CC Characteristics.
Week 6	Lab 6: Transistor as switch
Week 7	Lab 7: Frequency response of common emitter amplifier.
Week 8	Lab 8: Frequency response of common base amplifier.
Week 9	Mid Term exam.
Week 10	Lab 10: FET Transistor Characteristics.
Week 11	Lab 11: FET common Source Characteristics.
Week 12	Lab 12: FET common drain Characteristics.
Week 13	Lab 13: MOSFET Transistor Characteristics.

Week 14	Lab 14: Multistage amplifiers.
Week 15	Lab 15: Multistage amplifiers.
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electronic devices electronic flow version by Thomas L. Floyd	Yes
Recommended Texts	Electronic Devices And Circuit Theory by R. Boylston.	Yes
Websites		

GRADING SCHEME

مخطط الدرجات

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

16.13 Syllabus Description Guide/Level#1/Semester#2/Eng. Workshops

Module Information
معلومات المادة الدراسية

Module Title	**Engineering Workshops**	**Module Delivery**	
Module Type	**Basic**	☐ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☒ Practical ☐ Seminar	
Module Code	**ATU11212**		
ECTS Credits	**3**		
SWL (hr/sem)	**75**		
Module Level	UGI	**Semester of Delivery**	2
Administering Department		**College**	NETC
Module Leader	Liath Wajeh	**e-mail**	
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Aims أهداف المادة الدراسية	1. Develop practical skills in electronics workshop operations, focusing on safety measures and proficiency in using measuring devices and tools. 2. Acquire knowledge and techniques related to welding, soldering, and handling electronic components on printed boards. 3. Gain familiarity with various electronic components, circuits, and their behaviors through hands-on manufacturing and experimentation. 4. Understand the principles of parallel and series circuits involving resistors and capacitors, and apply them in practical scenarios. 5. Enhance the ability to read and interpret electronic boards, and design and assemble electronic circuits on printed boards.
Module Learning Outcomes	1. Demonstrate a thorough understanding of the fundamental concepts and principles of electronics, including measuring devices, soldering

مخرجات التعلم للمادة الدراسية	techniques, and electronic components. 2. Apply knowledge and skills in conducting welding and soldering operations with precision and adherence to safety guidelines in an electronics workshop. 3. Construct and analyze various electronic circuits, including resistive, capacitive, and semiconductor circuits, using appropriate tools and materials. 4. Evaluate and troubleshoot electronic circuits, identify faults, and apply effective problem-solving techniques to rectify issues. 5. Develop proficiency in reading and interpreting electronic boards, designing and assembling circuits, and effectively communicating ideas and findings related to electronics.
Indicative Contents المحتويات الإرشادية	1. Electronic Workshop: Acquire practical skills in electronics, including the use of measuring devices, soldering techniques, and working with electronic components. 2. Mechanical Workshop: Develop hands-on knowledge and skills in mechanical engineering, including working with different tools, understanding mechanical systems, and performing various mechanical operations.
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 showing the students how the construction members exposed to external loads. This can be done by films or videos or by the ready structural software.

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (hr/sem) (SSWL) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	48/15 =3.2
Unstructured SWL (hr/sem)(USSWL) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	27/15=1.8
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (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	
	Report	1	10% (10)	13	LO # 5, 8 and 10
	Midterm Exam	2 hr	10% (10)	7	LO # 1-7

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي المختبري

	Material Covered
Week	**Syllabus**
1-7	• Occupational Safety, Foundry Workshop, Files type Workshop, Carpentry Workshop, Turnery workshop, Welding types Workshop
8	• Learn how to use different measuring devices in the workshop, Learn how to use caustic, types of caustic, welding by using caustic
9	• Types of welding, Auxiliary materials for welding, wires welding between them and with other components. • Sucker solder and Solder removal, Training to remove some of the electronic components of the printed board
10	• Learn different types of printing board through printing method, drilling operation, Install the various components.
11	• Different types of electronics components through manufacturing for example the resistance and its power, measure the value of resistance in different methods, rheostat, Parallel resistance circuit - series resistance circuit - parallel and series resistance circuits - and check it.
12-13	• Types of capacitance • 14-15 Parallel capacitance circuit - series capacitance circuit - parallel and series capacitance, circuit - check it on the board, Switch types, Fuses types, Inductor types, Transformer types
14-15	• Learn how to read electronic board, Students learn to design electronic board on the printed board, install the component on the board, and welding the components on the board.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Electronics Workshop Companion by Stan Gibilisco	No
Recommended Texts	Electronic Principles Eighth Edition by Albert Malvino | David Bates. Make: Electronics Second Edition by Charles Platt.	
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	مقبول بقرار	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

16.14 Syllabus Description Guide/Level#2/Semester#1/Electronic Circuits Design

Module Information معلومات المادة الدراسية					
Module Title	Electronic Circuits Design			**Module Delivery**	
Module Type	C			☒ Theory ☐ Lecture ☒ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ATU11301				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level			**Semester of Delivery**	1	
Administering Department			**College**	NETC	
Module Leader	Ahmed Adnan Wahhab		**e-mail**	ahmedadnan@atu.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Nasir Hussein Selman		**e-mail**	Coj.nas@atu.edu.iq	
Scientific Committee Approval Date	01/10/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. he student learns about the basic construction and operation of a power electronic. 2. Identify and be able to explain the characteristics all types of rectifier circuits. 3. Being able to identify Chopper circuits. 4. Able to design inverter circuits 5. Able to design Voltage controller
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Knowing the concepts of power electronic. 2. Knowing about the Thyristor principle and application 3. Enabling to design inverter and chopper circuits
Indicative Contents	- Power electronics - Thyristor principle and application

المحتويات الإرشادية	- Controlled rectifier - Inverter - Choppers

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

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

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

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	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation
تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Power electronics systems: Power semiconductor diode : basic structure of power diode, I-V characteristics of power diode.
Week 2	power diode types (general purpose, fast switching and sckootky diodes), effect of forward and reverse recovery time of diode, diodes and rectifier circuit (half wave and full wave).
Week 3	Power transistor: bipolar junction transistor
Week 4-5	Power MOSFET, insulated Gate BJT, IGBJT structure

Week 6	Thyristor principle and application: basic structure of thyristor, I-V characteristics, two transistor model of thyristor
Week 7	turn-ON and turn-OFF characteristics, thyristor gate characteristics
Week 8	thyristor protection circuit, di/dt protection circuit, dv/dt protection circuit
Week 9	thyristor commutation circuit, series and parallel connection of thyristor, thyristor types
Week 10	controlled rectifier: single phase half wave rectifier (R, RL) load, freewheeling diode single phase full wave rectifier (RL)
Week 11&12	inverter : classification of inverter , single phase half wave inverter, single phase full bridge wave inverter
Week 13	Voltage controller: introduction to voltage controller, principle of ON-OFF control
Week 14&15	Choppers: introduction to chopper, basic classification of chopper, basic operation.
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to the lab tools which uses in the experiments.
Week 2 -3	**Thyristor** operation, **Thyristor** protection
Week 4&6	**Thyristor** applications
Week 7	Midterm exam
Week 8-9	controlled rectifier
Week 10 -12	Single phase inverter
Week 13 & 14	Chopper
Week 15	Final exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Power electronics devices, circuits, and applications by Muhammad H. Rashid	No
Recommended Texts	electronic-devices-9th-edition-by-floyd	Yes
Websites		

Grading Scheme
مخطط الدرجات

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

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

16.15 Syllabus Description Guide/Level#2/Semester#1/Signals & Systems

Module Information
معلومات المادة الدراسية

Module Title	**Signals and Systems**	**Module Delivery**	
Module Type	**Core**	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ATU11302		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		

Module Level		**Semester of Delivery**	1
Administering Department		**College**	NETC
Module Leader	Ahmad H. Hadi	**e-mail**	Coj.Ahmadhadi@atu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	1/10/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Objectives أهداف المادة الدراسية	1. Define the basics of signals in real-life. 2. Determine the circuit response to a periodic signal using the Fourier Series. Model linear time-invariant systems using convolution. 3. Describe how composite signals are used to determine the response of linear systems) 4. To understand the power and energy of signals. 5. Demonstrate what happens in the frequency domain when a continuous signal is sampled. 6. Design an anti-alias filter for a sampled data system. 7. Utilize the z-Transform to describe a discrete-time signal. 8. Understanding the representation signals using (Time/Frequency) domains
Module Learning Outcomes	1. Understand the main signal and recognize different types of signals and systems.

مخرجات التعلم للمادة الدراسية	2. Have the ability to Understand Signals operations. 3. Understanding the convolution and correlation operations. 4. Have the ability to design Filters. 5. Have the ability to representation of the signals in time/frequency-domains.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Signals and Systems. (6 hrs). 2. Fourier Series and Fourier Transform (6 hrs). 2. Filters (3 hrs). 3. Convolution and Correlation (6 hrs). 4. Noise (9 hrs). 6. Sampling (9 hrs). 7. Transmission lines (6 hrs).

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	78/15= 5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	72/15= 4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1-5	Signals and Systems, spectrum, and filters; Singularity functions; periodic signals and Fourier series; nonperiodic signals and Fourier transform. convolution and impulses system response and filters; correlation and spectral density; Parseval's theorem for energy signals
Week 6-8	Noise: Band-limited white noise; thermal noise; noise figure.
Week 9	Mid-term Exam
Week 10-12	Sampling: sampling theory and practice, aliasing.
Week 13-15	Transmission lines: characteristic impedance, reflection coefficient and standing waves
Week 16	**Final exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introducing laboratory equipment and their operation.
Week 2-3	Low pass filter and high pass filter (passive)
Week 4&5	Signals operations using RLC circuits and responses
Week 6&7	band pass filter and band reject filter
Week 8-9	Filter design: First order and second order filter design
Week 10	Midterm exam
Week 11-12	Oscillator's operation, Hartley oscillator, voltage control oscillator
Week 13	Signal analysis using oscilloscope
Week 14	sampling of signals circuits
Week 15	Aliasing proofing
Week 16	Final exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Introduction to Communication Systems" By F. G. Strelmer	No
Recommended Texts	Sanjay Sharma: "Communication Systems (Analog and Digital) T. R. Ganesh Babu, and G. Srinivasan: " Communication Theory and systems", 2006	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

16.16 Syllabus Description Guide/Level#2/Semester#1/Electromagnetic Static Fields

Module Information
معلومات المادة الدراسية

Module Title	**Electromagnetic Static Fields**	**Module Delivery**	
Module Type	**Core**	☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	ATU11303		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		
Module Level		**Semester of Delivery**	1
Administering Department		**College**	NETC
Module Leader	Ghufran Mahdi Hatem	**e-mail**	Coj.ghf@atu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Objectives أهداف المادة الدراسية	1. To provide a comprehensive understanding of the fundamental concepts and principles of electromagnetic fields. 2. To develop the ability to analyze and solve problems related to electromagnetic fields. 3. To enhance critical thinking skills in applying electromagnetic field theory to practical engineering applications. 4. To foster an appreciation for the importance of electromagnetic fields in various disciplines of engineering and science.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Explain the basic concepts and principles of electromagnetic fields. 2. Analyze and solve problems related to static and dynamic electric and magnetic fields. 3. Apply electromagnetic field theory to practical engineering applications. 4. Demonstrate an understanding of the interactions between electric and magnetic fields. 5. Evaluate and analyze electromagnetic wave propagation and transmission.

	6. Apply mathematical techniques, including vector calculus, in the analysis of electromagnetic fields.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Electromagnetic Fields a. Review of vector calculus and coordinate systems and transformation Between Coordinates and Dell operator b. Electric charge and Coulomb's law c. Electric field intensity and electric flux d. Gauss's law and its applications 2. Electric Fields in Materials a. Electric potential and voltage b. Conductors, insulators, and dielectrics c. Capacitance and capacitance calculations d. Poisson's and Laplace's equations

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

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

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	15% (15)	5 and 10	LO #1…….#16
	Assignments	2	15% (15)	2 and 12	LO #3, #4 and #6, #7
	Projects / Lab.	0	0%	-------	----------
	Report	2	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Electromagnetic Fields
Week 2	Vector definition- Scalars And Vectors and Vector Algebra
Week 3	The Cartesian Coordinate System - Vector Component And Unit Vectors - The Vector Field - Dot Product - Cross Product
Week 4	Cylindrical Coordinate - Spherical Coordinate
Week 5	Transformation Between Coordinates
Week 6	Del Operator - Laplacian Operator - Gradient - Divergence and Curl
Week 7	Coulomb law -Electric force
Week 8	Coulomb law - Electric field intensity - Field due to continuous volume charge - Field of line charge - Field of sheet charge
Week 9	Mid-term Exam
Week 10	Electric Flux Density
Week 11	Gauss Law - Application of Gauss Law - Maxwell First Equation.
Week 12	Energy and Potentials in A Moving Point Charge in An Electric Field
Week 13	Dielectric and Capacitance - Current and Current Density - Continuity of Current - Metallic Conductor
Week 14	Boundary Conditions - Image Theory -Semiconductor - Dielectric Materials – Capacitance
Week 15	Poisson's and Laplace's equations
Week 16	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	W.H. Hayt, and J.A. Buck, "Engineering Electromagnetics", McGraw-Hill, 2007.	Yes
Recommended Texts	1) David K. Cheng, "Fundamentals of Engineering Electromagnetics", Prentice Hall, 1993. 2) Matthew N.O. Sadiku, "Elements of Electromagnetics", 4th ed. Oxford, 2006.	Yes
Websites	https://empossible.net/academics/emp3302/	

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

16.17 Syllabus Description Guide/Level#2/Semester#1/Math. Modeling Systems

Module Information
معلومات المادة الدراسية

Module Title	**Mathematical Modeling Systems**	**Module Delivery**	
Module Type	**Basic**	☒ **Theory**	
Module Code	**ATU11304**	☒ **Lecture**	
ECTS Credits	**5**	☐ **Lab**	
SWL (hr/sem)	**125**	☒ **Tutorial**	
		☐ **Practical**	
		☐ **Seminar**	

Module Level		**Semester of Delivery**	1
Administering Department		**College**	NETC
Module Leader	Asaad. S. Daghal	**e-mail**	ad466kent@atu.edu.iq
Module Leader's Acad. Title	Assist. Prof.	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Objectives أهداف المادة الدراسية	1- To understand functions of multiple variables, limits, continuity, and partial derivatives. 2- To apply the chain rule, directional derivatives, and gradients. 3- To determine tangent planes, normal vectors, and extrema of functions in two variables. 4- To work with polar, cylindrical, and spherical coordinates. 5- To understand vectors in 3D space, including dot and cross products. 6- To evaluate double and triple integrals over various regions. 7- To apply convergence tests to infinite series. 8- To approximate functions with Maclaurin and Taylor polynomials. 9- To explore power series and their applications.
Module Learning Outcomes	1- Understanding functions of multiple variables 2- Computing partial derivatives 3- Applying the chain rule in multivariable calculus 4- Calculating directional derivatives and gradients of functions

مخرجات التعلم للمادة الدراسية	5- Determining tangent planes and normal vectors to surfaces 6- Finding maxima and minima of functions of two variables 7- Working with polar coordinates and graphing polar equations 8- Calculating areas and lengths in polar coordinates 9- Understanding conic sections and their representation in polar coordinates 10- Working in three-dimensional space 11- Understanding vectors, dot product, cross product, and their applications 12- Describing lines and planes using parametric equations 13- Understanding quadric surfaces and working with cylindrical and spherical coordinates 14- Evaluating double integrals over various regions 15- Calculating surface area and working with parametric surfaces 16- Computing triple integrals in different coordinate systems 17- Applying change of variables and understanding Jacobians in multiple integrals 18- Understanding sequences and series 19- Applying convergence tests and analyzing convergence properties 20- Approximating functions using Maclaurin and Taylor polynomials 21- Understanding power series and their convergence properties 22- Modeling with the Taylor series for various applications
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **1- Multivariable Calculus**: (25 h) • Functions of Two or More Variables • Limits and Continuity • Partial Derivatives • Directional Derivatives and Gradients • Tangent Planes and Normal Vectors **2- Optimization and Extrema**: (9 h) • Maxima and Minima of Functions of Two Variables • Lagrange Multipliers **3- Coordinate Systems and Vectors**: (25 h) • Polar Coordinates • Cylindrical and Spherical Coordinates • Matrices and Determinants • Vectors in Three-Dimensional Space • Dot Product and Cross Product **4- Multiple Integrals**: (25 h) • Double Integrals • Triple Integrals • Change of Variables in Multiple Integrals • Surface Area and Volume Calculations **5- Infinite Series and Sequences**: (25 h) • Convergence and Divergence • Taylor and Maclaurin Series • Power Series • Applications of Taylor Series
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	A) Use the following Learning, Teaching, and Assessment strategies Learning Strategies: • Encourage students to actively engage with the material through problem-solving, discussions, and group activities.

	• Use visual aids like graphs, diagrams, and interactive simulations to help students grasp complex concepts in multivariable calculus and vector calculus. • Connect calculus concepts to real-world scenarios to demonstrate their practical relevance and enhance understanding. • Conduct engaging lectures that involve student participation, discussions, and demonstrations to keep students actively involved. • Incorporate hands-on activities, such as working with software tools for graphing or numerical calculations, to reinforce learning. • Assign challenging problems that require critical thinking and problem-solving skills, promoting a deeper understanding of the material. • Use formative assessments like quizzes, homework assignments, and in-class exercises to provide feedback and monitor student progress. • Present case studies or application problems that require students to apply calculus concepts to analyze and solve real-world problems. • Incorporate peer evaluation in group activities or projects to promote collaboration and peer learning. By incorporating these strategies into the learning and teaching process, students can develop a solid understanding of advanced calculus topics and enhance their problem-solving skills in multivariable calculus, vector calculus, and series expansions.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

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

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Functions of Two or More Variables, Limits and Continuity, Partial Derivatives
Week 2	The Chain Rule, Directional Derivatives and Gradients.
Week 3	Tangent Planes and Normal Vectors, Maxima and Minima of Functions of Two Variables,

	Lagrange Multipliers.
Week 4	Polar Coordinates, Graphing Polar Coordinate Equations, Areas and Lengths in Polar Coordinates
Week 5	Conic Sections, Conics in Polar Coordinates
Week 6	THREE-DIMENSIONAL SPACE; VECTORS: Rectangular Coordinates in 3-Space
Week 7	Spheres; Cylindrical Surfaces, Vectors, The Dot Product, The Cross Product
Week 8	Parametric Equations of Lines, Planes in 3-Space, Quadric Surfaces, Cylindrical and Spherical Coordinates
Week 9	MULTIPLE INTEGRALS: Double Integrals, Double Integrals over Nonrectangular Regions,
Week 10	Double Integrals in Polar Coordinates, Surface Area; Parametric Surfaces
Week 11	Triple Integrals, Triple Integrals in Cylindrical and Spherical Coordinates, Change of Variables in Multiple Integrals; Jacobians
Week 12	INFINITE SERIES: Sequences, Monotone Sequences, Infinite Series, Convergence Tests
Week 13	The Comparison, Ratio, and Root Tests, Alternating Series; Absolute and Conditional Convergence
Week 14	Maclaurin and Taylor Polynomials, Maclaurin and Taylor Series; Power Series
Week 15	Convergence of Taylor Series, Differentiating and Integrating Power Series; Modeling with Taylor Series
Week 16	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Thomas' Calculus 14th edition	Yes
Recommended Texts	Calculus 10th edition by Anton , Bivens , and Davis	Yes
Websites	https://www.lboro.ac.uk/departments/mlsc/student-resources/helm-workbooks/	

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

16.18 Syllabus Description Guide/Level#2/Semester#1/Digital Circuits Design

Module Information
معلومات المادة الدراسية

Module Title	**Digital Circuits Design**	**Module Delivery**	
Module Type	**Core**	☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ATU11305		
ECTS Credits	**6**		
SWL (hr/sem)	**150**		

Module Level		**Semester of Delivery**	1
Administering Department		**College**	NETC
Module Leader	Huda Hussein Abed	**e-mail**	eng.huda2020@atu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Objectives أهداف المادة الدراسية	1. Explain the concepts of sequential logic circuits. 2. Describe the difference between NAND and NOR latch. 3. Explain the operation of S-R, D, J-K, and T flip-flops. 4. Create the excitation table and characteristic equation for the flip-flops. 5. Design asynchronous counters and draw the timing diagram for them. 6. Define the modulus number for the counter. 7. Design synchronous counters and draw the timing diagram for them. 8. Explain the concepts of the shift register. 9. Implement the logic circuits of the multiplexer, demultiplexer, encoder, and decoder using logic gates.
Module Learning Outcomes	1. Describe the difference between combinational logic circuits and sequential logic circuits. 2. Explain the operation of the S-R latch.

مخرجات التعلم للمادة الدراسية	3. Identify the difference between a positive and a negative edge-triggered flip-flop. 4. Describe the outputs of a given flip-flop. 5. Explain the difference between asynchronous and synchronous counters. 6. Draw the timing diagram for the counters. 7. Design various types of counters according to the given requirement. 8. Write the modulus of the given counter and the entire count sequence. 9. Define the concept for cascading counters. 10. Explain the operation of a multiplexer and a demultiplexer. 11. Explain the operation of an encoder and a decoder.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Concept of sequential logic circuits and flip-flops Define the sequential logic circuits, explain the operation of the S-R latch, determine the Q waveform for the NOR and NAND latch, define the flip-flop, explain the S-R, D, J-K, and T flip-flops, determine the Q output waveforms of the S-R, D, J-K, and T flip-flops, create the excitation table and characteristic equation for the flip- flops. [1-4 w] Part B – Counters Explain the operation of an asynchronous counter, design an asynchronous counter using J-K, D, and T flip-flops, draw the timing diagram for an asynchronous counter., define the modulus number for the counter, explain propagation delays in ripple counters, find the count sequence for the asynchronous counter with a truncated sequence, design of synchronous counters using J-K, T, and D flip-flops, analysis of synchronous counter to find the complete count sequence, create the timing diagram for the synchronous counter, describe the concept of cascading the counters, and explain the operation of a Johnson and Ring counters. [1-7 weeks] Part C – Shift Registers Describe the operation of four types of shift registers (SISO, SIPO, PISO, and PIPO), explain how data bits are entered into a shift register, and explain how data bits are taken out of a shift register. [1 week] Part D – Analysis and Design combinational logic circuits Implement 2:1, 4:1, and 8:1 multiplexers using logic gates, design higher order multiplexers using lower order multiplexers, implement logic functions using multiplexers, implement 1:2, 1:4, and 1:8 demultiplexers using logic gates, design higher order demultiplexers using lower order demultiplexers, describe the decimal-to-BCD encoder and the octal-to-binary encoder, explain the purpose of the priority feature in the binary encoders, describe the BCD-to-decimal decoder and the binary-to-octal decoder, and implement 2-to-4-line decoder with active low enable input using logic gates. [1-3 weeks]
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	• Interactive lecturing style, with opportunities for questions. • Encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. • Interactive simulation for the logic circuits. • Make tutorial questions for formative feedback. • Assessments related to students' answers are delivered with scientific comments.
Student Workload (SWL)	

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.8
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - Define the sequential logic circuits, and explain the operation of the S-R latch.
Week 2	Define the flip-flop, explain the operation of the S-R & D flip-flops, and determine the Q output waveforms of the S-R & D flip-flops.
Week 3	Explain the operation of J-K & T flip-flops, determine the Q output waveforms of the J-K & T flip-flops, and distinguish between synchronous and asynchronous inputs of the flip-flop.
Week 4	Create the excitation table of flip-flops, and derive the characteristic equation of the flip-flops.
Week 5	Design an asynchronous up binary counter using J-K flip-flops, design an asynchronous down binary counter using J-K flip-flops, and draw the timing diagram for an asynchronous counter.
Week 6	Describe the operation of an asynchronous up/down counter, define the modulus number for the counter, design a mod-10 asynchronous counter, and explain propagation delays in ripple counters.
Week 7	Design an asynchronous counter using D & T flip-flops, find the count sequence for the asynchronous counter with a truncated sequence, and explain the concept of frequency division.
Week 8	Mid-term Exam + Design of synchronous counters using J-K, T, and D flip-flops.
Week 9	Analysis of the synchronous counter to find the complete count sequence, create the timing diagram for the synchronous counter, and design a synchronous Up/Down counter.

Week 10	Design a synchronous decade counter, design a synchronous counter with the irregular count sequences, and describe the concept of cascading the counters.
Week 11	Explain the operation of a Johnson counter, draw the timing diagram for a Johnson counter, explain the operation of a ring counter, and draw the timing diagram for a Ring counter.
Week 12	Describe the operation of four types of shift registers (SISO, SIPO, PISO, and PIPO), explain how data bits are entered into a shift register, and explain how data bits are taken out of a shift register.
Week 13	Explain the basic operation of a multiplexer, implement 2:1, 4:1, and 8:1 multiplexers using logic gates, and design higher order multiplexers using lower order multiplexers.
Week 14	Implement logic functions using multiplexers, explain the basic operation of a demultiplexer, implement 1:2, 1:4, and 1:8 demultiplexers using logic gates, and design higher order demultiplexers using lower order demultiplexers.
Week 15	Describe the decimal-to-BCD encoder and the octal-to-binary encoder, explain the purpose of the priority feature in the binary encoders, describe the BCD-to-decimal decoder and the binary-to-octal decoder, and implement a 2-to-4-line decoder with active low enable input using logic gates.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Implement the S-R latch using NOR gates & NAND gates.
Week 2	Lab 2: Construct S-R, and D flip-flops using logic gates.
Week 3	Lab 3: Construct J-K, and T flip-flops using logic gates.
Week 4	Lab 4: illustrate the effect of asynchronous inputs on the output of the J-K & D flip-flops
Week 5	Lab 5: Design an asynchronous up binary counter using J-K flip-flops.
Week 6	Lab 6: Design an asynchronous down binary counter using J-K flip-flops.
Week 7	Lab 7: Design a 4-bit synchronous counter using J-K flip-flops.
Week 8	Lab 8: Design a synchronous decade counter using J-K flip-flops.
Week 9	Lab 9: Design a Mod-8 Johnson counter using J-K flip-flops.
Week 10	Lab 10: Design a Mod-4 Ring counter using J-K flip-flops.
Week 11	Lab 11: Implement SISO shift register using J-K flip-flops.
Week 12	Lab 12: Implement a 4:1 multiplexer using logic gates.
Week 13	Lab 13: Implement a 1:4 demultiplexer using logic gates.
Week 14	Lab 14: Design a 4 to 2 encoder using logic gates.
Week 15	Lab 15: Design a 2-to-4-line decoder using logic gates.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	1. G. K. Kharate, "Digital Electronics" Oxford university press, 7th edition, ISBN 13: 978-0-19-806183-0, 2013. 2. Thomas L. Floyd, "Digital Fundamentals" Pearson Education, 11th edition, ISBN 10: 1-292-07598-8, 2015.	NO Yes

	3. T. Ndjountche "Digital Electronics 1", John Wiley & Sons, 1st edition, ISBN 978-1-84821-984-7, 2016. 4. N. S. Widmer, G. L. Moss, R. J. Tocci, "Digital Systems Principles and Applications", Pearson Education Limited e, 12th edition, ISBN 978-0-134-22013-0, 2017. 5. Shuqin Lou, Chunling Yang, "Digital Electronic Circuits" Science Press, 4th edition, ISBN 978-3-11-061466-4, 2019.	Yes Yes NO
Recommended Texts	1. A. SAHA, and N. MANNA, "Digital Principles and Logic Design" Infinity science press LLC, ISBN: 978-1-934015-03-2, 2007. 2. M. M. Mano, and M. D. Ciletti "Digital Design" Pearson Education , 5th edition , ISBN-13: 978-0-13-277420-8, 2013.. 3. M. Rafiquzzaman, "Fundamentals of Digital Logic and Microcontrollers" John Wiley & Sons, Inc., 6th edition, ISBN 978-1-118-85579-9, 2014. 4. D. P. Kothari, and J. S. Dhillon "digital circuits and design" Pearson education, ISBN 978-93-325-4353-9, 2015. 5. Ata Elahi, "Computer Systems", Springer, ISBN 978-3-319-66774-4, 2018.	Yes Yes Yes No NO
Websites	https://www.allaboutcircuits.com/textbook/digital/ https://www.circuit-diagram.org/editor/ https://circuitverse.org/simulator	

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

16.19 Syllabus Description Guide/Level#2/Semester#1/Visual Basic

Module Information معلومات المادة الدراسية					
Module Title	**Visual basics**			**Module Delivery**	
Module Type	Basic			☒ **Theory** ☒ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ATU11306				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level			**Semester of Delivery**	1	
Administering Department			**College**	NETC	
Module Leader	Alia abduhussien Lafta		**e-mail**	Coj.alia@atu.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Nasir Hussein Selman		**e-mail**	Coj.nas@atu.edu.iq	
Scientific Committee Approval Date	01/10/2024		**Version Number**	1.0	

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

odule Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Explain the concepts of visual basic . 2. Describe the difference between loop and jumping instruction. 3. Explain the operation of all loop instruction.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Have will be able to be completed a basic computer literacy course (e.g., CIS100, BIT1150, INFS1010) or receive permission of instructor 2. Be self-motivated 3. Be computer savvy and feel VERY comfortable getting around on the computer

	4. Have the ability to troubleshoot their own computer problems 5. Any computer programming experience is helpful but not necessary.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Concept of visual basics Course Introduction • The Visual Basic Interface • Variables, Constants and Calculations • Decision Making • The IDE Debugger Part B – visual basics programming _Menus, Subprocedures and Functions • Creating Object-Oriented Programs • Lists, Looping and Printing • Arrays and Structures -

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	• Interactive lecturing style, with opportunities for questions. • Encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. • Interactive simulation for the logic circuits. • Make tutorial questions for formative feedback. • Assessments related to students' answers are delivered with scientific comments.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

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

Module Evaluation

تقييم المادة الدراسية

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

Total assessment	100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Identify Visual Basic components
Week 2	Identify Visual Basic instructions
Week 3	Understand Object-Oriented Programming
Week 4	Organize application development
Week 5	Design and create forms
Week 6	Build Menus
Week 7	Program using decision statements and loops
Week 8	Mid-term Exam
Week 9	Follow Visual Basic application development steps
Week 10	Code Global, Module, and Form level events, procedures, variables, and constants
Week 11	Identify Visual Basic data handling
Week 12	Use the Debug Tool
Week 13	Develop menu item, Help button, and context sensitive Help
Week 14	Preparing for final exam global review process
Week 15	Final exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	i)Study of VB environment with following details: Textbox, Label, Combo, List
Week 2	i)Study of VB environment with following details: Check boxand Option Buttons Form and their Types
Week 3	Design of Forms to perform mathematical operations: Addition,
Week 4	Subtraction,
Week 5	Multiplication
Week 6	Divisions using Text box, Labels, Command buttons
Week 7	Lab 7: exam
Week 8	Design of Forms to perform following operations: Use of Date, Time and Mathematical functions using Text box,
Week 9	Labels, Combo box, Command buttons
Week 10	To find the simple interest
Week 11	To find the greatest numbers among three numbers
Week 12	To find the greatest and smallest among a list of numbers
Week 13	To calculate the sum of N numbers
Week 14	To check whether a given number is even or odd
Week 15	Lab 15: Design a 2-to-4-line decoder using logic gates.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	. Columbia Guide to Online Style by Janice R. Walker and Todd Taylor	Yes
Recommended Texts	Columbia Guide to Online Style by Janice R. Walker and Todd Taylor	Yes
Websites	https://www.macmillanlearning.com/college/us/online/cite6.html	

Grading Scheme

مخطط الدرجات

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

16.20 Syllabus Description Guide/Level#2/Semester#2/Computer2

Module Information معلومات المادة الدراسية					
Module Title	**Computer2**			**Module Delivery**	
Module Type	**Basic**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ATU222				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level			**Semester of Delivery**	2	
Administering Department			**College**	NETC	
Module Leader	Salim Mohsen Wadi		**e-mail**	coj.sal@atu.edu.iq	
Module Leader's Acad. Title	Assistant Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Nasir Hussein Selman		**e-mail**	Coj.nas@atu.edu.iq	
Scientific Committee Approval Date	01/10/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. Training students on the basics of using the computer and providing them with the necessary skills to deal with the computer with high efficiency. 2. Assisting the student in distinguishing and developing his scientific and artistic abilities. 3. Enriching the student's skills to be able to deal with the computer with high efficiency. 4. Providing students with a way to use other modern technologies related to the educational process.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The computer course introduces students to the fundamentals of computer hardware and software. Additional topics covered are mobile devices, Linux, macOS, virtualization and cloud computing, as well as expanded information about Microsoft Windows operating systems, security, networking, troubleshooting, and the responsibilities of an IT professional. By the end of the course, students will be able to:

	1. Describe the internal components of a computer and assemble a computer. 2. Install and understand computer and mobile device operating systems. 3. Connect to the internet and share resources in a networked environment. 4. Secure SOHO networks, operating systems, and data. • Troubleshoot using system tools and diagnostic software.
Indicative Contents المحتويات الإرشادية	Personal Computer. PC Components. Computer Disassembly. Assemble the Computer. Boot the Computer. Electrical Power. Advanced Computer Functionality. Computer Configuration. Protecting the Environment. Preventive Maintenance. Troubleshooting Process. Network Components and Types. Networking Protocols, Standards, and Services. Network Devices. Network Cables. Device to Network Connection. Basic Troubleshooting Process for Networks. Characteristics of Laptops and Other Mobile Devices. Laptop Configuration. Laptop Hardware and Component Installation and Configuration. Other Mobile Device Hardware Overview. Network Connectivity and Email. Preventive Maintenance for Laptops and other Mobile Devices. Basic Troubleshooting Process for Laptops and other Mobile Devices. Common Printer Features. Printer Type Comparison. Installing and Configuring Printers. Sharing Printers. Maintaining and Troubleshooting Printers. Virtualization. Cloud Computing. Modern Operating Systems. Disk Management. Install Windows. Windows Desktop and File Explorer. Configure Windows with Control Panels. System Administration. Command-Line Tools. Windows Networking. 6 Common Preventive Maintenance Techniques for Operating Systems. Basic Troubleshooting Process for Windows Operating Systems. Mobile Operating Systems. Methods for Securing Mobile Devices. Linux and macOS Operating Systems. Basic Troubleshooting Process for Other Operating Systems. Security Threats. Security Procedures. Securing Windows Workstations. Wireless Security. Basic Troubleshooting Process for Security. Communication Skills and the IT Professional. Operational Procedures. Ethical and Legal Considerations. Call Center Technicians.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

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

Module Evaluation

تقييم المادة الدراسية

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

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

16.21 Syllabus Description Guide/Level#2/Semester#2/Differential Equations

Module Information معلومات المادة الدراسية					
Module Title	**Differential Equations**			**Module Delivery**	
Module Type	**Basic**			☒ Theory ☐ Lecture ☐ Lab ☒ Tutorial ☐ Practical ☐ Seminar	
Module Code	**ATU11408**				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level			**Semester of Delivery**	2	
Administering Department			**College**	NETC	
Module Leader	Asaad. S. Daghal		**e-mail**	ad466kent@atu.edu.iq	
Module Leader's Acad. Title	Assist. Prof.		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Nasir Hussein Selman		**e-mail**	Coj.nas@atu.edu.iq	
Scientific Committee Approval Date	01/10/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. **Understanding Transform Theory**: o To provide students with a comprehensive understanding of Fourier series and Fourier transforms, enabling them to analyze and represent both periodic and aperiodic functions in the frequency domain. 2. **Application of Fourier Analysis**: o To equip students with the skills to apply Fourier analysis to solve practical problems in signal processing, communications, and other related fields, including the use of convolution in system analysis. 3. **Differential Equations Fundamentals**: o To introduce students to the fundamental concepts of ordinary differential equations (ODEs), including first-order and second-order equations, and to develop their ability to classify and solve these equations using appropriate techniques. 4. **Analytical Techniques for ODEs**:

	o To teach students various analytical methods for solving first-order and second-order ordinary differential equations, including separation of variables, integrating factors, and the method of undetermined coefficients. 5. **Complex Problem Solving**: o To enhance students' problem-solving abilities by applying complex methods, such as variation of parameters, to find particular solutions of non-homogeneous differential equations. 6. **Real-World Applications**: o To emphasize the importance of differential equations in engineering and applied sciences by exploring their applications in modeling real-world phenomena, such as mechanical vibrations and electrical circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**1: Fourier Series** • **Learning Outcome**: Students will be able to represent periodic functions using Fourier series and calculate the Fourier coefficients for given functions, identifying even and odd properties. **2: Fourier Transform** • **Learning Outcome**: Students will understand the concept of the Fourier transform and its application to aperiodic functions, including the ability to compute the Fourier transform and its inverse for various functions. **3: Properties of Fourier Transforms** • **Learning Outcome**: Students will demonstrate knowledge of the key properties of Fourier transforms, including linearity, time and frequency shifting, and the convolution theorem. **4: Convolution Theorem and Fourier Integral** • **Learning Outcome**: Students will be able to apply the convolution theorem in signal processing and compute Fourier integrals for non-periodic functions, linking them to their Fourier transforms. **5: First Order Ordinary Differential Equations** • **Learning Outcome**: Students will solve first-order ordinary differential equations using various methods such as separation of variables, exact equations, and integrating factors, differentiating between homogeneous and non-homogeneous cases. **6: Second Order Ordinary Differential Equations** • **Learning Outcome**: Students will analyze and solve second-order ordinary differential equations, including homogeneous equations with

	constant coefficients, using methods such as characteristic equations, undetermined coefficients, and variation of parameters. These outcomes provide a structured approach to learning, allowing students to build on their knowledge each week.
Indicative Contents المحتويات الإرشادية	- Fourier transform - Ordinary differential equation - Bernoulli equation - High order differential equations

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	1. **Interactive Lectures**: o Use multimedia presentations and real-world examples to introduce key concepts of Fourier series, Fourier transforms, and differential equations. o Encourage student participation through questions and discussions to reinforce understanding. 2. **Problem-Based Learning**: o Assign practical problems that require the application of Fourier analysis and differential equation techniques. o Facilitate group work where students collaborate to solve complex problems, fostering teamwork and critical thinking. 3. **Hands-On Workshops**: o Organize workshops where students can use software tools (e.g., MATLAB, Python) to visualize Fourier transforms and solve differential equations. o Provide guided practice sessions to help students build confidence in applying mathematical methods. 4. **Flipped Classroom**: o Encourage students to review lecture materials and video tutorials at home, allowing class time to be dedicated to problem-solving and collaborative discussions. o Provide online resources and forums for students to ask questions and engage with peers outside of class. 5. **Case Studies and Applications**: o Present case studies that demonstrate the real-world applications of Fourier analysis and differential equations in engineering and science. o Invite guest speakers from industry to share their experiences and the relevance of these concepts in practical scenarios. 6. **Regular Assessments and Feedback**: o Implement formative assessments (quizzes, homework) to gauge student understanding and provide timely feedback. o Use peer review and self-assessment strategies to encourage reflection on learning progress and areas for improvement.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.2
Unstructured SWL (h/sem)	112	**Unstructured SWL (h/w)**	7.5

الحمل الدراسي غير المنتظم للطالب خلال الفصل		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 and 10	LO #1, #2 and #10, #11
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Homework	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Transform Theory; Fourier series; periodic function; even and odd functions
Week 2	Fourier transform; aperiodic functions; properties.
Week 3	Convolution theorem; Fourier Integral.
Week 4	Ordinary differential equation of first order: - basic concepts in differential equations; variable separable
Week 5	Equation's reducible to separable form
Week 6	Homogenous equations and non-homogenous equations
Week 7	Exact differential equations;
Week 8	Non exact differential equations; integrating factor
Week 9	linear first order differential equations
Week 10	Bernoulli equation
Week 11	Ordinary differential equations of second order: - homogenous linear second order; homogeneous with constant coefficients; roots of characteristics equations,'initial condition and boundary condition
Week 12	Non homogeneous second order differential equations; complex methods for obtaining particular solutions (undetermined coefficients);
Week 13	Variation of parameters method;

Week 14	High order differential equations: - basic concepts; solution of high order characteristics equation.
Week 15	Applications of Differential Equations
Week 16	**Final Exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Thomas' Calculus 14th edition	Yes
Recommended Texts	Calculus 10th edition by Anton , Bivens , and Davis	Yes
Websites	https://www.lboro.ac.uk/departments/mlsc/student-resources/helm-workbooks/	

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

16.22 Syllabus Description Guide/Level#2/Semester#2/Baath Party Crimes

Module Information
معلومات المادة الدراسية

Module Title	Baath Party crimes	**Module Delivery**	
Module Type	Suplement	☒ Theory ☐ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	ATUU211		
ECTS Credits	2		
SWL (hr/sem)	50		

Module Level		**Semester of Delivery**	2
Administering Department		**College**	NETC
Module Leader	Hyder Abd Al-Jaleel	**e-mail**	
Module Leader's Acad. Title	Assistant professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

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

Strategies	- المحاضرة والمشاركة. - المناقشة والحوار. - العصف الذهني. - كتابة التقارير عن الموضوع. - السؤال والجواب

Student Workload (SWL)
الحمل الدراسي للطالب

Structured SWL (hr/sem) (SSWL) الحمل الدراسي المنتظم للطالب خلال الفصل	18	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	18/15 =1.2
Unstructured SWL (hr/sem)(USSWL) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	32/15=2.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	المنهج الدراسي المقر للجامعات الحكومية والأهلية كافة كتاب وزارة التعليم والبحث العلمي ذي العدد (ت م /3 7588 في 19/10/2023)	
Recommended Texts		
Websites		

GRADING SCHEME

مخطط الدرجات

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

Module Information

معلومات المادة الدراسية

Module Title	**Analog communication**	**Module Delivery**	
Module Type	**Core**	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	ATU11410		
ECTS Credits	7		
SWL (hr/sem)	125		

Module Level	UGII	**Semester of Delivery**	2
Administering Department		**College**	1
Module Leader	Ahmad H. Hadi	**e-mail**	Coj.Ahmadhadi@atu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	1/10/2024	**Version Number**	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Objectives أهداف المادة الدراسية	1. To define the main terms of the analog communication systems. 2. To introduce the concept of modulation. 3. To learn the types of modulation techniques.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understanding the parameters of the analog communication system. 2. Recognizing the differences between modulation types. 3. Define the interaction between message signal and carrier signal. 4. Define the theory behind the generation of each modulation type. 5. Understanding the reaction between signals and noise.
Indicative Contents المحتويات الإرشادية	1. Modulation. 2. Amplitude modulation 3. Frequency modulation 4. Analog pulse modulation

Learning and Teaching Strategies

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6.5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1-2	Modulation: Linear modulation, double-sideband modulation AM and DSB modulators and transmitters; SSB and VSB; frequency conversion; detection and receivers; frequency division multiplexing.
Week 3-6	Amplitude modulation: the AM transmission: the AM spectrum; power considerations; phasor representation; AM modulators; another AM transmitter, Application of AM Systems.

Week 7-10	Frequency modulation: fundamental concepts; Frequency modulation: the FM spectrum; phasor representation; narrowband FM; broadband FM; FM generation; FM transmitter; interference and noise; the PM spectrum PM/FM transmitter.
Week 11	Mid – Term Exam.
Week 12-13	Noise in CW modulation: system models and parameters; interference noise in linear modulation; noise in exponential modulation; comparison of CW modulation system
Week 14-15	Pulse modulation: Analog pulse modulation; PAM, PDM and PPM, pulse-code modulation PCM, DM, and DPCM; time-division multiplexing
Week 16	**Final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1-2	Am modulation
Week 3	Design Amplitude modulation circuit by Student.
Week 4	Am demodulation
Week 5	Design Amplitude demodulation circuit by Student.
Week 6	Phase Locked Loop (PLL)
Week 7-9	FM modulation using different circuits (CD4046, 555 timer, 565 …etc)
Week 10	FM demodulation
Week 11	Midterm exam
Week 12-15	PM modulation (PAM, PDM and PPM)
Week 16	**Final exam**

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	1- Introduction to Communication Systems By F. G. Strelmer	Yes
Recommended Texts	1- Analog communication textbook by sanjay sharma. 2-Modern digital and analog communication systems by B. P. Lathi & Zhi Ding	No
Websites		

Grading Scheme

مخطط الدرجات

Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group	**A -** Excellent	امتياز	90 - 100	Outstanding Performance

(50 - 100)	**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

16.24 Syllabus Description Guide/Level#2/Semester#2/Integrated Electronic Circuits

Module Information
معلومات المادة الدراسية

Module Title	Integrated electronic circuits	**Module Delivery**	
Module Type	C	☒ Theory ☐ Lecture ☒ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	ATU11411		
ECTS Credits	7		
SWL (hr/sem)	175		

Module Level	UGII	**Semester of Delivery**	2
Administering Department		**College**	NETC
Module Leader	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Objectives أهداف المادة الدراسية	1. Understanding of Integrated Circuits. 2. To Define types of Integrated Circuits. 3. To Know the application on integrated Circuits. 4. To understand the design of integrated Circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Enabling student to know the concepts of IC 2. learning the type of IC. 3. Enabling student to know about the Construction of IC. 4. Enabling student to design Many application of IC. 5. Understand the basic operation of some types of IC 6. Enabling student to Select the suitable IC for the applications
Indicative Contents المحتويات الإرشادية	• introduction to IC • Working with Power point • Theoretical lectures • Lab.

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم	
Strategies	different styles of discussion that aim to connect the theoretical and practical sides. Asking questions and giving exercises that require analysis and conclusions related to lectures. Encourage students to participate in discussions and do the practical work. Encourage students to work in groups..

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا

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	97	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1-2	Introduction to Integrated Circuits, Types of integrated circuits, Analog Integrated Circuits, digital integrated circuits, Programmable Integrated Circuits, Integrated Circuit Applications, Advantages of integrated circuits, Future trends in integrated circuit technology
Week 3-10	operational amplifier, applications (linear and non-linear applications): inverting, noninverting, voltage follower, adder, subtractor, integrator and differential, comparator, zero crossing detector, voltage bounding, log and antilog, Analog to Digital Converters, Digital to Analog Converters, active filters design (Butterworth filter).
Week 11-12	Feedback Amplifier, Oscillators: Positive feedback and oscillation, Stability of Oscillation, Oscillators using OP-AMP: Phase-shift Oscillator, Wien Bridge Oscillator, Hartley Oscillator, Crystal Oscillator.
Week 13-15	Timing circuits 555 timer applications, 555 timer as a mono stable multivibrator and a bistable multivibrator
Week 16	Final Exam

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1 &2	Op-Amp Voltage Followers and Noninverting Amplifiers, Inverting Amplifiers
Week 3 &4	Summing and Difference Amplifiers
Week 5	Differentiator and integrator
Week 6 &7	Lowpass, Bandpass and High pass active Filters
Week 8	Midterm exam
Week 9 &10	Analog to Digital Converters, Digital to Analog converters
Week 11 & 12	Different Oscillators
Week 13 & 14	555 IC Operating as Astable Multivibrator, 555 IC Operating as Bistable Multivibrator, 555 IC Operating as Monostable Multivibrator
Week 15	Final exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Electronic Devices and Circuit Theory", Robert Boylestad, Louis Nashelsky, 10th Edition , 2009.	Yes
Recommended Texts	electronic-devices-9th-edition-by-floyd	Yes
Websites		

Grading Scheme
مخطط الدرجات

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

16.25 Syllabus Description Guide/Level#2/Semester#2/English2

Module Information معلومات المادة الدراسية					
Module Title	**English2**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☒ **Lecture**	
Module Code	ATUU113				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level			**Semester of Delivery**	2	
Administering Department			**College**	NETC	
Module Leader	Mohammed Salim		**e-mail**	E-mail	
Module Leader's Acad. Title	Asst. Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Nasir Hussein Selman		**e-mail**	Coj.nas@atu.edu.iq	
Scientific Committee Approval Date	01/10/2024		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1-The aim of this course is to provide English learners with integrated language skills such as reading, listening and writing resulting in a level of basic language knowledge. 2-This course will focus on grammar rules, basic word knowledge and usage, reading comprehension, reading out of the lesson, and Paragraph writing. 3- A student may be able to listen to native speakers and speak English Language. 4- A student may be able to write and have creativity in his writing.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Uses expressions of Quantity in elementary level of English. 2- Constructs sentences in Present Perfect Tense, Simple Future Tense and Going to Future Tense both in an oral and written task. 3- Defines basic Modals and employ them in elementary level of communication and writing skills. 4- Translates sentences in elementary level from English to another language.

	5- Interprets the texts written in elementary level of English.
Indicative Contents المحتويات الإرشادية	**Language** is a rule-governed behavior. It is defined as the comprehension and/or use of a spoken (i.e., listening and speaking), written (i.e., reading and writing), and/or **other communication symbol system** (e.g., American Sign Language). **Spoken and written language** are composed of receptive (i.e., listening and reading) and expressive (i.e., speaking and writing) components. Spoken language, written language, and their associated components (i.e., receptive and expressive) are each a synergistic system comprised of individual language domains (i.e., phonology, morphology, syntax, semantics, pragmatics) that form a dynamic integrative whole **Phonology** study of the speech sound (i.e., phoneme) system of a language, including the rules for combining and using phonemes. **Morphology** study of the rules that govern how morphemes, the minimal meaningful units of language, are used in a language. **Syntax** the rules that pertain to the ways in which words can be combined to form sentences in a language. **Semantics** the meaning of words and combinations of words in a language.

Learning and Teaching Strategies
استراتيجيات التعلم والتعليم

Strategies	1- Uses the available material to increase his efficiency. 2- Constructs sentences in Present Perfect Tense, Simple Future Tense and Going to Future Tense both in an oral and written task. 3-Defines basic Modals and employ them in elementary level of communication and writing skills. 4- Develop and enhance students' language skills to communicate in English properly. 5- Interprets the texts written in elementary level of English.

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

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	18	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	1.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation
تقييم المادة الدراسية

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

	Projects /Siminar	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Headway book for learning English	Yes
Recommended Texts	Skills in writing and Learning English	No
Websites	https://www.bbc.co.uk/learningenglish/	

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

16.26 Syllabus Description Guide/Level#2/Semester#2/Arabic Language2

Module Information
معلومات المادة الدراسية

Module Title	**Arabic language**	**Module Delivery**	
Module Type	**Suplement**	☒ **Theory** ☒ **Lecture**	
Module Code	**ATUU112**		
ECTS Credits	**2**		
SWL (hr/sem)	**50**		
Module Level		**Semester of Delivery**	2
Administering Department		**College**	NETC
Module Leader		**e-mail**	
Module Leader's Acad. Title		**Module Leader's Qualification**	
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Nasir Hussein Selman	**e-mail**	Coj.nas@atu.edu.iq
Scientific Committee Approval Date	01/10/2024	**Version Number**	1.0

Relation With Other Modules
العلاقة مع المواد الدراسية الأخرى

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

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

Module Aims أهداف المادة الدراسية	1. تعريف الطلبة اهم المفاتيح الاساس في التعامل بلغة عربية فصيحة خالية من اي الأخطاء. 2. رفع القدرات التعبيرية للطالب، ومساعدتهم على استخدام العبارة المناسبة بشكل صحيح وواضح. 3. تدريب الطلبة على التنظيم المنطقي للأفكار باللغة العربية الفصحى. 4. جعل الطلبة قادرين على اكتساب خزين لغوي من الكلمات والتعابير الفصيحة.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. تعلم اساليب اللغة العربية . 2. استخدام علامات الترقيم أثناء الكتابة. 3. تعلم كيفية تحليل النصوص الأدبية. 4. التدريب على القراءة الواضحة والالقاء.
Indicative Contents المحتويات الإرشادية	1. توضيح أهمية اللغة العربية وفوائدها للطلبة من غير اختصاص اللغة العربية. 2. تفسير بعض الايات القرآنية 3. تحليل بعض القصائد العربية. 4. قواعد اللغة العربية وأهميتها.

	5. الأسماء، أنواعها، الضمائر 6. النكرة والمعرفة. 7. اعراب بعض الايات القرآنية، الابيات الشعرية. 8. علامات الترقيم واهميتها في اللغة العربية. 9. شرح موضوع العدد ، وماهي اقسامه.
.10	
Strategies	.المحاضرة والمشاركة - .المناقشة والحوار - .العصف الذهني - .كتابة التقارير عن الموضوع - - السؤال والجواب

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (hr/sem) (SSWL) الحمل الدراسي المنتظم للطالب خلال الفصل	18	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	18/15 =1.2
Unstructured SWL (hr/sem)(USSWL) الحمل الدراسي غير المنتظم للطالب خلال الفصل	32	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	32/15=2.1
Total SWL (hr/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

Module Evaluation

تقييم المادة الدراسية

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

GRADING SCHEME

مخطط الدرجات

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