Ministry of Higher Education and Scientific Research

Department Assurance Quality and accreditation Academic

Academic Program Description Guide

MODULE DESCRIPTION

2025−2026

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 (Bologna), 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 academic program provides a brief summary of its vision, mission and objectives, including an accurate description of the targeted learning outcomes according to specific learning strategies.

Course Description: Provides a brief summary of the most important characteristics of the course and the learning outcomes expected of the 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 (Bologna), 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. That is, describe all classroom and extra-curricular activities to achieve the learning outcomes of the program.

Academic Program Description Form

University Name: University .... Southern Technical University.....

Faculty/Institute: Institute ..... Maysan Technical Engineering College.....

Scientific Department: Department of .....Engineering of electromechanical Systems techniques.....

Academic or Vocational Program Name: Bachelor of Electromechanical Technology .....

Final Certificate Name: Bachelor of Electromechanical Technology Engineering.....

Academic System: Bologna

Description Date: 5/10/2025

File Filling Date: 14/02/2026

Signature :

Scientific Associate Name: Dr. Jawad Jayoul Saadoun

Signature :

Head of department: Prof. Dr. Wael Hussein Zayer

Check the file before

Division of Quality Assurance and University Performance

Name of the Director of the Quality Assurance and University Performance Division: Alaa Qasim Mohammed

Date:

Signature:

Approval of the Dean

الكلية التقنية الهندسية / ميسان
مكتب العميد

1. Program Vision

This academic description of the program provides a brief summary of the most important characteristics of the program and the learning outcomes expected of the student to achieve, proving whether he has made the most of the available opportunities accompanied by a description of each course within the program to form a scientific or human base in the field of maintenance, programming and operation of electromechanical devices and systems and seeks to **prepare plans for the development of staff and curricula to ensure that the requirements of quality standards and academic accreditation are met, in addition to keeping pace with development and ready-made applications in order to contribute By achieving part of it, and that the department be a distinguished scientific research edifice in its programs, curricula and scientific research.**

2. Program Mission

The department seeks to prepare and graduate a specialized staff at a high level of scientific competence and leading leadership in their work, sciences and literature and in developing the knowledge balance in the field of scientific research to serve the local, regional and international community, as well as training and refining the minds of students scientifically and cognitively and emphasizing social and cultural values for the purpose of dealing with modern systems and technologies within the field of specialization. And work to provide appropriate opportunities to develop the capabilities of the community in investing the development in technology and the need of the labor market and meet their needs in the field of electronic and software systems and provide training advisory services.

3. Program Objectives

1- Graduating highly qualified engineers in the field of electromechanical engineering who are able to develop their skills in Engineering Knowledge Areas Maintenance of electromechanical equipment and systems.

2- **Ability to understand and solve problems** In the field of applications and specialized electromechanical systems and in the design of and programming and the use of organs relevant to the jurisdiction.

3- Providing the department with teachers and researchers and providing government institutions and the private sector Qualified engineers in the field of specialization.

4- **Participate in the preparation of designs Electromechanical systems.**

4. **Program Accreditation**
There isn't any

5. **Other external influences**
1- Application + research projects + continuous workshops for students 2- Also, external influences contribute to solving many dilemmas related to approved studies 3- The needs of the labor market, the quality of graduates and the support of students' skills

6. **Program Structure**				
Reviews*	**Percentage**	**Unit of study**	**Number of Courses**	**Program Structure**
Specialty+ Assistant + General	30% 35% 35%	60 Count 60 Count 60 Count	10 First stage 11Third stage 11Third stage	**Requirements of the institution**
		For one month for the second phase For one month for the third stage		**Summer Training**
				Other

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

7. Program Description

1-First year –first semester 2025-2026

Notes	Fundamental or optional	ECTS	Hours			Subjects	
			SWL	USSWL	SSWL		

English	Specialized	9	225	86	139	Fundamentals of Electrical Engineering	1
English	Specialized	9	225	116	109	Engineering Materials	2
English	help	7	175	81	94	Mathematics	3
Arabic	General	3	75	11	64	Computer 1fundamentals /	4
Arabic	General	2	50	17	33	Human Rights and Democracy	5
		30	750	311	439	Sum	

2-First year –Second semester 2025-2026

Notes	Fundamental or optional	ECTS	Hours			Subject	
			SWL	USSWL	SSWL		
English	Specialized	9	225	116	109	Electronic physics	1
English	Specialized	7	175	81	94	Engineering Mechanics	2
English	Specialized	6	150	40	110	Engineering and electrical drawing	3
English	Help	2	50	16	34	English language / 1	4
English	Specialized	6	150	56	94	workshops	5
		30	750	309	441	Sum	

3-Second year –first semester 2025-2026

Notes	Fundamental or optional	ECTS	Hours			Subject	
			SWL	USSWL	SSWL		

English	**Specialized**	7	175	66	109	Electrical Machines	**1**
English	**Specialized**	7	175	66	109	Thermodynamic and fluid	**2**
English	**Specialized**	7	175	51	124	Electrical and Electronic Circuits	**3**
English	**help**	4	100	21	79	Advance Mathematics	**4**
Arabic	**help**	3	75	26	49	Fundamentals of computer/2	**5**
Arabic	**help**	2	50	17	33	The crimes of the Baath regime in Iraq	**6**
		30	**750**	247	503	**Sum**	

4-Second year –Second semester 2025-2026

Notes	**Fundamental or optional**	**ECTS**	**Hours**			**Subject**	
			SWL	**USSWL**	**SSWL**		
English	**Specialized**	7	175	66	109	Electrical devices and measurements	**1**
English	**Specialized**	8	200	91	109	Electronics	**2**
English	**Specialized**	8	200	91	109	Strength of Materials	**3**
English	**help**	5	125	46	79	Advanced Programming	**4**
English	**General**	2	50	16	34	English Language/2	**5**
		30	**750**	310	440	**Sum**	

5-Third year –first semester 2025-2026

Notes		**ECTS**	**Hours**		

	Fundamental or optional		SWL	USSWL	SSWL	Subject	
English	Specialized	7	175	51	124	Electric Power Systems	1
English	Specialized	7	175	51	124	Heat transfer and Hydraulic systems	2
English	Specialized	5	125	31	94	Communications	3
English	help	5	125	62	36	Engineering and Numerical Analysis	4
English	Specialized	6	051	41	109	Vibration Theory	5
		30	750	623	451	Sum	

6-Third year –Second semester 2025-2026

Notes	Fundamental or opional	ECTS	Hours			Subject	
			SWL	USSWL	SSWL		
English	Specialized	.007	751	15	241	Synchronous and special Machines	1
English	Specialized	6.00	150	41	109	Control Systems Theory	2
English	Specialized	4.00	100	22	78	Industrial Engineering	3
English	Specialized	4.00	100	22	78	Electromechanical designs	4
English	Specialized	.007	751	15	241	Theory of Machines	5
Arabic	General	2.00	50	17	33	Arabic Language/1	6
		30	750	204	546	Sum	

Number of hours for three years = 83 Percentage of theoretical hours = 56.4% Total
Number of working hours for four years = 64 Percentage of working hours = 43.6%

7. Expected learning outcomes of the program	
Knowledge	
	A1- Definition of the concept of electromechanical A2- Definition of the elements of hardware design for electromechanical systems A3- Introducing the basics of engineering design in the field of specialization **A4- The student's knowledge of digital and logical circuits, communications and their areas of implementation.** **A5- The student's knowledge of the labor market and industries.** **A6- The student's knowledge of how to conduct laboratory experiments and how to analyze and apply the results.**
Skills	
	B1 - Exercises and examples specific to the subject B2 - Explain the methods of solving problems in detail B3 - Analysis and explanation of the vocabulary of the course in detail B4- The use of modern means in the delivery of the vocabulary of the study material
Values	
	A1- Involving the graduate in the labor market and spreading the spirit of honest competition. C2- Competition among the students of the stage for the purpose of completing higher university studies. C3- The ability to analyze, deduce and practice professional ethics in all circumstances. C4- Working under pressure, adopting equality and justice, and working as a member of the same team.

8. Teaching and Learning Strategies

- Education Strategies:

Education strategies are the methods and methods followed by the professor in communicating the educational goals of students, and the following are some of the teaching strategies:

1- **Lecture or delivery** strategy: in which the professor provides information and facts to students and other ideas related to the topic at hand.

2- **Discussion strategy:** In this type of education strategy, the professor determines the topic to be discussed in the lecture

3- **Problem solving strategy**: In this strategy, the cognitive environment of students is activated, through problem-solving activities, through most of the positive processes and activities that stimulate thinking and raise motivation to learn.

4- **Project-based learning strategy**: This strategy relies on design work that requires applied work, as students are assigned an applied project for the activity, so they are forced to search, read and use books and all knowledge sources in order to accomplish the required.

-Learning Strategies:

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

9. Evaluation methods

- Daily surprise exam and homework assessment
- Written Semester Exam
- Study Reports
- Class Participations and Discussions
- Daily Attendance Assessment
- Small Business Valuation

10. Faculty

Faculty Members

Preparation of the teaching staff		Special requirements/skills (if applicable)		Specialization		Academic Rank
lecturer	angel			special	year	
	angel		**Delivering awareness lectures**	**Refractories**	**Mechanical**	**1- Prof. Mahmoud Aziz Mohamed**

	angel		**Holding workshops and seminars**	**Control and computers**	**electricity**	**2- Prof. Wael Hussein Zayer**
	angel			**Capacity & Machinery**	**electricity**	**3-Assoc. Prof. Ahmed Thamer Radi**
	angel			**Applied Mechanics**	**Mechanical**	**4- Assoc. Prof. Jawad Karam Customer**
	angel			**law**	law	**Dr. Khairy Berri**
	angel			mathematics	mathematics	**Eng. Raed Khalid**
	angel			**Refractories**	Mechanical	Mr. Waleed Khalaf
	angel			**Applied Mechanics**	Mechanical	Prof. Ali Taha Mohammed
lecturer				Control and computers	Computer Science	**Dr. Mustafa Sadek**
lecturer					Mechanical	**Eng. Hussain Rahim**
lecturer				Capacity & Machinery	electricity	**A.M. d. Sadeq Da'ir**
lecturer				**Capacity & Machinery**	**electricity**	**5-M.M. Wissam Rahim**
lecturer				Capacity & Machinery	electricity	**Eng. Fatima Yassin**
lecturer				Air conditioning and refrigeration	Mechanical	**Eng. Ahmed Rahma Mikhilf**
lecturer					Mechanical	**Prof. Asaad Kazem Akal**
lecturer					electricity	**A.M. d. Thaer Abd El , Rahim**
lecturer				soldering	Mechanical	**Eng. Hussein Karim Abdel Zahra**

Professional Development
Mentoring new faculty members
1- Holding workshops, seminars and seminars for developments in the field of electromechanics and information technology for reliability. 2- Involve them in courses to develop administrative skills, time management and smart skills. 3- Keeping up with and following up the implementation of the government program and entry.
Professional development of faculty members
The focus in the Department of Electromechanical Techniques in general is on continuous improvement, as the department always seeks to improve the scientific and administrative process and overcome all the difficulties and obstacles that hinder the educational program through the development of human resources for personal development. **The following procedures illustrate the steps implemented or in the process of being implemented in this area:** **D1. Continuous improvement and development of faculty members through training programs and workshops inside and outside the department and the university.** **D2. Increase extracurricular activities such as holding conferences, scientific seminars, personal creations, and sports locally, regionally, and internationally.** **D3. Encouraging faculty members to obtain the highest scientific and administrative ranks through promotions.** **D4. Providing modern scientific sources and books for the department's library to keep pace with continuous progress.**

10. **Acceptance Criterion**
- Central acceptance by the Ministry (biological + applied) - Top 10% of technical institutes of the corresponding scientific departments

11.	**The most important sources of information about the program**

• The curriculum approved by the Ministry of Higher Education and Scientific Research and its guides.
• Decisions and recommendations of the scientific committees at the Southern Technical University.
• Courses in teaching methods.
• Course descriptions.
• Courses in civil society organizations.
• Conferences, seminars , workshops and seminars.
• Relevant state institutions.
• Internet research for similar experiments .
• Personal experiences.
• Labor market needs.

12.	Program Development Plan

Developing engineering education and building an electromechanical technical engineer by building a development system based on:
- Modern and contemporary curricula
- Simulation of technical engineering education quality curricula
- Relying on the international academic program taking into account local specificity
- Studying the need of the labor market for electromechanical disciplines and their various branches

- Opening branches specialized in the field of measurement and control, maintenance of networks and according to the needs of the labor market.

- Use and development of comprehensive virtual laboratories.

Program Skills Outline														
Please tick the boxes corresponding to the individual learning outcomes from the progra														
Learning outcomes required from the program														
Values				Skills				Knowledge				fundamental Or optional	Course Name	Cou
C4	C3	C2	C1	B4	B3	B2	B1	A4	A3	A2	A1			
√	√	√	√	√	√	√	√		√	√	√	Specialized	Fundamentals of Electrical Engineering	ST
√	√	√	√	√	√	√	√		√	√	√	Specialized	Engineering Materials	STU
√	√	√	√		√		√	√	√	√	√	help	Mathematics	ST
√	√	√	√	√	√	√	√	√	√	√	√	General	Computer fundamentals /1	ST
√	√	√	√	√	√	√	√	√	√	√	√	General	Human Rights and Democracy	ST
√	√	√	√	√	√	√	√		√	√	√	Specialized	Electronic physics	STU
√	√	√	√	√	√	√	√		√	√	√	Specialized	Engineering Mechanics	ST
√	√	√	√	√	√	√	√		√	√	√	Specialized	Engineering and electrical drawing	ST
√	√	√	√		√		√	√	√	√	√	Help	English language / 1	ST
√	√	√	√	√	√	√	√		√	√	√	Specialized	workshops	ST
√	√	√	√	√	√	√	√		√	√	√	Specialized	Electronics	ST
√	√	√	√	√	√	√	√	√	√	√	√	Specialized	DC circuits	ST
√	√	√	√	√	√	√	√		√	√	√	Specialized	Electrical Instruments and Measurements	ST
√	√	√	√	√	√	√	√	√	√	√	√	General	Computer Fundamentals	ST
√	√	√	√		√		√	√	√	√	√	Help	Math	ST
√	√	√	√	√	√	√	√		√	√	√	Specialized	Electrical Machinery / DC	ST
√	√	√	√	√	√	√		√	√	√	√	Specialized	Thermodynamics	STU

√	√			√	√	√	√	√	√	√	√	Specialized	Material resistance	STU 243
√		√	√		√	√	√		√	√	√	Specialized	Advanced Programming	STU
	√	√	√		√	√	√		√	√	√	General	Crimes of the defunct Baath Party	STU
√		√	√			√	√		√	√	√	General	English Language	STU
√	√	√	√	√	√	√	√		√	√	√	Specialized	Electrical Power Systems	ST
	√	√	√		√	√	√		√	√	√	Specialized	Synchronous and special machines	ST
√	√	√	√		√	√	√		√	√	√	Specialized	Control theory and vibrations	ST
√	√	√	√	√	√	√	√		√	√	√	Specialized	Communications	ST
√	√	√	√	√	√	√	√	√	√	√	√	Specialized	Industrial Engineering	ST
√	√	√	√		√		√	√	√	√	√	Specialized	Heat transfer, hydraulic systems	ST
√	√	√	√	√	√	√			√	√	√	Specialized	Electromechanical designs	ST
√	√	√	√		√	√	√	√	√	√	√	Help	Engineering and numerical analyses	ST
√	√				√	√	√	√	√	√	√	General	English Language	ST
√		√	√		√	√	√		√	√	√	Specialized	Machine theory	ST
√	√	√	√	√	√	√	√		√	√	√	Specialized	Power & Driving Electronics	ST
√	√	√	√	√	√	√	√		√	√	√	Specialized	Microprocessors and controllers	ST
√	√	√	√	√	√	√	√	√	√	√	√	Specialized	Signals & Systems	ST

√	√	√	√	√	√	√	√		√	√	√	Specialized	Control and automation	ST
√	√	√	√	√	√	√	√	√	√	√	√	Specialized	Electromechanical devices	ST
√	√	√	√		√		√	√	√	√	√	Specialized	Computer aided design and manufacturing	ST
√	√	√	√	√	√	√			√	√	√	Specialized	Air Conditioning & Refrigeration Systems	ST
	√	√	√		√	√	√		√	√	√	General	English Language	ST

- **Please tick the boxes corresponding to the individual learning outcomes of the program subject to the program.**

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Electronic Physics			**Module Delivery**	
Module Type	**Core**			**Theory** **Lecture** **Lab**	
Module Code	STUMETC 121				
ECTS Credits	**7**				
SWL (hr/sem)	**175**				
Module Level	1		**Semester of Delivery**		2
Administering Department	ETE		**College**	METC	
Module Leader	Wael Hussein Zayer		**e-mail**	wael.zayer@stu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Ahmed thamer radhi		**e-mail**	Ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date	18/02/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 the fundamentals of structure of the atom, orbitals in the atom, energy levels connectivity, semiconductors. 2. To have knowledge about the physics of semiconductor materials. 3. To understand the characteristics and theories in semiconductor materials in terms of crystal structures, charge carriers and energy bands. 4. To describe crystalline structures of semiconductors. describe band structures of semiconductors. 5. To explain the properties of n-type and p-type semiconductors.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the structure of the atom, orbitals in the atom, energy levels. To understand contributory, conductivity, semiconductors. 2. Understand doping, equivalence , diffraction and diffusion , conductors, insulators and semiconductors, connectivity. 3. Understand the structure of PN junction:, the properties of the junction, the operation of diodes in electrical circuits. 4. Learn junction applications like zener diode, half wave rectifier and full wave rectifier filters. 5. Understand the transistor specifications. 6. Recognize saturation and cutoff in the transistor. 7. Understand the operation of transistor as a switch. 8. Understand the operation of transistor as an amplifier. 9. Understand the operation of FET transistor. 10. Understand the operation of JFET transistor and JFET Properties. 11. Understand the circuit analysis of JFET. 12. Understand the properties and circuit analysis of MOS-FET transistor. 13. Understand the operation of FET transistor as an amplifier. 14. Understand the operation of FET transistor as switch.

Indicative Contents المحتويات الإرشادية	semiconductors: 1. structure of the atom, orbitals in the atom, - energy levels 2. Contributory and Contributory Links - Conductivity, semiconductors. [7] doping, equivalence -Diffraction and diffusion -Conductors, insulators and semiconductors -connectivity. [7] PN junction: open circuit connection -Bias joint. Pn -The properties of the junction. V-I Diodes in electrical circuits- junction applications- Dual types- Zener diode. Half wave rectifier and full wave rectifier -Filters. [14] three-way transistor- The controlled source- Triple connection- Transistor specifications- saturation and cutoff in the transistor- transistor as a switch- transistor as an amplifier. [28] FET transistor- Voltage controlled power source- JFET transistor- JFET properties- Circuit Analysis of JFET- MOS-FET transistor- properties and circuit analysis- FET transistor as an amplifier- FET transistor as a switch. [42]

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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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	5% (5)	5 and 10	LO #1, #2 and #12, #13
	Assignments	2	5% (5)	4 and 8	LO #3 and #6
	Project	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #3, #8 and #9
	Lab reports and Lab exam	15, 1	15% (15)	1-15, 8	LO #1-15, LO #1-8
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #8
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	semiconductors: - structure of the atom, orbitals in the atom, - energy levels - Contributory and Contributory Links - Conductivity, semiconductors
Week 2	doping, equivalence -Diffraction and diffusion -Conductors, insulators and semiconductors - Connectivity
Week 3	PN junction: open circuit connection -Bias joint. Pn -The properties of the junction. V-I Diodes in electrical circuits
Week 4	junction applications Dual types. Zener diode. Half wave rectifier and full wave rectifier Filters
Week 5	three-way transistor The controlled source Triple connection. Transistor specifications

Week 6	saturation and cutoff in the transistor
Week 7	transistor as a switch
Week 8	transistor as an amplifier
Week 9	FET transistor Voltage controlled power source
Week 10	JFET transistor JFET Properties
Week 11	JFET circuit analysis
Week 12	MOS-FET transistor Properties and circuit analysis
Week 13	FET transistor as an amplifier
Week 14	FET transistor as a switch
Week 15	Application examples

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	**Characteristics Diode**
Week 2	**Half wave rectifier**
Week 3	**Full wave rectifier**
Week 4	**Clipper Circuit**
Week 5	**Clamper Circuit**
Week 6	**Voltage Multipliers**
Week 7	**Other Diode applications (AND circuit)**
Week 8	**Other Diode applications (OR circuit)**
Week 9	**Zener Diode characteristics**
Week 10	**Zener regulator**
Week 11	**BJT characteristics**
Week 12	**FET characteristics**

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Electronics for Physicists: An Introduction (Undergraduate Lecture Notes in Physics) 1st ed. 2020 Edition by Bryan H. Suits	No
Recommended Texts	fundamental of physics by F.Bush	No
Websites	No	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Engineering and electrical Drawing	**Module Delivery**	
Module Type	Basic	**Theory** **Lecture** **Practical**	
Module Code	STUMETC 123		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	**Semester of Delivery**	2
Administering Department	ETE	**College**	METC
Module Leader	Ala'a	**e-mail**	Ala'a.qasim@stu.edu.iq
Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**	Asst.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Ahmed Thamer Radi	**e-mail**	ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**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 manual drafting and dimensioning of views 2- To perform lines drawing, simple sketches and modify dimensions. 3- This course deals with the basic concept of electrical drawing. 4- To understand sections and isometrics. 5- Explains the principles of orthographic views 6- To understand multi view projection. 7- To understand sectional view drawing
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Recognize drawing paper Specification and Kinds of Lines 2- Understand the first angle projection and third angle projection 3- Explain multi view projection and views Distributions. 4- Drawing of side view and drawing of top view . 5- Dimensioning of Drawing and Full Section 6- Understand half Section and offset Section 7- Explain partial section 8- To understand electrical drawing
Indicative Contents المحتويات الإرشادية	Drawing Paper Specification, Kinds of Lines, First Angle Projection [21 hrs] Third Angle Projection, Multi View Projection, Views Distributions [21 hrs] Drawing of Side View, Drawing of Top View, Dimensioning of Drawing, Full Section, Half Section, Offset Section [21 hrs] Partial Section, Pictorial Drawing, Isometric Drawing [21 hrs] Electrical Drawing , Electrical Symbols, Electronic Symbols [21 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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	110	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	40	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
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	20% (10)	5 and 8	LO #1, #2 and #5, #6
	Assignments	2	20% (10)	4 and 14	LO #3 and #8
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي

	Material Covered
Week 1	Drawing Paper Specification
Week 2	Kinds of Lines
Week 3	First Angle Projection
Week 4	Third Angle Projection
Week 5	Multi View Projection
Week 6	Views Distributions
Week 7	Drawing of Side View, Drawing of Top View
Week 8	Dimensioning of Drawing, Full Section
Week 9	Half Section, Offset Section
Week 10	Partial Section
Week 11	Pictorial Drawing
Week 12	Isometric Drawing
Week 13	Electrical Drawing
Week 14	Electrical Symbols
Week 15	Electronic Symbols

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Drawing . assistant professor Abed Alrassol AL-Khfaf , UOT , 1990 Electrical Drawing, J. C. Cluley , 1979	No

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Engineering materials			**Module Delivery**	
Module Type	Core			**Theory** **Lecture** **Lab**	
Module Code	STUMETC112				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level		1	**Semester of Delivery**		1
Administering Department		ETE	**College**	METC	
Module Leader	Jawad Kareem Zbun		**e-mail**	jawad.kareem@stu.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		Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date		18/02/2025	**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. 2. It provides a working knowledge of Material Science. 3. Illustration and discussion the principles of Material structure-selection and description. To select a material for a given use based on considerations of cost and performance. 4. To be able to create a new material that will have some desirable properties. 5. To understand the limits of materials and the change of their properties with use.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. 2. An understanding of Dimensions and units of measurement. 3. 4. List the various terms associated with Engineering Materials . 5. 6. Summarize what is meant by a basic of materials selection. 7. Discuss the structure, properties and application on of different materials. Describe atoms bonding. Define Crystal Structure. Identify the principle of solidification. 8. Discuss the various properties of semiconductors.. 9. Identify the properties of composite materials.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A –various Materials types , structure and behavior Theory Classification of Materials, Advanced materials, Atomic structure, Crystal structureDefects-types of defect-linear defect- Alloy applications- Types of Ceramics. [15 hrs] Ceramics, Types of Ceramics polymers, Polymers types and properties, Semiconductors, Composite materials phase. [15 hrs] diagram -Carbon steel diagram, Heat treatment , Quenching and Tempering. [10 hrs] Mechanical behavior for metals- elastic and plastic deformation, Mechanical behavior of polymers, Mechanical behavior of Ceramics, Mechanical behavior of Composite materials. [15 hrs] Revision problem classes [6 hrs] Part B –Properties of materials Hardness and other mechanical properties, Physical propertiese. [15 hrs] Thermal properties, Heat capacity, Thermal expansion, Thermal stresses. [7 hrs] Physical and electrical properties, Electrical conductivity of polymers and Ceramics. Semi conductivity Dielectrical properties [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluationتقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (5)	5 and 10	LO #1, #3 and #4, #5
	Assignments	2	5% (5)	3 and 8	LO #6 and #9
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Lab report and Lab exam	7, 1	15% (15)		
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	7	LO #1 - #7
	Final Exam	2.5 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction - Classification of Materials.
Week 2	Advanced materials – Atomic structure.
Week 3	Atoms bonding- Crystal structure.
Week 4	Defects-types of defect-linear defect-Principle of solidification.
Week 5	Alloy applications- Types of Ceramics.

Week 6	Polymers, Polymers types and properties.
Week 7	Semiconductors, Composite materials.
Week 8	Phase diagram -Carbon steel diagram.
Week 9	Heat treatment.
Week 10	Mechanical behavior for metals- elastic and plastic deformation .
Week 11	Mechanical behavior for Ceramics, Polymers and composite materials.
Week 12	Hardness and other mechanical properties
Week 13	Physical and electrical properties
Week 14	Electrical conductivity of polymers and Ceramics
Week 15	Thermal properties
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Rockwell Hardness tes
Week 2	Lab 2: Brinell Hardness test
Week 3	Lab 3: Vickers Hardness test
Week 4	Lab 4: Sample preparation for Microscopic examination
Week 5	Lab 5: ASTM GRAIN SIZE ANALYSIS
Week 6	Lab 6: Heat Treatment- Quenching and tempering
Week 7	Lab 7: Preparation and study of the Micro Structure of pure metals like Iron, Copper and Aluminum.

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Engineering Materials 1, An introduction to Their Propertiesand Applications, second edition, M. F. Ashby and D. R. H. Jones, Butterworth-Heinemann, Woburn, UK, 1996.	NO
Recommended Texts	Materials Science and Engineering – An introduction, sixth edition,John Wiley & Sons, Inc. 2004.	No
Websites	https://ftp.idu.ac.id/wp-content/uploads/ebook/tdg/TEKNOLOGI%20REKAYASA%20MATERIAL%20PERTAHANAN/Materials%20Science%20and%20Engineering%20An%20Introduction%20by%20William%20D.%20Callister,%20Jr.,%20David%20G.%20Rethwish%20(z-lib.org).pdf	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Engineering Mechanics			**Module Delivery**	
Module Type	Core			**Theory** **Lecture**	
Module Code	STUMETC 122				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		1	**Semester of Delivery**		2
Administering Department		ETE	**College**	METC	
Module Leader	Ahmed thamer radhi		**e-mail**	Ahmed.radhi@stu.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		Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date		18/02/2025	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 mechanics theory through the application of techniques. 2. 3. To understand force, resultant and vectors from a mechanical devices. 4. This course deals with the basic concept of statics and dynamics mechanics. This is the basic subject for all mechanics parts. 5. To understand force moment, equilibrium, centroid and moment of inertia problems. 6. To know about friction problems perform mechanics dynamics analysis.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. 2. 3. 4. Recognize how force resultant works in mechanic parts. 5. 6. 7. 8. Understand the moment associated with force resultant. 9. Explain what is the equilibrium. 10. Discuss the centroid and its types in mechanics. 11. Describe moment of inertia. Define truss concept. Identify the basic friction elements and their applications. Discuss the different types of loads. Discuss the terms of displacement, velocity . Explain the two dynamics. Identify how to find the dynamics components and analysis.

Indicative Contents المحتويات الإرشادية	Introduction to static. Scalar quantity, vector quantity ,standers units. Tow– Tow–dimensional force systems, rectangular components .Moment, principle of moment ,couple ,couple-force system Resultants .Three-dimensional force system, component forces for three dimensions .couple in three-dimensional force system, couple-force system in three-dimensional force system. Resultant in three –dimensional forces. Equilibrium, free body diagram. Structures ,analysis methods. Types of friction, types friction centroid.[10 hrs] Composite bodies &figures Moment of inertia-composite area. [10 hrs] Introductiontodynamic.Kinematicsofparticles,rectilinearmotion.Velocity,acceleration&motionlaws.Plane curvilinear motion(rectangularcoordinate(xy)).Projectilemotion.Planecurvilinearmotion(normal & tangential coordinates (n-1)).Plane curvilinear motion (polar coordinates (rϴ)).[10 hrs] Kinetics of particles, Newton's second law. Rectilinear motion. Curvilinear motion. Kinetics of particles, work power, Efficiency, principle of work & kinetic energy. Impulse & momentum [15 hrs]

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #6, #8
	Assignments	2	10% (10)	4 and 12	LO #3 and #6, #7
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	7	LO #1 - #7
	Final Exam	2.5 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to static. Scalar quantity, vector quantity, standers units. Tow– Tow– dimensional force systems, rectangular components.
Week 2	Moment, principle of moment,
Week 3	couple, couple -force system Resultants.
Week 4	Three-dimensional force system, component forces for three dimensions. couple in threedimensional force system, couple-force system in three-dimensional force system.
Week 5	Resultant in three –dimensional forces. Equilibrium, free body diagram.
Week 6	Structures, analysis methods.
Week 7	Centroid concept
Week 8	Composite bodies &figures Moment of inertia-composite area.
Week 9	Introduction to friction,.
Week 10	Introduction to dynamic. Kinematics of particles, rectilinear motion.
Week 11	Velocity, acceleration& motion laws. Plane curvilinear motion (rectangular coordinate(x-y)). Projectile motion.

Week 12	Plane curvilinear motion(normal & tangential coordinates (n-1)). Plane curvilinear motion(polar coordinates (r-Θ)).
Week 13	Kinetics of particles
Week 14	Newton's second law. Rectilinear motion. Curvilinear motion.
Week 15	Kinetics of particles, work power, Efficiency, principle of work& kinetic energy. Impulse & momentum

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering Mechanics,Volume1, Statics &Dynamics , Fifth Edition by J. L. Meriam & L. G. Kraige	No
Recommended Texts		
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**English language/1**	**Module Delivery**	
Module Type	Basic	**Theory** **Lecture**	
Module Code	STUMETC 124		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	**Semester of Delivery**	2
Administering Department	ETE	**College**	METC
Module Leader	Wael Hussein Zayer	**e-mail**	wael.zayer@stu.edu.iq
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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. Develop students skills in understanding the basic grammars of English. 2. Develop students' speaking skills in English. 3. Develop students' listening skills in English. 4. Develop students' reading skills in English. 5. Develop students' reading skills in English.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the rule of present simple, numbers as Vocabulary 2. Understand the usage of am / are / is, cities and countries as Vocabulary. 3. Understand the grammars of personal information, social expressions as Vocabulary . 4. Understand the grammars of possessives, word groups as Vocabular . 5. Understand the grammars of present simple, Countries and nationalities as Vocabulary. 6. Understand the grammars of present simple, Your day as Vocabulary. 7. Understand the grammars of Question words, Verb patterns 1, Adjectives as Vocabulary. 8. Understand the grammars of There is / are, places and things as Vocabulary. 9. Understand the grammars of Simple irregular, was/were, have, do, go as Vocabulary. 10. Understand the grammars of past simple, work, sports, and leisure as Vocabulary. 11. Understand the grammars of can / can't, requests, verbs as Vocabulary. 12. Understand the grammars of like / would like, some / any, in a restaurant as Vocabulary. 13. Understand the grammars of present continuous, opposite verbs as Vocabulary. 14. Understand the grammars of future plans, present continuous for future, transport and travel as Vocabulary.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. The grammars of present simple, am / are / is, personal information. Numbers, cities and countries, social expressions as Vocabulary. [12]. The grammars of possessives, present simple. Word groups, Countries and nationalities, your day as Vocabulary. [12]. The grammars of Question words, There is / are, Simple irregular, was/were . Verb patterns 1, adjectives, places and things, have, do, go as Vocabulary. [12]. The grammars of past simple, can / can't, like / would like, some / any. Work, sports, and leisure, verbs, in a restaurant as Vocabulary. [12]. The grammars of present continuous, future plans, present continuous for future. Opposite verbs, transport and travel as Vocabulary. [8].

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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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**	3	15% (10)	3, 8 and 12	LO #1and #5 and #11
	Assignments	3	15% (10)	4, 9 and 14	LO #3, #8 and #13
	Report	1	10% (10)	13	LO #4, #8 and #12
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Unit one : At a party Grammar: Present Simple Vocabulary: Numbers
Week 2	Unit two : Going sightseeing Grammar: am / are / is Vocabulary: Cities and countries
Week 3	Unit three: In a cafe Grammar: Personal information Vocabulary: Social expressions
Week 4	Unit four : In a chemist's Grammar: Possessives Vocabulary: Word groups
Week 5	Unit Five : In a post office Grammar: present simple Vocabulary: Countries and nationalities
Week 6	Unit six : In a railway station Grammar: present simple Vocabulary: Your day
Week 7	Unit seven : On the phone Grammar: Question words, Verb patterns 1 Vocabulary: Adjectives
Week 8	Unit eight : Personal questions Grammar: Questions and answers, There is / are Vocabulary: Places and things

Week 9	Unit nine : What's the matter? Grammar: Past Simple irregular, was/were Vocabulary: have, do, go
Week 10	Unit ten: What's the problem? Grammar: Past Simple 1 Vocabulary: Work, sports, and leisure
Week 11	Unit eleven: Grammar: can / can't, Requests Vocabulary: Verbs
Week 12	Unit twelve: Grammar: like / would like, some / any Vocabulary: In a restaurant
Week 13	Unit thirteen: Grammar: Present Continuous Vocabulary: Opposite verbs
Week 14	Unit fourteen: Grammar: Future plans, Present Continuous for future Vocabulary: Transport and travel
Week 15	assessment

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	New headway, Liz and John Soars, OXFORD	No
Recommended Texts	English Grammar in Use, 5th Edition by Raymond Murphy.	No
Websites	https://elt.oup.com/student/headway/beg/?cc=global&selLanguage=en	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Fundamentals of computer/1**			**Module Delivery**	
Module Type	basic			**Theory** **Lecture** **Lab**	
Module Code	STUMETC 114				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		1	**Semester of Delivery**		1
Administering Department		ETE	**College**	METC	
Module Leader	Ghadah Salim Khefi		**e-mail**	g.s.khefi@stu.edu.iq	
Module Leader's Acad. Title		Assist. Lecturer	**Module Leader's Qualification**		Asst.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date		18/02/2025	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 an understanding of the computer through the application of techniques 2. 2- To understand the work of the electronic computer and the possibility of dealing with it 3. Developing an understanding of the fundamental concepts of computer science, including programming, algorithms, data structures, computer architecture, operating systems, and networks. 4. Developing practical skills in software development, including programming, debugging, testing, and documentation. 5. Developing problem-solving skills, including the ability to analyze problems, design solutions, and implement them using appropriate programming languages and tools. 6. Developing an understanding of the ethical and social issues related to computing, including privacy, security, intellectual property, and the digital divide. 7. Developing an understanding of the role of computer science in society, including its impact on industry, government, healthcare, and education. 8. Developing an appreciation for the diversity of applications of computer science, including artificial intelligence, machine learning, robotics, and data science
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Discusses the basic components of a computer system, including hardware, software, and peripherals. 2. Understand basic computer programming concepts such as variables, loops, and conditionals 3. It discusses the basics of computer networking, including the different types of networks, network topologies, and network protocols. 4. Learn about common operating systems, such as Windows, Mac OS, and Linux, including their features, functions, and user interface 5. Learn to use popular productivity software, including word processing, spreadsheet, and presentation applications 6. Understand the importance of computer security and privacy, including risks associated with malware, viruses, and phishing 7. Develop basic troubleshooting skills, including identifying and resolving common hardware and software problems 8. Learn basic computer terms and concepts, including file management, data storage, and computer ethics 9. Familiarize learners with basic computer terms and concepts, such as file management, data storage, and computer ethics. 10. Learners understand different file formats, data storage options, and ethical considerations related to the use of computers and the Internet. 11. Learners understand how to protect their data and devices, including using antivirus software, firewalls, and strong passwords

	12. Learners have developed skills in creating, editing and formatting documents, spreadsheets and presentations.

Indicative Contents المحتويات الإرشادية	<u>Part A - Computer Basics</u> 1- Computer Basics includes, computer life cycle - computer generations - data and information - computer features - areas of use. Computer's components(10 hrs) 2- The physical parts of the computer - input devices - output devices - computer case Software entity - computer setup systems - personal computer features (8 hrs) 3- Part review (2hrs) <u>Part B-Computer security and software licenses</u> 4- Ethics of the electronic world - forms of transgression in the digital world - computer security - computer privacy - computer software licenses - types of licenses - intellectual property - types of electronic penetration (10hrs) 5- malicious programs Computer viruses - components of the virus - types of viruses - the most common security risk (8hrs) -Part review (2hrs) <u>Part C- Operating Systems</u> -Definition of operating system - Functions of the operating system - Objectives of the operating system - Classification of operating systems (10hrs) 6- Desktop Components - Start Menu - Taskbar - Notification Area - Folders and Files - Desktop Backgrounds - Control Panel – Help (8hrs) - Part review (2hrs)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	1. Start with the basics: Begin by introducing learners to the basic components of a computer system, including hardware, software, and peripherals. Use simple, easy-to-understand language and provide visual aids, such as diagrams and images, to help learners grasp the concepts. 2. Use a hands-on approach: Provide learners with opportunities to practice using computers and software applications. Use interactive activities, such as tutorials, quizzes, and games, to engage learners and reinforce their learning. 3. Provide clear instructions: Ensure that instructions are clear and easy to follow. Break down complex tasks into smaller, manageable steps and provide learners with clear guidance on how to complete each step. 4. Use real-world examples: Use real-world examples to illustrate the relevance and practical applications of computer technology. For example, show learners how to create a resume using word processing software or how to create a budget using a spreadsheet application.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Phases of the computer cycle, and its development
Week 2	Electronic computer, data Information and computer features
Week 3	Computer components and types of computers
Week 4	The physical parts of the computer, and the entity software
Week 5	computer setup systems and computer features
Week 6	Factors that must be taken into account when Buying a computer, and the ethics of the world electronic
Week 7	Forms of abuse in the digital world - Computer security and privacy the computer
Week 8	Computer software licenses and types Intellectual property licenses
Week 9	Hack email and its sources
Week 10	Malignant-Types - components
Week 11	Computer risks- Health - psychological - social
Week 12	Operating systems - concept - functions - goals

Week 13	Desktop background, control panel
Week 14	Mouse settings and controls Windows general exercises
Week 15	preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Word- Understanding the Word interface- Creating a new document - Saving and opening documents- Basic text editing and formatting
Week 2	Formatting Text- Font type, size, and color- Bold, italic, and underline- Alignment and indentation- Bullets and numbering
Week 3	Page Layout- Margins and orientation- Page size and breaks- Headers and footers - Page numbering
Week 4	Styles and Themes- Creating and modifying styles- Applying themes- Saving and sharing styles and themes
Week 5	Tables- Creating tables- Formatting tables- Merging and splitting cells- Calculating in tables
Week 6	Images and Graphics- Inserting images and graphics- Resizing and cropping images- Adding captions and alt text- Working with shapes and text boxes
Week 7	Document Collaboration- Sharing documents- Tracking changes- Reviewing and accepting changes- Adding comments
Week 8	Mail Merge- Creating a data source- Creating a mail merge document- Previewing and finishing the merge
Week 9	Templates- Using built-in templates- Creating custom templates- Saving and sharing templates - Applying templates
Week 10	Working with Long Documents- Using headings and subheadings- Creating a table of contents - Adding footnotes and endnotes- Creating an index
Week 11	Advanced Formatting- Using styles for formatting- Formatting page numbers and section breaks - Working with columns and breaks- Using line and page breaks
Week 12	Advanced Editing- Using find and replace- Using the thesaurus and dictionary- Creating and modifying autocorrect entries- Using the Clipboard and Smart Cut and Paste

Week 13	Macros and Automation- Recording and running macros- Customizing the Quick Access Toolbar and Ribbon- Using keyboard shortcuts- Automating tasks with Visual Basic for Applications (VBA)
Week 14	Advanced Topics- Creating and editing forms- Protecting documents with passwords and permissions- Using macros to automate tasks- Customizing Word options and settings

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	William Stallings, (2003), Computer Organization & Architecture, Sixth edition, Preson Education	Yes
Recommended Texts	1. "Computer Science Illuminated" by Nell Dale and John Lewis - .	No
Websites	1. GCF Global - Computer Basics: https://edu.gcfglobal.org/en/computerbasics/ 2. Digital Unite - Computer Basics: https://digitalunite.com/technology-guides/computerbasics	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Fundamentals of Electrical Engineering**	**Module Delivery**	
Module Type	**Core**	**Theory** **Lecture** **Lab** **Tutorial**	
Module Code	STUMETC 111		
ECTS Credits	**8**		
SWL (hr/sem)	**200**		
Module Level	1	**Semester of Delivery**	1
Administering Department	ETE	**College**	METC
Module Leader	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.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	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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	5- Learn the fundamentals and principles of electrical engineering. 6- Knowledge of electric circuit elements. 7- Analysis of electric circuits. 8- Electrical circuits theorems. 9- Calculations of currents, voltages and electrical power for DC and AC circuits 10- Analysis of resonance in AC circuits (Series and parallel resonance) 11- Analysis of Electromagnetic circuits

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Able to Recognize the Basic concepts of electrical circuits, elements and values. Understand Ohm's Law and Power , Efficiency , Energy definitions 2. Able to Recognize the resistors in series - voltage sources in series - Kirchhoff's voltage law - battery signal and voltage drop and UnderstandVoltage divider law internal resistance voltage sources voltage regulation 3. Able to Recognize the Parallel circuits: resistors in parallel - parallel networks - Kirchhoff's current law - bypass law - open circuits and short circuits. Understand series-parallel circuits, series-parallel networks. 4. Discuss the Stream sources: converting sources - approved and unaccredited sources and Current sources in series - Current sources in parallel – Limiters. 5. Describe Analysis methods: sub-stream method.Grid current method - node voltage method. 6. Identify the Arch circles. Understand Transform (delta-star) and (star-delta). 7. Discuss the Network theories: superposition theory - Thevenin theory Norton's theory . 1. Able to Recognize the theory of transfer of greatest ability and Melman's theory 2. Discuss the AC circuits and sinusoidal quantities. Understand Phase relations - average values and effective values - response (resistance - coil and capacitance) to voltage and alternating current - average power and power factor 3. Explain the Complex numbers: representation of complex numbers using the orthogonal system - the polar system - conversion between systems. Understand Arithmetic operations using complex numbers - converting electrical quantities from the system of time indication to the phase system. 4. Identify the AC circuits: Impedance - tolerance - phase diagram - Resistance and capacitance - regression response - inductive yield - capacitive yield - power and power factor. UnderstandSeries AC circuits - impedance and phase diagram -, R-L-C, R-C in series - voltage divider law - frequency response. 5. Explain the Parallel alternating current circuits - tolerance and phase diagram Understand R-L-C, R-C, and R-L circuits in parallel. 6. Able to Recognize the Circuits of inductors and reactive power - capacitor circuits. Understand Power triangle - P, Q, S power factor correction. 7. Able to Recognize the Magnetic circuits: magnetic field, field intensity, magnetic field strength. Understand Permeability coefficient, magnetic force, and hysteresis. 8. Able to Recognize the Magnetic circuits in series and parallel

Indicative Contents المحتويات الإرشادية	Part A -DC Circuit Basic concepts, introduction to electricalcircuits, elements and valuesof DC circuits, Ohm's Law - Power - Efficiency – EnergySeries circuit: resistors in series - voltage sources in series - Kirchhoff's voltage law - battery signal and voltage dropVoltage divider law internal resistance voltage sources voltage regulationParallel circuits: resistors in parallel - parallel networks - Kirchhoff's current law - bypass law - open circuits and short circuitsSeries-parallel circuits: series-parallel networks,Stream sources: converting sources - approved and unaccredited sourcesCurrent sources in series - Current sources in parallel - Limiters [36 hr] DC circuitsAnalysis methods I –sub-stream methodGrid current method - node voltage method Arch circles,Transform (delta-star) and (star-delta). [18hrs] Network theories: superposition theory - Thevenin theory, Norton's theory, the theory of transfer of greatest ability ,Melman's theory. [36 hr] Part B - AC Circuits AC Circuits II - AC circuits and sinusoidal quantities Phase relations - average values, effective values - response (resistance - coil and capacitance) to voltage, alternating current - average power and power factor. [18hrs] Complex numbers: representation of complex numbers using the orthogonal system - the polar system - conversion between systemsArithmetic operations using complex numbers - converting electrical quantities from the system of time indication to the phase system. [18hrs] AC circuits:Impedance - tolerance - phase diagram - Resistance and capacitance - regression response - inductive yield - capacitive yield - power and power factor Series AC circuits - impedance and phase diagram -, R-L-C, R-C in series - voltage divider law - frequency responseParallel alternating current circuits – tolerance, and phase diagramR-L-C, R-C, and R-L circuits in parallel. [18 hr] Current bypass law - series circuits - alternating parallel - series and parallel circuits Power in alternating current circuits: resistance circuits - apparent power Circuits of inductors and reactive power-capacitor circuits Power triangle - P, Q, S power factor correction [18 hr] Magnetic circuits: magnetic field, field intensity, magnetic field strengthPermeability coefficient, magnetic force, hysteresisMagnetic circuits in series and parallel [18 hr]

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	139	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	9
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (10)	5 and 12	LO #1, #3 and # 6, #8
	Assignments	2	5% (10)	8 and 14	LO #4 and #9, #13
	Projects	1	5% (10)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Lab Reports and Lap Exam	15, 1	15%(15)	1-15,8	LO #1- #15, LO #1- #8
Summative assessment	**Midterm Exam**	1.5hr	10% (10)	8	LO #1 - #7
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Basic concepts andintroduction to electricalcircuits, elements, and valuesDC circuitsOhm's Law - Power - Efficiency - Energy
Week 2	Series circuit: resistors in series - voltage sources in series - Kirchoff's voltage law - battery signal and voltage dropVoltage divider law internal resistance voltage sources voltage regulation
Week 3	Parallel circuits: resistors in parallel - parallel networks - Kirchoff's current law - bypass law - open circuits and short circuitsSeries-parallel circuits: series-parallel networks,
Week 4	Stream sources: converting sources - approved and unaccredited sources, Current sources in series - Current sources in parallel - Limiters
Week 5	Analysis methods: sub-stream methodGrid current method - node voltage method
Week 6	Arch circles, Transform (delta-star) and (star-delta).
Week 7	Network theories: superposition theory - Thevenin theoryNorton's theory - the theory of transfer of greatest ability
Week 8	Melman's theory ,AC circuits and sinusoidal quantities
Week 9	Phase relations - average values and effective values - response (resistance - coil and capacitance) to voltage and alternating current - average power and power factorComplex numbers: representation of complex numbers using the orthogonal system - the polar system - conversion between systems
Week 10	Arithmetic operations using complex numbers - converting electrical quantities from the system of time indication to the phase systemAC circuits:Impedance - tolerance - phase diagram - Resistance and capacitance - regression response - inductive yield - capacitive yield - power and power factor
Week 11	Series AC circuits - impedance and phase diagram -, R-L-C, R-C in series - voltage divider law - frequency responseParallel alternating current circuits - tolerance and phase diagram
Week 12	R-L-C, R-C, and R-L circuits in parallelCurrent bypass law - series circuits - alternating parallel - series and parallel circuits
Week 13	Power in alternating current circuits: resistance circuits - apparent powerCircuits of inductors and reactive power - capacitor circuits
Week 14	Power triangle - P, Q, S power factor correction, Magnetic circuits: magnetic field, field intensity, magnetic field strength
Week 15	Permeability coefficient, magnetic force, hysteresis Magnetic circuits in series and parallel

Week 16	The preparatory week before the Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Color resistance code
Week 2	Lab 2: Ohm's law
Week 3	Lab 3: Series and Parallel connection
Week 4	Lab 4:Kirchhoff's law
Week 5	Lab 5:Star – Delta connection
Week 6	Lab 6;Supper position theorem
Week 7	Lab 7; Thévenin's / Norton's Theorem and Kirchhoff's Laws
Week 8	Lab 8: : Mesh theorem
Week 9	Lab 9: Nodal theorem
Week 10	Lab 10: Impedance elementcharacteristics
Week 11	Lab 11: A.C Maximumtransfer
Week 12	Lab 12:RL series circuit
Week 13	Lab 13:RC series circuit, RLC series circuit
Week 14	Lab 14:RL parallel circuit, RC parallel circuit
Week 15	Lab 15:RLC parallel circuit

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 A Textbook of Electrical Technology Volume I, B.L. THERAJA. A.K. THERAJA, 2005 Introductory Circuit Analysis, Volume 10, Boylestad	NO
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org /electrical-engineering	

Grading Scheme مخطط الدرجات				
Group	**Grade**	التقدير	**Marks %**	**Definition**
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
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Fail Group (0 – 49)	**FX –** Fail	راسب)قيد المعالجة(	(45-49)	More work required but credit awarded
	F – Fail	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Mathematics**			**Module Delivery**	
Module Type	Basic			**Theory** **Lecture** **Tutorial**	
Module Code	STUMETC 113				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		1	**Semester of Delivery**		1
Administering Department		ETE	**College**	METC	
Module Leader	Raed Khalid Hemeed		**e-mail**	Read.Khalid@stu.edu.iq	
Module Leader's Acad. Title		Assist. Lecturer	**Module Leader's Qualification**		Asst.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date		18/02/2025	**Version Number**		1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 mathematics through the application of techniques. 2. To understand fundamental functions, differentiation, integration. 3. This course deals with the basic concepts of differentiation of the functions. 4. This is the basic subject for all simple function, polynomials, and power, rational functions. 5. To understand problems like derivatives applications, change rate, draw functions, derivatives of trigonometric functions, natural logarithm and exponential functions, log function and other types of functions. 6. To develop knowledge and techniques to integrate various types of function and integration application, finding area, volumes, methods of integration.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe elementary functions (e.g. polynomial, power, rational, algebraic, exponential, log, and trigonometric functions) which arise in engineering. 2. Understanding basic functions, Functions graph, and equation of the straight line, Trigonometric functions and their sketches.Define limits, Polar coordinates (general definition). 3. Methods of differentiation, Differentiation of basic functions (e.g. polynomial, power, rational, algebraic). 4. Skills of Some applications of differentiation. Rates of change, Velocity and acceleration, implicit functions. 5. Derivative of Logarithmic function, exponential, natural logarithmic and special function a^x,x^x. 6. Differentiation of hyperbolic functions, inverse trigonometric and hyperbolic functions.Discuss the use of derivatives to find the limit L'Hôpital's rule. 7. Discussion and review of the previous topics. 8. Define the integration. Integration of basic functions e.g. polynomial, power, rational, algebraic) 1. Integration of trigonometric and hyperbolic functions. 2. Applications of definite integration, area and volume. 3. Integration of other functions, Logarithmic function, exponential, natural logarithmic and special function a^x,x^x, inverse trigonometric and hyperbolic functions. 4. Methods of integration, integration by parts, substitution sin and cos function, partial fraction. 5. Methods of integration of special function, of type $\sin^n$, $\cos^n$. 6. Discussion and review of the previous topics.

Indicative Contents المحتويات الإرشادية	<u>Part A – define functions</u> Functions - Describe elementary functions (e.g. polynomial, power, rational, algebraic, exponential, log, and trigonometric functions) which arise in engineering. Understanding basic functions, Functions graph, and equation of the straight line, Trigonometric functions and their sketches.Define limits, Polar coordinates (general definition). [12hrs] <u>Part B – Differentiation functions</u> Differentiation - Methods of differentiation, Differentiation of basic functions (e.g. polynomial, power, rational, algebraic).Skills of Some applications of differentiation. Rates of change, Velocity and acceleration, implicit functions.Derivative of Logarithmic function, exponential, natural logarithmic and special function a^x,x^x.Differentiation of hyperbolic functions, inverse trigonometric and hyperbolic functions.Discuss the use of derivatives to find the limit L'Hôpital's rule. Discussion and review of the previous topics. Define the integration. Integration of basic functions e.g. polynomial, power, rational, algebraic). [24hrs] Revision problems [6 hrs] <u>Part B – Integration functions</u> Define the integration. Integration of basic functions e.g. polynomial, power, rational, algebraic). Integration of trigonometric and hyperbolic functions. Applications of definite integration, area and volume.Integration of other functions, Logarithmic function, exponential, natural logarithmic and special function a^x,x^x, inverse trigonometric and hyperbolic functions.[24hrs] Methods of integration, integration by parts, substitution sin and cos function, partial fraction.Methods of integration of special function, of type $\sin^n$, $\cos^n$.[12hrs] Discussion and review of the problems.[6hrs] Exam preparing. [6 hrs] Exam. [4hrs]

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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #3 and #8, #9
	Assignments	2	10% (10)	6 and 13	LO #5 and #7, #12
Summative assessment	**Midterm Exam**	1.5 hr	30% (20)	7	LO #1 - #7
	Final Exam	2.4 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Describe elementary functions (e.g. polynomial, power, rational, algebraic, exponential, log, and trigonometric functions) which arise in engineering.
Week 2	Understanding basic functions, Functions graph, and equation of the straight line, Trigonometric functions and their sketches.Define limits, Polar coordinates (general definition).
Week 3	Methods of differentiation, Differentiation of basic functions (e.g. polynomial, power, rational, algebraic).
Week 4	Skills of Some applications of differentiation. Rates of change, Velocity and acceleration, implicit functions.
Week 5	Derivative of Logarithmic function, exponential, natural logarithmic and special function a^x,x^x.
Week 6	Differentiation of hyperbolic functions, inverse trigonometric and hyperbolic functions.Discuss the use of derivatives to find the limit L'Hôpital's rule.
Week 7	Mid-term Exam
Week 8	Discussion and review of the previous topics.
Week 9	Define the integration. Integration of basic functions e.g. polynomial, power, rational, algebraic)
Week 10	Integration of trigonometric and hyperbolic functions.
Week 11	Applications of definite integration, area and volume.
Week 12	Integration of other functions, Logarithmic function, exponential, natural logarithmic and special function a^x,x^x, inverse trigonometric and hyperbolic functions.
Week 13	Methods of integration, integration by parts, substitution sin and cos function, partial fraction.
Week 14	Methods of integration of special function, of type $\sin^n$, $\cos^n$.Discussion and review.
Week 15	Final Exam

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Theory of advanced mathematics with application by Thomas Calculus.**	No
Recommended Texts	**Books and Literatures in different kinds of Advanced Mathematics.**	No
Websites	https://www.khanacademy.org/math/calculus-1	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	**Workshops**	**Module Delivery**	
Module Type	Core		
Module Code	STUMETC 125		
ECTS Credits	6		
SWL (hr/sem)	150	**Practical**	
Module Level	1	**Semester of Delivery**	2
Administering Department	ETE	**College**	METC
Module Leader	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.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	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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. Enable the student to know and understand the theoretical and practical principles of the plumbing workshop. 2. Enable the student to know and understand the theoretical and practical principles of the electrical workshop. 3. Enable the student to know and understand the theoretical and practical principles of the blacksmithing workshop. 4. Enable the student to know and understand the theoretical and practical principles of the turning workshop. 5. Enable the student to know and understand the theoretical and practical principles of the automobile workshop. 6. Design of various models and Manufacture of some simple products.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the types of fillings 2. Understandthe types of blacksmithing. 3. Understandthe types ofTurning. 4. Understandthe types ofWelding. 5. Understandabout plumbing. 6. Understand about electricity.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A -Tools Include recognition of different tools. Employed for surface preparation and methods of application correctly, Devices of measuring dimensions, Calipers, types and uses, drill types and dimensions.[12hrs] Measuring toolsSteel miler, Veneer, Micrometer, Height & height gauge hand tools, Saws, Hammers, Files, Scriber, Chisels, Taps and dies, Surface plate, Bench working. [18 hrs] Part B – filings The coolant used for wood, the coolant used for iron, the cutting edge, and the means of joining work piecesHow to process refrigerators and their types, taking care of the refrigerator when using it, the proper use of refrigerators and methods of maintaining them[12hrs] Part C- blacksmithing Saw, drill, welding machine, cutting rocket, concrete shot gun[12 hrs] Part D-LathingWorkshop lathe machine – Parts – Operation - Practice on longitudinal lathing – Making center – Puncturing – Making external teeth – Practice - Employing measuring tools – internal & external lath machining.[12 hrs] Part E–WeldingWorkshop Include recognition of tools and materials employed – A gas cylinder of oxy – Acetylene welding of surface – Electrical welding exercise – Welding spot.[12hrs] Part F–plumbing Characteristics of the casting process, casting defects, sand casting, sand casting steps, preparation and shaping, the necessary processes for sand casting, other casting methods, casting in permanent molds under pressure, lost wax casting (melted)[12hrs] Part G – electricity Electrical insulation, insulation materials, winding methods, some practical examples, electrical contacts, diagrams, some practical examples[12hrs]

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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	94	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	6
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	56	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	8 and 12	LO #1, #4 and #٥, #6
	Assignments	2	10% (10)	5 and 12	LO #3, #5 and #6, #12
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #2, #4and #6
Summative assessment	**Midterm Exam**	1.5hr	10% (10)	8	LO #1 - #7
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly work shop. Syllabus) المنهاج الاسبوعي للورش ة

	Material Covered
Week 1,2, 3	Include recognition of different tools. Employed for surface preparation and methods of application correctly, Devices of measuring dimensions, Calipers , types and uses , drill types and dimensions
Week 4,5	Steel miler , Veneer , Micrometer , Height & height gauge hand tools , Saws, Hammers , Files , Scriber , Chisels , Taps and dies , Surface plate , Bench working.
Week 6,7	blacksmithing Saw, drill, welding machine, cutting rocket, concrete shot gun
Week 8,9	Lathing Workshoplathe machine – Parts – Operation - Practice on longitudinal lathing – Making center – Puncturing – Making external teeth – Practice - Employing measuring tools – internal & external lath machining
Week 10 ,11	Welding Workshop Include recognition of tools and materials employed – A gas cylinder of oxy – Acetylene welding of surface – Electrical welding exercise – Welding spot.
Week 12, 13	Part F – plumbingCharacteristics of the casting process, casting defects, sand casting, sand casting steps, preparation and shaping, the necessary processes for sand casting, other casting methods, casting in permanent molds under pressure, lost wax casting (melted)
Week 14, 15	electricity, Electrical insulation, insulation materials, winding methods, some practical examples, electrical contacts, diagrams, some practical examples

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Engineering workshop chairs	NO
Recommended Texts		No
Websites		

Grading Scheme
مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	الديمقراطية وحقوق الانسان	**Module Delivery**	
Module Type	**basic**	**Theory** **Lecture**	
Module Code	STUMETC 115		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	1	**Semester of Delivery**	1
Administering Department	ETE	**College**	METC
Module Leader	Khairy Bree Yasser	**e-mail**	Khairy.yasser@stu.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	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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	4. المعرفة بحقو ق الإنسان. 5. تعرف على حقوق الإنسان الطبيعية والمحمية التي توفرها الحكومات والمجتمع الدولي للناس. 6. الهدف من هذه الوحد ة الدراسية هو تعريف الطلاب على ماهية الح ق ، وما هي حقوقه م الطبيعية ، وما هي حقوقهم السياسية.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. اعرف ما هو الحق. 2. معرفة الحقوق الطبيعية. 3. أن يكون الطالب قادراً على التعرف على حقوق الإنسان والحماية التي تمنحها لها الدساتير. 4. معرفة الحقوق السياسية. 5. معرفة دور المنظمات الدولية. 6. معرفة اسس حقوق الانسان في القانون الدولي. 7. معرفة الاعتراف الدولي بحقوق الانسان. 8. معرفة الحقوق المدنية. 9. معرفة حق المساواة امام القانون. 10. معرفة مفهوم الحرية وانواعها . 11. معرفة الانتخابات كمبدأ من مبادئ حقوق الانسان. 12. تأثير ظاهرة الفساد الاداري على حقوق الانسان والمجتمع.
Indicative Contents المحتويات الإرشادية	طبيعة الحق وماهية حقوق الانسان- مفهوم حقوق الانسان - خصائص حقوق الانسان في الاديان - مميزات القانون الطبيعي – الحقوق الطبيعية [9] اهمية حقوق الانسان واسسها – حقوق الانسان في الاديان - حقوق الانسان في الشريعة الاسلاميه : في القرأن الكريم . في السنة النبوية الشريفة - ارتباط الواجبات بالحقوق في الشريعة الاسلامية [9] اسس حقوق الانسان في القانون الدولي – مصادرة– الحق الطبيعي – الدين - العرف العاده –الحقوق اللصيقه الكائن الطبيعي - الاعتراف الدولي بحقوق الانسان – الاعتراف الاقليمي بحقوق الانسان – المنظمات غير الحكومية ودورها في الدفاع عن حقوق الانسان [9] الحقوق المدنية – حق الحياة والحرية وحق الحرية الشخصية – حق التملك – حق التعاقد –حق حرية الاعتقاد حرية الضمير - حق تاسيس الجمعيات والاشتراك فيها –حق تكوين العائلة – حق المساواة امام القانون – ضمانات الحقوق المدنية حقوق الدين - حقوق الابناء - حقوق النساء - حقوق الجوار [9]

	مفهوم الحرية وانواعها – قيود الحرية - الانتخابات كمبدأ من مبادئ حقوق الانسان -تأثير ظاهرة الفساد الاداري على حقوق الانسان والمجتمع [9]

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 15 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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 #6, #8
	Assignments	2	10% (10)	4 and 12	LO #3 and #9, #10
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #3, #5 and #8
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	طبيعة الحق وماهية حقوق الانسان
Week 2	مفهوم حقوق الانسان - خصائص حقوق الانسان في الاديا ن
Week 3	مميزا ت القانون الطبيعي – الحقوق الطبيعي ة
Week 4	اهمية حقوق الانسان واسسها – حقوق الانسان في الاديا ن
Week 5	حقوق الانسان في الشريعة الاسلاميه : في القرأن الكريم . في السنة النبوية الشريف ة
Week 6	ارتباط الواجبات بالحقوق في الشريعة الاسلامية
Week 7	اسس حقوق الانسان في القانون الدولي – مصادرة– الحق الطبيعي – الدي ن
Week 8	العرف العاده –الحقوق اللصيقه الكائن الطبيع ي
Week 9	الاعتراف الدولي بحقوق الانسان – الاعتراف الاقليمي بحقوق الانسان – المنظمات غير الحكومية ودورها في الدفاع عن حقوق الانسا ن
Week 10	الحقوق المدنية – حق الحياة والحرية وحق الحرية الشخصية – حق التملك – حق التعاقد –حق حرية الاعتقاد حرية الضمي ر
Week 11	حق تاسيس الجمعيات والاشتراك فيها –حق تكوين العائلة – حق المساواة امام القانون – ضمانات الحقوق المدني ة
Week 12	حقوق الدين - حقوق الابناء - حقوق النساء - حقوق الجوار

Week 13	مفهوم الحرية وانواعها – قيود الحري ة
Week 14	الانتخابا ت كمبدأ من مبادئ حقوق الانسان
Week 15	تأثير ظاهرة الفساد الاداري على حقوق الانسان والمجتمع

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	حقوق الانسان . حافظ علوان حمادي . جامعة بغداد كلية العلوم السياسية . 2009	No

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	جرائم حزب البعث البائد	**Module Delivery**	
Module Type	**basic**	**Theory Lecture**	
Module Code	STUMETC 126		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1	**Semester of Delivery**	2
Administering Department	ETE	**College**	METC
Module Leader	Khairy Bree Yasser	**e-mail**	Khairy.yasser@stu.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	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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- المعرفة بانتهاكات الحقوق والحريات من قبل النظام البعثي البائد. 2- المعرفة باساليب البعث البائد الظالمه التي اثرت على الميدان النفسي والاجتماعي . 3- المعرفة باثر القمع والحروب على البيئة والسكان .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- معرفة نبذة وصفية عن الانظمة السياسية في العراق)1921-2003(. 2- معرفة إنتهاكات النظام البعثي للحقوق والحريات العامة . 3- معرفة أثر سلوكيات النظام البعثي في المجتمع وتسلطه على الدولة 4- معرفة أثر المرحلة الانتقالية في محاربة السياسة الاستبدادية 5- معرفة اساليب البعث البائد الظالمة التي اثرت على الميدان النفس ي 6- معرفة اساليب البعث البائد الظالمة التي اثرت على الميدان الاجتماعي 7- معرفة تعامل حزب البعث البائد مع الدين ومفهوم الدول ة 8- معرفة اساليب حزب البعث البائد يف الثقافة السيئة والاعلام المسيس 9- معرفة عسكرة المجتمع 10- معرفة أستعمال الاسلحة المحرمة دوليا من قبل حزب البعث البائد والتلوث البيئى 11- معرفة سياسة الارض المحروقة من قبل حزب البعث البائد 12- معرفة تجفيف الاهوار والهجرة القسرية من قبل حزب البعث البائد 13- معرفة تدمير البيئة الزراعية والحيوانية والتلوث الاشعاعي من قبل حزب البعث البائد 14- معرفة المقابر الجماعية وقصف دور العبادة من قبل حزب البعث البائد

Indicative Contents المحتويات الإرشادية	إنتهاكات الحقوق والحريا ت نبذة وصفية عن الانظمة السياسية في العراق)1921-2003(- إنتهاكات النظام البعثي للحقوق والحريات العامة- أثر سلوكيات النظام البعثي في المجتمع وتسلطه على الدولة- أثر المرحلة الانتقالية في محاربة السياسة الاستبدادية [01] الميدان النفسي- الميدان الاجتماعي- الدين والدولة- الثقافة والاعلام وعسكرة المجتمع [01] أثر القمع والحروب على البيئة والسكان أستعمال الاسلحة المحرمة دوليا والتلوث البيئى- سياسة الارض المحروقة- تجفيف الاهوار والهجرة القسرية- تدمير البيئة الزراعية والحيوانية والتلوث الاشعاعي- المقابر الجماعية وقصف دور العبادة [10]

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 15 اسبوع			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	2	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

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

Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #1, #2 and #6, #8
	Assignments	2	10% (10)	4 and 12	LO #3 and #9, #10
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #3, #5 and #8
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	نبذة وصفية عن الانظمة السياسية في العراق)1921-2003(
Week 2	إنتهاكات النظام البعثي للحقوق والحريات العامة
Week 3	أثر سلوكيات النظام البعثي في المجتمع وتسلطه على الدولة
Week 4	
Week 5	أثر المرحلة الانتقالية في محاربة السياسة الاستبدادية
Week 6	الميدان النفس ي
Week 7	الميدان الاجتماعي
Week 8	الدين والدول ة
Week 9	الثقافة والاعلام
Week 10	عسكرة المجتمع
Week 11	أستعمال الاسلحة المحرمة دوليا والتلوث البيئى
Week 12	سياسة الارض المحروق ة
Week 13	تجفيف الاهوار والهجرة القسرية
Week 14	تدمير البيئة الزراعية والحيوانية والتلوث الاشعاعي
Week 15	المقابر الجماعية وقصف دور العبادة

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	منهاج جرائم حزب البعث البائد 2023- وزارة التعليم العالي والبحث العلمي – دائرة الدراسات والتخطيط والمتابعة	No

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Advance Mathematics	**Module Delivery**	
Module Type	basic	**Theory** **Lecture** **Tutorial**	
Module Code	STUMETC 234		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	**Semester of Delivery**	3
Administering Department	ETE	**College**	METC
Module Leader	Raed Khalid Hemeed	**e-mail**	Read.Khalid@stu.edu.iq
Module Leader's Acad. Title	Assist.Lecturer	**Module Leader's Qualification**	Asst.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 fundamental of partial functions, partial differentiation of two and three variables, understanding the chain rule principles. 2. To understand the ordinary differential equations, first and order and their solutions 3. The use of Laplace transforms of various functions and invers of Laplace transforms. Then extending to the use of that technique for solving differential equations. 4. To develop knowledge of understanding vectors and basic mathematical procedure of vectors, adding, subtracting, dot product, cross product and applications. 5. To understand the sequence and series of Taylor and maclaurin for functions and their presentations. 6. To understand the Fourier series for functions and their presentations. Knowing odd and even function and their graphs.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe elementary of functions with two and more variables. 2. Understanding of partial derivatives and the chain rule principles. 3. Understanding of principles of the ordinary differential equations, first order type.Skills ofsolving first order differential equations, separation of variables and the use of integration factor. 4. Understanding of principles of the ordinary differential equations, second order type. 5. Skills of solving second order differential equations, homogenous and nonhomogenous types. 6. Developing knowledge of Laplace transforms and anti-Laplace transforms. 7. Applications of Laplace transforms in solving differential equations. 8. Discussion and review of the previous topics. • Define the vectors term and its mathematical procedures. • The use of dot product and cross product. • Define the sequence term and solving the related problems. • Define the Taylor and Maclaurin series for the functions and solving related problems. • Define the Fourier series for the functions and solving related problems. • Discussion and review of the previous topics.

Indicative Contents المحتويات الإرشادية	Part A – define functions of two and three variables Describe elementary of functions with two and more variables. Understanding of partial derivatives and the chain rule principles. [10hrs] Part B – Differential equations Understanding of principles of the ordinary differential equations, first order type. Skills of solving first order differential equations, separation of variables and the use of integration factor.Understanding of principles of the ordinary differential equations, second order type. Skills of solving second order differential equations, homogenous and non-homogenous types. [15hrs] Part C – Laplace transforms Developing knowledge of Laplace transforms and anti-Laplace transforms. Applications of Laplace transforms in solving differential equations.[10hrs] Revision problems [5hrs] Part D – Vectors Define the vectors term and its mathematical procedures. The use of dot product and cross product. [10hrs] Part E – Sequences and series Define the sequence term and solving the related problems.Define the Taylor and Maclaurin series for the functions and solving related problems. Define the Fourier series for the functions and solving related problems. [15hrs] Discussion and review of the problems. [6 hrs] Exam preparing. [5hrs] Exam. [4 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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module
Evaluationتقييم
المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (10)	5 and 10	LO #3, #4 and #6, #8
	Assignments	2	10% (10)	8 and 14	LO #5 and #13
	Report	1	10% (10)	15	LO #4, #6 and #12
Summative assessment	**Midterm Exam**	1.5 hr	20% (20)	7	LO #1 - #7
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Partial differentiation Function with two independent variables or more Partial differentiation for first and higher order of derivatives.

Week 2	Change of variables (Chain rule) of two independent variables or more.
Week 3	Understanding of principles of the ordinary differential equations, first order type. Skills of solving first order differential equations, separation of variables and the use of integration factor.
Week 4	Understanding of principles of the ordinary differential equations, second order type.
Week 5	Skills of solving second order differential equations, homogenous and non-homogenous types.
Week 6	Developing knowledge of Laplace transforms and anti-Laplace transforms.
Week 7	Applications of Laplace transforms in solving differential equations.
Week 8	Mid-term Exam
Week 9	Define the vectors term and its mathematical procedures.
Week 10	The use of dot product and cross product.
Week 11	Define the sequence term and solving the related problems.
Week 12	Define the Taylor and Maclaurin series for the functions and solving related problems.
Week 13	Define the Fourier series for the functions and solving related problems.
Week 14	Discussion and review of the previous topics.
Week 15	Final Exam

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Theory of advanced mathematics with application by Thomas Calculus.	Yes
Recommended Texts	Books and Literatures in different kinds of Advanced Mathematics.	No
Websites	https://www.khanacademy.org/math/calculus-1	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Electrical and Electronic Circuits	**Module Delivery**	
Module Type	core	**Theory** **Lecture** **Lab** **Tutorial**	
Module Code	STUMETC 233		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	2	**Semester of Delivery**	3
Administering Department	ETE	**College**	METC
Module Leader	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.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	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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. 2. Understand the dimensional Analysis of Electrical and electronic circuits. At the end of the year the student should be able demonstrate knowledge and understanding of the concepts, theory, and application of Electrical and electronic circuits. 3. To analysis of Electrical and electronic circuits. 4. To select and apply the appropriate analysis techniques. 5. Know the engineering methodologies.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Able to recognize the First Order Circuit the Source-free RC Circuit. Understand the Source-free RL Circuit – Singularity Functions. 2. Able to recognize the Step Response of an RC Circuit and Understand Step Response of an RL circuit 3. Able to recognize the Second Order Circuit: - Finding Initial and Final Values Understand The Source-Free Series RLC Circuit. 4. Discuss the source-Free Parallel RLC Circuit and unaccredited Step Response of a Series RLC Circuit 5. Discuss step Response of a parallel RLC circuit and general second-0rder circuits. 6. Able to recognize the operation of magnetically Coupled Circuits: - Mutual Inductance. Understand Energy in a Coupled Circuit – Linear Transformers. Discuss the Ideal Transformers. 7. 8. Able to Recognize the three-Phase Transformers. Understand Frequency Response: - Transfer Function 9. Discuss the Decibel Scale - Bode Plots. Understand Series Resonance. 10. Explain the parallel Resonance. Understand Active Filters. 11. Identify the Two Port Networks: - Impedance Parameters. Understand Admittance Parameters. 12. Explain the hybrid Parameters .Understand Transmission Parameters. 13. Able to Recognize the Three-Phase Circuits: -Balanced Three-Phase Voltages. Understand Balanced Wye-WyeConnection - Balanced Wye-DeltaConnection. 14. Able to Recognize the Balanced Delta-Delta Connection. Understand Balanced Delta-Wye Connection - Power in a Balanced System. 15. Able to Recognize the unbalanced three Phase Systems. Understand ThreePhase Power Measurement

Indicative Contents المحتويات الإرشادية	Part A -The Source of circuits First Order Circuit: -The Source-free RC Circuit, The Source-free RL Circuit – Singularity Functions, Step Response of an RC Circuit, Step Response of an RL circuit, Second Order Circuit:- Finding Initial and Final Values, The Source-Free Series RLC Circuit, The Source-Free parallel RLC Circuit, Step Response of a Series RLC Circuit, General Second-Order Circuits [35 hrs] Part B - Magnetic circuits Magnetically Coupled Circuits: - Mutual Inductance. Energy in a Coupled Circuit– Linear Transformers, Ideal Transformers, Ideal Autotransformers, Three-Phase Transformers, Frequency Response:- Transfer Function [21hrs] The Decibel Scale -Bode Plots. Series Resonance, Parallel Resonance, Active Filters [21hrs] Part C Two Port Networks Two Port Networks: -Impedance Parameters. Admittance Parameters, Hybrid Parameters, Transmission Parameters [21hrs] Three-Phase Circuits: -Balanced Three-Phase voltages, balanced wye-Wye Connection – balanced wye-delta Connection. Balanced Delta-Delta Connection, Balanced Delta-Wye Connection - Power in a Balanced System, unbalanced three phase systems, Three-Phase Power Measurement [21hrs]

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 15 اسبوع ا

Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	124	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	26	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
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	5% (5)	9 and 12	LO #1, #8 and #8, #11
	Assignments	2	5% (5)	5 and 12	LO #3, #5 and #6, #9
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #5
	Lab Report and Lap Exam	15, 1	15%(15)	1-15,8	LO #1- #15, LO #1- #8
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	8	LO #1 - #7
	Final Exam	2.5 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week 1	First Order Circuit: -The Source-free RC Circuit, the Source-free RL Circuit – Singularity Functions
Week 2	Step Response of an RC Circuit, Step Response of an RL circuit
Week 3	Second Order Circuit:- Finding Initial and Final Values, The Source-Free Series RLC Circuit
Week 4	The Source-Free Parallel RLC Circuit, Step Response of aSeries RLC Circuit
Week 5	Step Response of a Parallel RLC Circuit, General Second-Order Circuits
Week 6	Magnetically Coupled Circuits: - Mutual Inductance, Energy in a Coupled Circuit – Linear Transformers
Week 7	Ideal Transformers, Ideal Autotransformers
Week 8	Three-Phase Transformers ,Frequency Response:- Transfer Function

Week 9	The Decibel Scale -Bode Plots, Series Resonance.
Week 10	Parallel Resonance, Active Filters. Two Port Networks: -Impedance Parameters.
Week 11	Admittance Parameters, Hybrid Parameters.
Week 12	Transmission Parameters, Three -Phase Circuits: -Balanced Three-Phase voltages
Week 13	Three-Phase Circuits: -Balanced Three-Phase voltages, Balanced Delta-Delta Connection
Week 14	Balanced Delta-Delta Connection, Balanced Delta-Wye Connection - Power in a Balanced System
Week 15	Unbalanced Three Phase Systems ,Three-Phase Power Measurement

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Nodal Theorem
Week 2	Series RL Circuits
Week 3	Series Rc Circuits
Week 4	Natural Response of a Series RLC Circuit
Week 5	Step Response of a Series RLC Circuit
Week 6	parallel RLC Natural responses Circuits
Week 7	parallel RLC step responses Circuits
Week 8	Low-pass Filters
Week 9	High -pass Filters
Week 10	ower Factor correction
Week 11	Transformer
Week 12	Transformer
Week 13	Transformer
Week 14	Transformer
Week 15	Transformer

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 A Textbook of Electrical Technology Volume I, B.L. THERAJA. A.K. THERAJA, 2005 Electronic Circuits - Fundamentals and Applications" by Mike Tooley BA	NO

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Electrical devices and measurements	**Module Delivery**	
Module Type	core	**Theory** **Lecture** **Lab**	
Module Code	STUMETC 241		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	2	**Semester of Delivery**	4
Administering Department	ESTE	**College**	METC
Module Leader	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.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	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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. Illustration and discussion the theory of measurement including static characteristics of instruments, various standards, error analysis, classifications and statistical analysis. 2. Illustrate the principles design theory of various dc and ac analogue voltmeters, Ammeters Watt meters, and single phase energy meter. 3. Discuss and analyze various dc and ac bridges used for the measurement of resistances, impedances and associated parameters like inductance, capacitance and frequency. 4. Explain the various active and passive transducers; also it includes a detail discussion of the theory and application of some transducers for example, strain gauges, LVDT, thermister, piezoelectric, etc. 5. Illustration and discussion of CRT and the various parts of CRO. And the theory of operation of the instrument. 6. Giving knowledge and unfolds the details of various signal analyzers such as distortion, waveform and spectrum analyzers. 7. Illustrate the certain advantages of electronic meters as compared to analogue.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Enable a starting back ground to the students aquatinting them with various electrical and electronic instruments for their principle, operation, calibration and application 2- Enable student to get the knowledge and understanding of the basic measurement techniques such as accuracy, precision, standards which is absolute necessary for the use of sophisticated systems 3- Enable student to become aware how to operate and develop various electrical and electronic systems 4- Enable student to understand the measuring technique, construction and working principle of various measuring instruments 5- The student will understand the working principles of electrical devices and measurements 6- Recognize types of errors and their calculations 7- Understand theory of analogue measuring instruments 8- Understand Bridges and their applications: dc bridges 9- Identify the construction and operation of Cathode Ray Oscilloscope (CRO) 10- Know primary sensing elements 11- Learn Signal analysis 12- Recognize the construction and operation of spectrum analyzer 13- Realize the construction and operation of Digital instruments

Indicative Contents المحتويات الإرشادية	Introduction to measurements: elements of measurement system; static characteristics, accuracy, precision, resolution, linearity, sensitivity-Measuring units, dimensions and standards: introduction to MKS system, system of units of measurements, SI units- fundamental and derived units, electric and magnetic units- Measurement errors-Absolute error - types of errors and their calculations- limiting error, random error [21 hrs] General theory of analogue measuring instruments- indicating type; PMMC-moving iron electrodynamometer- thermal instrument- Watt meters-integrating type (energy kWh meter) [21 hrs] Recording type; self balancing strip chart recorder- X-Y recorder- Bridges and their applications: dc bridges (Wheatstone)- Kelvin, Kelvin double bridge); ac bridges(Maxwell, Hay's, Schering, Wien)- Cathode Ray Oscilloscope (CRO)CRT, block diagram [21 hrs] vertical and horizontal Reports deflection systems; applications-Transducers-primary sensing elements (displacement, LVDT)-strain gauge, piezoelectric, acceleration, thermo electric- Signal analysis -wave analyzer, harmonic distortion analyzer [21 hrs] spectrum analyzer- Electronic analogue measuring instruments- direct coupled, FET bridge type, dc &ac voltagecurrent, and power and resistance measurement-Digital instruments: D/A &A/D, voltage, current and resistance measurements-digital display sensitivity of DMM (digital multimeter), resolution of decimal display [21 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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation تقييم
المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to measurements: elements of measurement system; static characteristics, accuracy, precision, resolution, linearity, sensitivity……etc Measuring units, dimensions and standards: introduction to MKS system, system of units of measurements, SI units
Week 2	fundamental and derived units, electric and magnetic units. Measurement errors: Absolute error
Week 3	types of errors and their calculations limiting error, random error
Week 4	General theory of analogue measuring instruments indicating type; PMMC

Week 5	moving iron electrodynamometer thermal instrument
Week 6	Watt meters integrating type (energy kWh meter)
Week 7	Recording type; self balancing strip chart recorder (pot. Bridge, LVDT) X-Y recorder
Week 8	Bridges and their applications: dc bridges (Wheatstone) Kelvin, Kelvin double bridge); ac bridges(Maxwell, Hay's, Schering, Wien)
Week 9	Cathode Ray Oscilloscope (CRO) CRT, block diagram
Week 10	vertical and horizontal Reports deflection systems; applications Transducers: classification and selection
Week 11	primary sensing elements (displacement, LVDT) strain gauge, piezoelectric, acceleration, thermo electric
Week 12	Signal analysis wave analyzer, harmonic distortion analyzer
Week 13	spectrum analyzer Electronic analogue measuring instruments
Week 14	direct coupled, FET bridge type, dc &ac voltage current, and power and resistance measurement
Week 15	Digital instruments: D/A &A/D, voltage, current and resistance measurements digital display sensitivity of DMM (digital multimeter), resolution of decimal display

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to electrical devices & measurements How to use (the oscilloscope , function generator , Dc powers supply , digital multimeter)
Week 2	How to test (Diode , LED Diode , Zener diode) How to test a fuse
Week 3	Passive and Active filters
Week 4	low & high pass filters
Week 5	Band pass filter
Week 6	Using Of Kilvanometer
Week 7	Transducers (sensors and actuators)
Week 8	Relay using and testing
Week 9	Calibration of Ammeter

Week 10	Tungsten Filament
Week 11	incandescent Lamp
Week 12	D.C. Bridge Measurement
Week 13	Wheatstone bridge
Week 14	Design and construction of analogue multimeter
Week 15	Calibration of Voltmeter

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Electrical and Electronics Measurements and Instrumentation" by Prithwiraj Purkait and Budhaditya Biswas	No
Recommended Texts	Electronic Instrumentation and Measurements" by David A Bell	No

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Electrical Machines	**Module Delivery**	
Module Type	core	**Theory** **Lecture** **Lab**	
Module Code	STUMETC 231		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	2	**Semester of Delivery**	3
Administering Department	ETE	**College**	METC
Module Leader	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.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	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 the construction and operation of DC generators. 2. To understand the construction and operation of DC motors. 3. To understand the construction and operation of single phase transformers. 4. To understand the construction and operation of Three phase transformers. 5. To understand the construction and operation induction motor
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize the construction and principle of DC generator. 2. Know the lap and wave winding, EMF and torque equation 3. Understand armature reaction and commutation, types of generators. 4. Understand equivalent circuit of DC generators. 5. Know the construction and principle of DC motor, types of motors, armature torque characteristics. 6. Recognize the equivalent circuit of the motor, torque speed characteristics 7. Estimate Losses and efficiency of the DC motors, and understand starting and braking. 8. Explain speed control methods of DC motors. 9. Understand the Construction and principle of single phase transformer, Equivalent circuit and phasor digram, Voltage and current ratio Open ,short and polarity tests. 10. Understand Voltage regulation, losses and efficiency of single phase transformer. Know parallel operation, the operation of auto transformer and instrumental transformers. 11. Understand the Construction and principle of 3- phase transformer, transformer connection group. 12. Understand the parallel operation of 3- phase transformer. 13. Understand the construction and principle of induction motor, equivalent circuit and phasor diagram, Power flow diagram. 14. Understand the losses and efficiency of induction motor, open and short circuit tests, torque speed characteristics. 15. Understand the method of starting induction motor , method of speed control of induction motor.

Indicative Contents المحتويات الإرشادية	Part A - DC generators construction and principle of DC generator - lap and wave winding, EMF and torque equation-armature reaction and commutation-types of generators- equivalent circuit of DC generators. [hrs 28] Part b - DC motors construction and principle of DC motor-types of motors-armature torque characteristics- equivalent circuit of the motor-torque speed characteristics- Losses and efficiency of the DC motors-starting and braking- speed control methods of DC motors [hrs28] Part c - transformers Construction and principle of single phase transformer- Equivalent circuit and phasor digram-Voltage and current ratio- Open ,short and polarity tests- Voltage regulation, losses and efficiency of single phase transformer-parallel operation- the operation of auto transformer and instrumental transformers- Construction and principle of 3- phase transformer- transformer connection group- parallel operation of 3-phase transformer [28 hrs] Part d - Induction motors construction and principle of induction motor-equivalent circuit and phasor diagram-Power flow diagram- losses and efficiency of induction motor- open and short circuit tests- torque speed characteristics- starting induction motor , method of speed control of induction motor [21 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 اسبوع ا

Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**200**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (5)	3 and 8	LO #1, #2 and #6
	Assignments	2	5% (5)	10 and 14	LO#8, #9 and #11, #12, #13
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #1, #2 and #3
	Lab reports and lab exam	15, 1	15% (15)	1-15, 8	All, 1-7
Summative assessment	**Midterm Exam**	1.5hr	10% (10)	7	LO #1 - #7
	Final Exam	2.5hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction, Construction and principle of DC generator
Week 2	Lap and wave winding, EMF and torque equation
Week 3	Armature reaction and commutation, Types of generators
Week 4	Equivalent circuit of DC generators
Week 5	Construction and principle of DC motor, Types of motors, armature torque characteristics

Week 6	Equivalent circuit of the motor, Torque speed characteristics
Week 7	Losses and efficiency of the DC motors, Starting and braking
Week 8	Speed control methods of DC motors
Week 9	Construction and principle of single phase transformer, Equivalent circuit and phasor digram, Voltage and current ratio Open ,short and polarity tests
Week 10	Voltage regulation, Losses and efficiency of single phase transformer, parallel operation Auto transformer and Instrumental transformers
Week 11	Construction and principle of 3- phase transformer, Transformer connection group
Week 12	Parallel operation of 3- phase transformer
Week 13	Construction and principle of induction motor, Equivalent circuit and phasor diagram, Power flow diagram
Week 14	Losses and efficiency of induction motor, open and short circuit tests, Torque speed characteristics
Week 15	Method of starting induction motor , method of speed control of induction motor

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Operation of the Separately Excited DC shunt Generator Loaded Operation of the Separately Excited DC Shunt Generator
Week 2	No-Load operation of the self excited DC shunt Generator Loaded Operation of the Self Excited DC Shunt Generator
Week 3	Swinburne's Test on a DC Shunt generator No-Load Operation of the DC Series Generator
Week 4	Loaded Operation of the DC Series Generator Load Characteristics of a DC cumulatively Compound Generator
Week 5	Load Characteristics of a DC differentially Compound Generator
Week 6	Study of Operational Working and Principle of DC Shunt Motor

Week 7	Study of running and reversing phenomenon of DC Shunt Motor Study of No Load Characteristic of DC Shunt Motor
Week 8	Study of Load Characteristic of DC Shunt Motor Brake Test on a DC Shunt Motor
Week 9	Brake Test on a DC Series Motor
Week 10	Retardation test on a DC machine
Week 11	Study of speed control of DC Shunt Motor using armature voltage control and flux field control method
Week 12	Study and Determine the losses of DC shunt motor and correspondingly calculate the efficiency of DC Motor by Swinburn's Test Method
Week 13	Hopkinson's test on a pair of DC machines OC & SC Tests on a Single Phase Transformer
Week 14	Direct Load Test on a Single Phase Transformer Separation of Constant losses of a Single Phase Transformer
Week 15	Sumpner's Test Parallel Operation of two dissimilar Single Phase Transformers OC & SC Tests on a Three Phase Transformer

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**A Textbook of Electrical Technology Volume II, AC and DC machines, B.L. THERAJA. A.K. THERAJA, 2006**	No

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Electronics		**Module Delivery**		
Module Type	Core		**Theory** **Lecture** **Lab**		
Module Code	STUMETC 242				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level			**Semester of Delivery**	4	
Administering Department	ETE		**College**	METC	
Module Leader	Wael Hussein Zayer		**e-mail**	wael.zayer@stu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Ahmed thamer radhi		**e-mail**	Ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date	18/02/2025		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	- To provides a knowledge of electronic circuits. - Illustration and discussion the principles of electronics structureselection and description. - To select an electronics circuit for a given use based on considerations of cost and performance. - The ability to analyze and solve problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Able to tell the structure and the operation of transistors and recognize the different types of transistors. 2- Recognizes the different configurations of circuits with transistors and the characteristics of these circuits and compares these circuits. 3- Analyzes transistor dc biasing. 4- Explains the operation of transistor dc biasing circuits. 5- Able to explain different circuits with transistors. 6- Explains the amplification in amplifier circuits with transistors. 7- Analyzes and performs measurements in different amplifier circuits. 8- Calculates the hybrid parameters of the equivalent circuit of a transistor. 9- Explains cascade amplifier circuits 10- Calculates parameters in cascade amplifier circuits.

Indicative Contents المحتويات الإرشادية	Part A –various Electronics_ccttypes, structure and analyses Theory Bipolar Transistor, Basic constriction ,Biasing& stability study for different circuit models of a transistor ,Plot Discrete-Time Signal In Matlab ,Transistor as switch Two port network analysis. [15 hrs] Transistor model with parameter, Π-equivalent circuit using two port network ideas T-Equivalent circuit of C, B. transistor ,h- Parameter uses to find out input impedance, output impedance, current voltage gain ,Relationship of h- parameter for different circuit modes. [15 hrs] Overall voltage gain, overall current modes, Transistor amplifier, small signal analysis Low frequency / high frequency circuit analysis using Equivalent circuit to get high cutoff frequency. [15 hrs] Revision problem classes [6 hrs] Part B –Properties of electronic cct Power amplifiers, class A, class B, class AB, class C power amplifiers ,Feedback, positive & negative feedback studies ,Oscillators: R-C oscillator, phase shift oscillator, Wine Bridge oscillator, Hartley oscillator Colpitts oscillator, Crystal oscillator, Frequency stability. [15hrs] Differential amplifiers, common mode rejection ratio ,Operational amplifiers with their applications ,Implementation of LP FIR Filters ,Timer "555" and its applications Implementation of HP FIR Filters. [15 hrs] Active filters, Basic filter responses for different modes. [7 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module تقييمEvaluation المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (5)	5 and 10	LO #3, #4 and #8
	Assignments	2	5% (5)	4 and 8	LO #2 and #6
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #8
	Lab reports and lab exam	15, 1	15% (15)	1-15, 8	All, 1-7
Summative assessment	**Midterm Exam**	1.5hr	10% (10)	7	LO #1 - #7
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Bipolar Transistor, Basic constriction ,Biasing & stability study for different circuit models of a transistor
Week 2	Plot Discrete-Time Signal In Matlab ,Transistor as switch
Week 3	Two port network analysis , Transistor model with hparameter, Π-equivalent circuit using two port network ideas

Week 4	T-Equivalent circuit of C, B. transistor , h- Parameter uses to find out input impedance, output impedance, current&voltage gain
Week 5	Relationship of h- parameter for different circuit modes ,Overall voltage gain, overall current modes, Transistor amplifier, small signal analysis
Week 6	Low frequency / high frequency circuit analysis using Π equivalent circuit to get high cutoff frequency
Week 7	Power amplifiers, class A, class B, class AB, class C power amplifiers
Week 8	Feedback, positive & negative feedback studies
Week 9	Oscillators: R-C oscillator, phase shift oscillator, Wine Bridge oscillator, Hartley oscillator Colpitts oscillator, Crystal oscillator, Frequency stability
Week 10	Differential amplifiers, common mode rejection ratio ,
Week 11	Operational amplifiers with their applications
Week 12	Implementation of LP FIR Filters
Week 13	Timer "555" and its applications
Week 14	Implementation of HP FIR Filters
Week 15	Active filters, Basic filter responses for different modes

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Input and output Characteristics BJT transistor common Emitter , BJT transistor as switch
Week 2,3,4	Input and output Characteristics BJT transistor common Emitter , Characteristics FET transistor , Characteristics JFET transistor
Week 5,6,7	Characteristics MOSFET transistor , BJT Amplifier common Emitter , BJT Amplifier common Base
Week 8,9	BJT Amplifier common collector , BJT Amplifier common Emitter with voltage divider
Week 10,11	Operation Amplifier IC-741 non inverting , Operation Amplifier IC-741 inverting
Week 12,13	Operation Amplifier IC-741 summing , Operation Amplifier IC-741 integral
Week 14	Operation Amplifier IC-741 differential

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electronic Devices and Circuit Theory , 11 edition , Boylested, 2013.	Yes
Recommended Texts	- Power Electronics , K. B. Khanchandani, second edition, 2008	No
Websites	https://mohamadramdhani.staff.telkomuniversity.ac.id/files/2016/08/Electronic-Devicesand-Circuit-Theory-11th-Edition-Ebook.pdf	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	English language/2	**Module Delivery**	
Module Type	Basic	**Theory** **Lecture**	
Module Code	STUMETC 235		
ECTS Credits	3		
SWL (hr/sem)	75		
Module Level	2	**Semester of Delivery**	3
Administering Department	ETE	**College**	METC
Module Leader	Wael Hussein Zayer	**e-mail**	wael.zayer@stu.edu.iq
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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. Develop students skills in understanding the basic grammars of English. 2. Develop students' speaking skills in English. 3. Develop students' listening skills in English. 4. Develop students' reading skills in English. 5. Develop students' reading skills in English.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understand the rule of Possessive 's, Verbs, conversations as Vocabulary 2- Understand the usage of Questions and answers, Present Simple 1, Times as Vocabulary. 3- Understand the grammars of Present Simple 2, Present Simple 3, Adverbs of frequency, words that go together as Vocabulary . 4- Understand the grammars of some / any, There is / are, adjectives and numbers as Vocabulary . 5- Understand the grammars of can / could, was / were, present simple and past Simple , noun + noun as Vocabulary. 6- Understand the grammars of past Simple 1, past Simple 2, adjectives as Vocabulary. 7- Understand the grammars of past Simple 3, Adverbs, in, at, or on? as Vocabulary. 8- Understand the grammars of like and would like, some, any, much, many, Food and drink as Vocabulary. 9- Understand the grammars of directions, comparatives and superlatives, superlatives, places as Vocabulary. 10-Understand the grammars of Present Continuous, social expressions as Vocabulary. 11-Understand the grammars of going to and past simple, suggestions, he weather as Vocabulary. 12-Understand the grammars of present perfect 1, take, get and go as Vocabulary. 13-Understand the grammars of anything, something, nothing, everything, months of the year as Vocabulary. 14-Understand the grammars of present perfect 2, Verb + noun as Vocabulary.

Indicative Contents المحتويات الإرشادية	The grammars of Possessive 's, Present Simple 1, Present Simple 2, Present Simple 3, Adverbs of frequency. Verbs, conversations, times and Words that go together as Vocabulary. [9] The grammars of some / any, There is / are, can / could, was / were, Present Simple and Past Simple, Past Simple 1, Past Simple 2 . Adjectives, Numbers, Noun + noun as Vocabulary. [9]. The grammars of Question Past Simple 3, Adverbs, like and would like, some, any, much, many, directions, comparatives and superlatives, superlatives . in, at, or on?, Food and drink, places as Vocabulary. [9]. The grammars of present continuous, going to and past simple, suggestions, present perfect 1 . Social expressions, the weather, take, get, go as Vocabulary. [9]. The grammars of anything, something, nothing, everything, present perfect 2. months of the year, verb + noun as vocabulary. [6].

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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	27	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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**	3	15% (10)	3, 8 and 12	LO #1and #5and #10
	Assignments	3	15% (10)	4, 9 and 12	LO #3, #8 and #11
	Report	1	10% (10)	14	LO #4, #9 and #13
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Unit one : At the airport Grammar: Possessive 's Vocabulary: Verbs, Conversations
Week 2	Unit two : Going shopping Grammar: Questions and answers, Present Simple 1 Vocabulary: Times
Week 3	Unit three: In a cafe Grammar: Present Simple 2, Present Simple 3, Adverbs of frequency Vocabulary: Words that go together
Week 4	Unit four : Making suggestions Grammar: some / any, There is / are Vocabulary: Adjectives, Numbers
Week 5	Unit Five : Social expressions Grammar: can / could, was / were, Present Simple and Past Simple Vocabulary: Noun + noun
Week 6	Unit six : What time is it? Grammar: Past Simple 1, Past Simple 2 Vocabulary: Adjectives
Week 7	Unit seven : Grammar: Past Simple 3, Adverbs Vocabulary: in, at, or on?

Week 8	Unit eight : Grammar: like and would like, some, any, much, many Vocabulary: Food and drink
Week 9	Unit nine : Grammar: Directions, Comparatives and superlatives, Superlatives Vocabulary: Places
Week 10	Unit ten: Grammar: Present Continuous Vocabulary: Social expressions
Week 11	Unit eleven: Grammar: going to and Past Simple, Suggestions Vocabulary: The weather
Week 12	Unit twelve: Grammar: Present Perfect 1 Vocabulary: take, get, go
Week 13	Unit thirteen: Grammar: anything, something, nothing, everything Vocabulary: Months of the year
Week 14	Unit fourteen: Grammar: Present Perfect 2 Vocabulary: Verb + noun
Week 15	assessment

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	New headway, Liz and John Soars, OXFORD	No
Recommended Texts	English Grammar in Use, 5th Edition by Raymond Murphy.	No
Websites	https://elt.oup.com/student/headway/elementary4/?cc=global&selLanguage=en	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Fundamentals of computer/2			**Module Delivery**	
Module Type	Basic			Theory Lab	
Module Code	STUMETC 245				
ECTS Credits	3				
SWL (hr/sem)	75				
Module Level		2	**Semester of Delivery**		4
Administering Department		ETE	**College**	METC	
Module Leader	Ghadah Salim Khefi		**e-mail**	g.s.khefi@stu.edu.iq	
Module Leader's Acad. Title		Assist. Lecturer	**Module Leader's Qualification**		Asst.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date		18/02/2025	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 an understanding of the computer through the application of techniques 2- To understand the work of the electronic computer and the possibility of dealing with it 3- To develop and understand of the fundamental concepts of computer science, including programming, algorithms, data structures, computer architecture, operating systems, and networks. 3- To develop practical skills in software development, including programming, debugging, testing, and documentation. 4- To develop problem-solving skills, including the ability to analyze problems, design solutions, and implement them using appropriate programming languages and tools. 5- To develop and understand of the ethical and social issues related to computing, including privacy, security, intellectual property, and the digital divide. 6- To develop and understand of the role of computer science in society, including its impact on industry, government, healthcare, and education. 7- To understand the diversity of applications of computer science, including artificial intelligence, machine learning, robotics, and data science
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the fundamentals of networking protocols and technologies, such as TCP/IP, DNS, DHCP, Ethernet, and wireless networking. 2. Know how to design, implement, and troubleshoot computer networks, including local area networks (LANs), wide area networks (WANs), and wireless networks. 3. Understand network security concepts, such as firewalls, intrusion detection/prevention systems, and virtual private networks (VPNs). 4. Understand the principles of network management and be able to configure and manage network devices, such as routers, switches, and access points. 5. Understand the basics of network administration, including user and group management, file sharing, and printer sharing. 6. Be able to diagnose and troubleshoot common network problems, including connectivity issues, slow performance, and security breaches. 7. Understand the importance of network monitoring and be able to use network monitoring tools to identify and resolve network issues. 8. Understand the role of networking in cloud computing and be able to design and implement cloud-based networks. 9. Understand the principles of virtualization and be able to implement virtualized networks using technologies such as VMware and Hyper-V. 10. Be able to communicate effectively with other IT professionals and non-technical stakeholders about networking concepts and issues.

	11. Learners understand how to protect their data and devices, including using antivirus software, firewalls, and strong passwords 12. develop skills in creating, editing and formatting documents, spreadsheets and presentations.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A - Fundamentals of networks and the Internet</u> Introduction to networks- Define networks.Network components - Types of networks The Internet - Extranet.(8 hrs) E-mail - E-mail features - Create an e-mail account Skype chat program - program installation - program features(8hrs) Skype chat program - program installation - program features Internet law and types of infringements in the digital world(8hrs) - Part review (2hrs) <u>Part B-the internet and its ethics</u> Internet Information Security - Security Problems - - Weaknesses in the Internet - computer fragility–(8hrs) Computer and information protection The negative effects of using the Internet on health and society–(8hrs) -Part review (3hrs)

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	Supervised learning: This is a commonly used technique in which the neural network is trained on a labeled dataset. The network is fed input data, and the corresponding output is also provided as a label. The network adjusts its weights and biases to minimize the difference between its output and the actual label. Unsupervised learning: This technique involves training a neural network on an unlabeled dataset. The network tries to find patterns and relationships in the data without any supervision. Clustering, dimensionality reduction, and generative models are some examples of unsupervised learning. Reinforcement learning: This technique involves training a neural network to take actions in an environment to maximize a reward signal. The network learns from feedback in the form of rewards or penalties based on its actions. Transfer learning: This refers to using a pre-trained neural network to solve a new task. The pre-trained network is used as a starting point, and its weights and biases are fine-tuned to the new task.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	49	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	26	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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	5% (5)	7 and 13	LO #2, #3، and #7, #8،
	Assignments	2	5% (5)	3 and 10	LO #1, #4 and #5, #6،#9
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	14	LO #10, #11 and #12
	Lab reports and lab exam	15, 1	15% (15)	1-15, 8	All, 1-7
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	3hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction to networks- Define networks
Week 2	Network components - Types of networks
Week 3	The Internet - Extranet
Week 4	Cloud Computing - Cloud computing applications
Week 5	Types of cloud computing - Areas of using the Internet
Week 6	Web browsers - Internet Explorer browser
Week 7	Search on the Internet - use search engines - advanced search
Week 8	E-mail - E-mail features - Create an e-mail account
Week 9	Skype chat program - program installation - program features

Week 10	Internet law and types of infringements in the digital world
Week 11	Internet Information Security - Security Problems -
Week 12	Weaknesses in the Internet - computer fragility
Week 13	Computer and information protection
Week 14	The negative effects of using the Internet on health and society
Week 15	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction to Excel 1- Spreadsheet - A grid of cells used to organize, analyze and manipulate data. 2. Workbook - A file containing one or more worksheets. 3. Worksheet - A single sheet within a workbook where data is entered and analyzed. 4. Cell - The intersection of a row and a column in a worksheet where data is entered.
Week 2	: Basic Excel FunctionsSUM 1- A function used to add up a range of values in a worksheet. 2. AVERAGE - A function used to calculate the average of a range of values in a worksheet. 3. MAX - A function used to find the highest value in a range of values in a worksheet
Week 3	Formatting in Excel 1. Cell formatting - Changing the appearance of a cell, including font, color, and alignment. 2. Number formatting - Changing the way numbers are displayed, such as currency or percent. 3. Conditional formatting - Formatting cells based on certain criteria, such as highlighting cells that contain a certain value.
Week 4	Data Analysis in Excel 1- Sorting - Arranging data in a specific order, such as from highest to lowest. 2- Filtering - Hiding certain rows or columns based on specific criteria

Week 5	Advanced Functions in Excel 1- VLOOKUP - A function used to search for a value in a table and return a corresponding value from another column in the same table. 2- IF - A function used to perform a calculation based on a logical condition.
Week 6	Advanced Data Analysis in Excel 1. Goal Seek - A tool used to find the input value needed to achieve a specific output value in a formula. 2. Scenario Manager - A tool used to analyze how changing certain variables affects the outcome of a formula.
Week 7	What-if Analysis in Excel 1. Data Tables - A tool used to compare different sets of data by substituting different variables. 2. Scenario Analysis - A tool used to analyze how changing different variables affects the outcome of a formula.
Week 8	: Macros in Excel 1. Macro - A set of instructions used to automate repetitive tasks in Excel. 2. VBA - Visual Basic for Applications, a programming language used to create macros in Excel.
Week 9	Working with Large Data Sets in Excel 1. Tables - A range of data that can be sorted, filtered, and analyzed as a single unit in Excel. 2. Data Validation - A tool used to control what data can be entered into a cell or range of cells.
Week 10	Advanced Charting Techniques in Excel 1. Combo Chart - A chart that combines two or more chart types to display different data sets. 2. Sparkline - A small chart that provides a visual representation of data in a single cell.
Week 11	: Advanced Formatting in Excel 1. Custom Number Formats - A tool used to display numbers in a specific format, such as phone numbers or social security numbers. 2. Conditional Formatting - Formatting cells based on certain criteria, such as highlighting cells that contain a certain value.

Week 12	Collaboration in Excel 1- Sharing - A tool used to share a workbook with other users and allow them to edit it simultaneously. 2- Track Changes - A tool used to track changes made to a workbook by different users.
Week 13	Excel Add-Ins and Customization 1. Add-Ins - Additional programs or features that can be added to Excel to extend its functionality. 2. Ribbon - The toolbar at the top of the Excel window that contains commands and options.
Week 14	Data Import and Export in Excel 1- Data Import - Bringing data from external sources into Excel, such as from a database or text file. 2- Data Export - Saving data from Excel to external sources, such as a database or text file.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	William Stallings, (2003), Computer Organization & Architecture, Sixth edition, Preson Education	Yes
Recommended Texts	1. "Networks, Crowds, and Markets: Reasoning About a Highly Connected World" by David Easley and Jon Kleinberg.	No
Websites	Nothing	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Programming			**Module Delivery**	
Module Type	basic			**Theory** **Lab**	
Module Code	STUMETC 244				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2	**Semester of Delivery**		4	
Administering Department	ETE	**College**		METC	
Module Leader	Ghadah Salim Khefi	**e-mail**		g.s.khefi@stu.edu.iq	
Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**		Asst.	
Module Tutor	Name (if available)	**e-mail**		E-mail	
Peer Reviewer Name	Ahmed Thamer Radhi	**e-mail**		ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date	18/02/2025	**Version Number**		1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 and knowing how programming languages work 2. Dealing with problems and analyzing them logically. 3. Problem-solving using programming. 4. Choose the best way to perform the tasks programmatically. 5. Implementation and translation of ideas appropriately to meet my needs and the needs of others from the program.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Knowing how the program works and how the program is translated from natural languages into machine language. 2- The ability to deal with program inputs and outputs. 3- The ability to understand the different types of data and how to manage them during the implementation of the program. 4- The ability to perform various mathematical and logical operations on variables and constants. 5- The ability to control the progress of the program according to the status of the variables, depending on the conditions. 6- The ability to repeat certain operations according to the change in the state of the variables. 7- The ability to manage a sequential set of data in arrays and perform various operations on them.
Indicative Contents المحتويات الإرشادية	Introduction –[History Of Programming Languages, Editors, Compilers, Write First Program][5Hrs]. Input And Output Operator – Comments[Cout Statements ,Cin Statement, Single And Multi Line Comments, CHARACTERS AND LITERALS][5Hrs]. Data Type – Variables And Constants[Variables And Their Declarations, Initializing Variables, Objects, Variables, And Constants, Numeric Data Types, The Boolean Type, Character Types, Integer Types][5Hrs] Operators[Arithmetic Operators, The Increment And Decrement Operators, Composite Assignment Operators][10 Hrs] Selection[The If Statement, The If..Else Statement, Comparison Operators, Boolean Expressions, Nested Selection Statements, The Else If Construct, The Switch Statement][15 Hrs] Loop[The While Statement, Terminating A Loop, The Do..While Statement, The For Statement, The Break Statement, The Continue Statement, The Goto Statement][20 Hrs]. Array[Introduction, Initializing An Array, The Linear Search Algorithm, The Bubble Sort Algorithm, The Binary Search Algorithm][10 Hrs]. String[INTRODUCTION, C-STRINGS, STRING I/O][5hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	46	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module
Evaluationتقييم
المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	5% (5)	5 and 12	LO #1, #2,#3 and #6, #7
	Assignments	2	5% (5)	4 and 10	LO #3, #4 and #6, #7
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Lab report and Lab exam	7, 1	15% (15)		
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	7	LO #1 - #4
	Final Exam	2.5 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered

Week 1	Introduction
Week 2	Input and output operator - comments
Week 3	Data type – Variables and constants
Week 4	Operators
Week 5	Increment and decrement
Week 6	Selection
Week 7	Selection
Week 8	Selection
Week 9	Loop
Week 10	Loop
Week 11	Loop
Week 12	Loop
Week 13	Array
Week 14	Array
Week 15	**String**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Introduction -
Week 2	Input and output operator - comments
Week 3	Data type – Variables and constants
Week 4	Operators
Week 5	Increment and decrement
Week 6	Selection
Week 7	Selection
Week 8	Selection
Week 9	Loop
Week 10	Loop
Week 11	Loop

Week 12	Loop
Week 13	Array
Week 14	Array
Week 15	**String**

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	SCHAUM'S OUTLINE OF THEORY AND PROBLEMS of PROGRAMMING WITH C++ Second Edition	No

Grading Scheme
مخطط الدرجات

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

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Strength of Materials			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab**	
Module Code	STUMETC 243				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	2	**Semester of Delivery**	4		
Administering Department	ETE	**College**	METC		
Module Leader	Jawad Kareem Zebun	**e-mail**	jawad.kareem@stu.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	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq		
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0		

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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. 2. It provides the main features of the strength materials. 3. Illustration and discussion the stress concept as well as types of stresses. Illustrated the Internal forces in beams, how to draw shear force and bending moment diagrams. 4. Understanding of stress strain relationship and solving relevant problems. 5. To understand the limits of materials and the change of their properties with use.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. 2. An understanding of stresses concept 3. 4. An understanding of beam, stresses in beams beam theory and shear 5. 6. An understanding of torsion in shafts determination of shear 7. stresses and twisting. Discuss the buckling in colums. Describe Mohr's Circle. Define thermal stresses. 8. Identify the principle stresses. 9. Can know how to employ the understanding od strength of material to analysis the stress on different sections.
Indicative Contents المحتويات الإرشادية	<u>Part A –various stresses</u> Concept of stress(Tension and compression)- poison's ratio Hook's low, Application ofPoison's ratio onbiaxial stresses- Joint stress- Statically indeterminate problems. [15 hrs] Impact load, elastic and plastic deformation-The torsion formula for the solid circular shaft, Shear stress, Strain and twisting, [15 hrs] Stresses and bending stress – Stress Transformation and Mohr's Circle. [10 hrs] Stresses on thinwall vessels - Stresses on thik wall vessels. [15 hrs] Revision problem classes [6 hrs] <u>Part B –Beam and bending moment and bending streses</u> Beams, deflection of Beams - Stress on beams. [15 hrs] Shear force diagram in beams- Beams loading. [7 hrs] Bending stresses of beams-Failer theory [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
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	5% (5)	5 and 8	LO #3 and #6
	Assignments	2	5% (5)	4 and 6	LO #3and #5
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #4
	Lab reports and lab exam	15, 1	15% (15)	1-7, 8	All, 1-4
Summative assessment	**Midterm Exam**	1.5hr	10% (10)	7	LO #1 - #7
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Concept of stress(Tension and compression)-Poison's ratio Hook's low
Week 2	Application of Poison's ratio on biaxial stresses– Axial load on composite bar.
Week 3	Thermal stresses- Composite rodand pipes.
Week 4	Stresses on thin wall vessels- Stresses on thick wall vessels.
Week 5	Joint stress- Statically indeterminate problems.
Week 6	Impact load, elastic and plastic deformation-The torsion formula for the solid circular shaft.
Week 7	Shear stress, strain and twisting.
Week 8	Maximum shear stress and Torque-Bending moment diagram and shear force diagram.
Week 9	Beams, deflection of Beams - Stress on beams
Week 10	Shear force diagram in beams- Beams loading
Week 11	Stresses and bending stress – Stress Transformation and Mohr's Circle.
Week 12	Mohr's Circle -axial stress and strain theory
Week 13	Columns-Buckling of columns.
Week 14	Moment area method-Theory of shear stress and strain
Week 15	Bending stresses of beams-failer theory

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1-2	Tensile test
Week 3-5	compression test
Week 6-8	Impact test
Week 9-10	Torsion test
Week 11	Spring test
Week 12	Fatigue test
Week 13-15	Bending test – Deflection test

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	Strength of Materials (Fourth Edition) Ferdinand L. Singer , Andrew Pytel Mechanics of Materials (sixth Edition) Ferdinand P. Beer, E. Russell Johnston, Jr.	Yes
Recommended Texts	Mechanics of Materials (Seventh Edition) R.C. Hibbeler.	No
Websites	https://www.amazon.com/Mechanics-Materials-7th-Russell-Hibbeler/dp/0132209918	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Thermodynamic and fluid	**Module Delivery**	
Module Type	core	**Theory** **Lecture** **Lab**	
Module Code	STUMETC 232		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	2	**Semester of Delivery**	3
Administering Department	ETE	**College**	METC
Module Leader	Waleed Khalaf Jabaar	**e-mail**	Waleed.allamy@stu.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	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 provide a knowledge of thermodynamics and energy concept. 2. Illustration and discussion the principles of heat engine principles and description. 3. To understand a cycles for a given use based on energy and heat generation and performance. 4. To be able to know aentropy concept that will have some desirable propertiese. 5. To understand the fluid and flow types which limit of fluidproperties.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An understanding of definition of work ,heat ,system ,type of system ,energy, temperature, pressure ,and show the SI unit and its conservations. 2. List the various terms associated with Properties of a Pure Substance Definition of pure substance ,The Phase Boundaries , show phase change on P-h diagram. 3. Understand tables of thermodynamic properties. 4. Discuss the thermal properties of The Superheated Vapor States Examples for the using steam and R134a Tables. 5. Describe the Ideal Gas States Charles law , Boyles law , Equations of State ,specific heat capacity at constant pressure and at constant volume definition only. 6. Define first Law of Thermodynamics Zero law of thermodynamic ,The Definition of Work, energy equation for open system ,mass conservation. 7. Identify the engineering Applications of energy equation on open system Boiler, compressor ,pump, turbine, and throttling device. 8. Discuss the thermodynamic reversible process (pure substance and Ideal gas) Constant pressure process Constant volume process Constant temperature process Hyperbolic process Adiabatic process ,polytrobic process 9. Identify the thermodynamic irreversible process (pure substance and Ideal gas) Adiabatic Mixing Heat exchanger Separator Throttling.

Indicative Contents المحتويات الإرشادية	Part A –1. An understanding of Definition of work ,heat ,system ,type of system ,energy, temperature, pressure ,and show the SI unit and its conservations. **1-** List the various terms associated with Properties of a Pure Substance Definition of pure substance ,The Phase Boundaries , show phase change on P-h diagram. **2-** understand tables of Thermodynamic Properties. **3-** Discuss the thermal properties of The Superheated Vapor States Examples for the using steam and R134a Tables.. [15 hrs] **4-** Describe the Ideal Gas States Charles law , Boyles law , Equations of State ,specific heat capacity at constant pressure and at constant volume definition only. **5-** Define first Law of Thermodynamics Zero law of thermodynamic ,The Definition of Work, energy equation for open system ,mass conservation. **6-** Identify the engineering Applications of energy equation on open system Boiler, compressor ,pump, turbine, and throttling device. [15 hrs] Part B –8. Discuss the thermodynamic reversible process (pure substance and Ideal gas) Constant pressure process Constant volume process Constant temperature process Hyperbolic process Adiabatic process ,polytrobic process 9. Identify the thermodynamic irreversible process (pure substance and Ideal gas) Adiabatic Mixing Heat exchanger Separator Throttling.[15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	91	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	6

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200

Module Evaluationتقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	5 and 8	LO # 3 and #6
	Assignments	2	5% (5)	4 and 12	LO #3 and # 8
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Lab report and Lab exam	7, 1	15% (15)	1-7, 8	All, 1-4
Summative assessment	Midterm Exam	1.5hr	10% (10)	7	LO #1 - #7
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	dimensions, energies, phases of matter and units of measurement and fluids and thermodynamicsproperties
Week 2	definition of work ,heat ,system ,type of system ,energy, temperature, pressure ,and show the SI unit and its conservations.
Week 3	properties of a Pure Substance Definition of pure substance ,The Phase Boundaries , show phase change on P-h diagram and tables of Thermodynamic Properties "steam and R134a"Thermal.
Week 4	the Ideal Gas States Charles law , Boyles law , Equations of State ,specific heat capacity at constant pressure and at constant volume definition only
Week 5	first Law of Thermodynamics Zero law of thermodynamic ,The Definition of Work, energy equation for open system ,mass conservation
Week 6	engineering Applications of energy equation on open system Boiler, compressor ,pump, turbine, and throttling device

Week 7	thermodynamic reversible process (pure substance and Ideal gas) Constant pressure process Constant volume process Constant temperature process Hyperbolic process Adiabatic process ,polytrobic process
Week 8	thermodynamic irreversible process (pure substance and Ideal gas) Adiabatic Mixing Heat exchanger Separator Throttling
Week 9	constant volume process representation on P-V,T-S and P-h Diagrams Constant temperature process representation on PV,T-S and P-h Diagrams Hyperbolic process representation on P-V,T-S and P-h Diagrams Adiabatic process ,polytrobic process representation on PV,T-S and P-h Diagrams
Week 10	Principleoffluidmotional flow classification
Week 11	bernoulli's equation
Week 12	Entropy concept
Week 13	Conservation of energy and conservation of mass
Week 14	Entropyproduction
Week 15	Nozzle and Boundarylayerkinds

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to thermodynamics experiment
Week 2	carnnot cycle test
Week 3	energy test
Week 4	ideal gaslaw test
Week 5	bernoulli's ANALYSIS
Week 6	Lab 6: flow types
Week 7	Lab 7: entropy test.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Advances of thermodynamics 1, An introduction to Their Properties and Applications, second edition, M. F. Ashby and D. R. H. Jones, Butterworth-Heinemann, Woburn, UK, 1996.	Yes

Websites	https://ftp.idu.ac.id/wp-content/uploads/ebook/tdg/TEKNOLOGI%20REKAYASA%20MATERIAL%20PERTAHANAN/Materials%20Science%20and%20Engineering%20An%20Introduction%20by%20William%20D.%20Callister,%20Jr.,%20David%20G.%20Rethwish%20(z-lib.org).pdf

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	communications			**Module Delivery**	
Module Type	Core			**Theory** **Lecture** **Lab**	
Module Code	STUMETC 353				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	3		**Semester of Delivery**	5	
Administering Department	ETE		**College**	METC	
Module Leader	Wael Hussein Zayer		**e-mail**	wael.zayer@stu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Ahmed thamer radhi		**e-mail**	Ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date	18/02/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 provide a knowledge of communications. 2. Illustration and discussion the principles of communications system, description of type of signals , filters and modulation(AM,FM and PM) as well as transportation lines with basic equations and analysis. 3. To understand the components of signals, their types, and the operations that are performed on them. 4. To understand the analysis of communication systems and how to obtain the best designs.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Able to Recognize Signal analysis. Understand the Types of signs and their Classification. 2. Able to Recognize the Fourier series and understand the spectrum. 3. Able to Recognize the Complex Fourier series. UnderstandFourier integration. 4. Discuss the power and spectrum power and understand modulation and demodulation. 5. Describe Amplitude modulation frequency analysisAM wave generation Detect amplitude-modulated signals. UnderstandFrequency modulationfrequency analysisFM wave generationDetect Frequency modulationsignals. 6. Identify the Segmentation by using time distribution. UnderstandSegmentation by usingfrequency. 7. Discuss Digital modulation and demodulation.Understandmodeling. 8. Able to Recognize PPM and understand PWM. 1- Discuss the PAM and understandPCM. 2- Explain the DM and understand FSK. 3- Identify the ASK and understandPSK. 4- Explain the transportation lines and basic equations and analysis. Understand Impedance. 5- Able to recognize the propagation constant. Understand standing waves. 6- Able to Recognize the Compatible lines. Understand Smith chart. 7- Able to recognize the antennas.Understandcoding and decoding.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A -Signal analysis Types of signs and theirclassification,Fourier series,discrete spectrum,Complex Fourier series,Fourier integration, power and spectrum power[24hrs] Modulation and demodulation,Amplitude modulationfrequency analysisAM wave generationDetect amplitude modulatedsignals,Frequency modulationfrequency analysisFM wave generationDetect Frequency modulationsignals,Segmentation by using timedistribution,Segmentation by usingfrequency. [25hrs] Part B - Digital modulation anddemodulation Digital modulation anddemodulation,modeling,PPM,PWM,PAM,PCM,DM,FSK,ASK,PSK. [35hrs] transportation lines andbasic equations and analysis,Impedance,propagation constant,standing waves,Compatible lines,Smith chart,The antennas,coding and decoding. [28hrs]

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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200

Module Evaluationتقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	5 and 12	LO #1, #3 and #6, #8
	Assignments	2	5% (5)	8 and 13	LO #5 and #6, #12
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Lab Report and Lap Exam	15, 1	15%(15)	1-15,8	LO #1- #15, LO #1- #8
Summative assessment	Midterm Exam	1.5hr	10% (10)	8	LO #1 - #7
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Signal analysis, Types of signs and theirclassification
Week 2	Fourier series, discrete spectrum, Complex Fourier series
Week 3	Fourier integration, Fourier integration
Week 4	power and spectrum power, modulation and demodulation
Week 5	Amplitude modulationfrequency analysis, AM wave generationDetect amplitude modulatedsignals , Frequency modulationfrequency analysisFM wave generationDetect Frequency modulationsignals
Week 6	Segmentation by using timedistribution, Segmentation by usingfrequency,
Week 7	Digital modulation anddemodulation, modeling
Week 8	PPM, PWM.
Week 9	PAM, PCM.

Week 10	DM, FSK
Week 11	ASK, PSK.
Week 12	Transportation lines andbasic equations and analysis, Impedance.
Week 13	Propagation constant, standing waves.
Week 14	Compatible lines, Smith chart.
Week 15	The antennas, coding and decoding.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction &sampling
Week 2	Introduction to digital signaling
Week 3	Amplitude modulation
Week 4	Amplitude modulation
Week 5	Double side band modulation
Week 6	Single side band modulation
Week 7	Pulse width modulation
Week 8	Pulse position modulation
Week 9	Sampling theorem
Week 10	Delta modulation
Week 11	Adaptive delta
Week 12	Pulse code modulation(Multiplexer/Demultiplexer)
Week 13	Pulse Code Modulation (PCM)
Week 14	Amplitude Shift Keying
Week 15	Filters

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**

Required Texts	1.M. Schwartz, Information Transmission, Modulation, and Noise, 4/e,McGraw- Hill, 1990. 2.P. H. Young, Electronic Communication Techniques, 4/e, Prentice-Hall,1998. 3. L. W. Couch II, Digital and Analog Communication Systems, 5/e, PrenticeHall,1997.	NO
Recommended Texts	H. P. Hsu, Analog and Digital Communications, McGraw-Hill, 1993.	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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Control and Vibration Theory			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab**	
Module Code	STUMETC 362				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level		3	**Semester of Delivery**		6
Administering Department		ETE	**College**	METC	
Module Leader	Ahmed thamer radhi		**e-mail**	Ahmed.radhi@stu.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		Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date		18/02/2025	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 provide a knowledge of control and vibration theory. 2. Illustration and discussion the principles of control and vibration theory. 3. The aim of this course is to study control and vibration theory. 4. To be able to create a new material that will have some desirable properties.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An understanding of Dimensions and units of measurement. 2. An understanding of Dimensional Analysis, control and vibration theory. To show knowledge and understanding of the concepts, theory and application of control and vibration theory. 3. Solution of problems involving basic control and vibration theory. 4. Selection and application of appropriate analysis techniques. 5. Observation and recording of experimental data. 6. 7. Preparation of technical report.
Indicative Contents المحتويات الإرشادية	Part A – simple pendulum, [20 hrs] mass-spring-system. [25 hrs] Torsion Vibration. [15 hrs] Part B – Two Degree of Freedom Tensional Vibration. [15 hrs] whirling of shafts [7 hrs] Forced Vibration with Negligible Damping[15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	41	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluationتقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (5)	5 and 8	LO #3 and #6
	Assignments	2	5% (5)	4 and 6	LO #3, and #5
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #4
	Lab report and Lab exam	7, 1	15% (15)	1-15, 8	All, 1-6
Summative assessment	**Midterm Exam**	1.5hr	10% (10)	7	LO #1 - #7
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Introduction
Week 2-6	Simple pendulum.
Week 7-11	Mass-spring systems
Week 12-16	Torsion Vibration
Week 17-21	Two degree of freedom torsion vibration

Week 22-26	Whirling of shafts
Week 27-30	Forced Vibration with negligible damping
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1-2	Simple Pendulum
Week 3-5	Mass –Spring Systems
Week 6-8	Torsion Vibration
Week 9-10	Two Degree of Freedom Torsion vibration
Week 11-13	Whirling of shafts
Week 13-15	Force Vibration with Negligible Damping
Week 16	Preparation and study of the micro Structure of pure metals like Iron, copper and aluminum.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	A Textbook of Vibration with Control inman, Danil J.:Books-.	Yes
Websites	https://books.google.iq/books?hl=en&lr=&id=HbvuDQAAQBAJ&oi=fnd&pg=PR11&dq=+Vibration+with+Control+inman,+Danil+J.:.&ots=VQDdxF47NH&sig=mvQz6hlSesFL8911kuZrPBb9Yd4&redir_esc=y#v=onepage&q=Vibration%20with%20Control%20inman%2C%20Danil%20J.%3A.&f=false	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Electric Power Systems			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab**	
Module Code	STUMETC 351				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level	3	**Semester of Delivery**	5		
Administering Department	ETE	**College**	METC		
Module Leader	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.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	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq		
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0		

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 introduce the students to the general structure of the network for transferring power from generating stations to the consumers. 2- To expose the students to the different electrical & mechanical aspects of the power network along with its environmental and safety constraints. 3- To know solution and analysis of power systems using digital computers
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Ability to design and analyze the real time electrical transmission system with respect to various electrical parameters considering environmental and economic obligations. 2. Develop the ability to implement the appropriate safety equipments for design of electrical power system with enhancing the efficiency of the transmission and distribution system with environment friendly technology. 3. Ability to implement the knowledge of basic mathematical ,physical and electrical principles to formulate significant electrical hazards. 4. Judge the suitability of installing overhead and underground power transmission strategies considering electrical, mechanical, environmental, performance, safety and economic constraints. 5. Chose the appropriate type of power generating station following norms and guidelines related to cost, environment, societal and ethical issues. Also review the different tariff systems available and determine the one most appropriate for a given scenario to optimize the revenue earned. 6. Recognize the need to continuously follow the advancements in technology and incorporating them in the present system to improve efficiency.

Indicative Contents المحتويات الإرشادية	GENERATION OF ELECTRICAL ENERGY- SOURCES OF ENERGY- GENERATING STATIONS- TYPES OF GENERATING STATIONS- ECONOMICAL CONSIDERATION OFGENERATING STATIONS - RECENT DEVELOPMENT IN METHODS OF ELECTRICAL POWER GENERATION- LOAD CURVES AND LOAD FACTORS- BASE LOAD AND PEAK LOAD ON POWER STATION [28 hrs] Over head transmission lines PERFORMANCE OF TRANSMISSION LINES- TRANSMISSION LINE REPRESENTATION (SHORT LENGTH TL, MEDIUM LENGH TL, LONG LENGTH TL)-TRANSMISSION LINE REPRESENTATION (SHORT LENGTH TL, MEDIUM LENGH TL, LONG LENGTH TL)-GENERALIZED CONSTANTS OF OTHER ELEMENTS CONNECTED TO TRANSMISSION LINE- MECHANICAL DESIGN OF TRANSMISSION LINE TRANSIENTS IN TRANSMISSION LINE- TRANSMISSION LINE POWERFLOW AND POWER CIRCLE- INSULATORS (PIN INSULATOR, STRAIN TYPE, SUSPENSION) –SUPPORTS [28 hrs] DISTRIBUTION SYSTEM GENERAL DISTRIBUTION SYSTEM CONFIGURATION- VARIOUS DISTRIBUTION SYSTEM CIRCUIT COMPONENTS- DISTRIBUTION SYSTEM REPRESENTTATION AND PARAMETERS- DISTRIBUTION PARAMETRS ((RADIAL,RING)-DISTRIBUTION PARAMETRS SPIKE, SPINDLE AND INTERCONNECTED SYSTEMS- CALCULATION OF VOLTAGE DROPACROSS DISTRIBUTORS- CALCULATION OF CROSS SECTIONAL AREA OF CONDUCTORS [28 hrs] Cables COSTRUCTION OF CABLES-INSULATING MATERERIALS FOR CABLES- UNDER GROUND CABLES, TYPE OF CABLES- UNDER GROUND CABLES, TYPE OF CABLES [14 hrs] ELECTRICAL SUBSTATION

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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluationتقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (5)	8 and 13	LO #3 and #4
	Assignments	2	5% (5)	12 and 14	LO#5 and #6
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #5
	Lab reports and lab exam	15, 1	15% (15)	1-15, 8	All, 1-6
Summative assessment	**Midterm Exam**	1.5hr	10% (10)	7	LO #1 - #6
	Final Exam	2.5hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	GENERATION OF ELECTRICAL ENERGY SOURCES OF ENERGY
Week 2	GENERATING STATIONS, TYPES OF GENERATING STATIONS
Week 3	ECONOMICAL CONSIDERATION OFGENERATING STATIONS - RECENT DEVELOPMENT IN METHODS OF ELECTRICAL POWER GENERATION

Week 4	LOAD CURVES AND LOAD FACTORS BASE LOAD AND PEAK LOAD ON POWER STATION
Week 5	PERFORMANCE OF TRANSMISSION LINES OVERHEAD TRANSMISSION LINES
Week 6	TRANSMISSION LINE REPRESENTATION (SHORT LENGTH TL, MEDIUM LENGH TL, LONG LENGTH TL) TRANSMISSION LINE REPRESENTATION (SHORT LENGTH TL, MEDIUM LENGH TL, LONG LENGTH TL)
Week 7	GENERALIZED CONSTANTS OF OTHER ELEMENTS CONNECTED TO TRANSMISSION LINE MECHANICAL DESIGN OF TRANSMISSION LINE TRANSIENTS IN TRANSMISSION LINE
Week 8	TRANSMISSION LINE POWERFLOW AND POWER CIRCLE INSULATORS (PIN INSULATOR, STRAIN TYPE, SUSPENSION) –SUPPORTS
Week 9	DISTRIBUTION SYSTEM GENERAL DISTRIBUTION SYSTEM CONFIGURATION
Week 10	VARIOUS DISTRIBUTION SYSTEM CIRCUIT COMPONENTS DISTRIBUTION SYSTEM REPRESENTTATION AND PARAMETERS
Week 11	DISTRIBUTION PARAMETRS ((RADIAL,RING) DISTRIBUTION PARAMETRS SPIKE, SPINDLE AND INTERCONNECTED SYSTEMS
Week 12	CALCULATION OF VOLTAGE DROPACROSS DISTRIBUTORS CALCULATION OF CROSS SECTIONAL AREA OF CONDUCTORS
Week 13	COSTRUCTION OF CABLES INSULATING MATERERIALS FOR CABLES
Week 14	UNDER GROUND CABLES, TYPE OF CABLES UNDER GROUND CABLES, TYPE OF CABLES
Week 15	ELECTRICAL SUBSTATION

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Three phase Transformer Turns Ratio Test set TTR
Week 2	MIT (10KV Diagnostic insulation resistance tester)
Week 3	OiL insulation test
Week 4	Protection Relay
Week 5	Grounding system
Week 6	NGR (the neutral grounding resistance)
Week 7	Power Transmission line Model Study
Week 8	Voltage Distribution and String Efficiency of Model Suspension Insulator
Week 9, 10, and 11	Power Transmission line performance Study
Week 12, 13, and 14	Load flow analysis using power world SIMULATOR
Week 15	Voltage Control in Power System

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	M.E. El-Hawary, “Electrical Energy Systems”,1st Ed., CRC, 2000 Hadi, Saadat, “Power System Analysis”, 2nd Ed., McGraw-Hill 2002 Electrical power systems. {Weedy, B.M. }	No

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Electromechanical designs	**Module Delivery**	
Module Type	core	**Theory** **Lecture**	
Module Code	STUMETC 364		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	3	**Semester of Delivery**	6
Administering Department	ETE	**College**	METC
Module Leader	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.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	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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. Cover the basics of machine design, including the design process, engineering mechanics and materials, failure prevention under static and variable loading, and Characteristics of the principal types of mechanical elements. 2. Offer a practical approach to the subject through a wide range of real-world applications and examples. 3. Identify appropriate analytical models to describe and predict the behavior of standard machine components;
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Make appropriate use of available computer aided design software for Electromechanical designs. 2- Understand measurement and instrumentation in modern electromechanical systems 3- Conceptualise, design and evaluate an electro-mechanical systems. 4- Apply stress analysis theory, fatigue theory and appropriate criteria of failure to the design of simple machine elements; 5- Select appropriate mechanical components from manufacturers' catalogues. 6- Apply codes and standards to machine component design. 7- Understand safety and reliability concepts in the design of machine elements. 8- Communicate the results of a design assignment by means of drawings and a design report.

Indicative Contents المحتويات الإرشادية	Materials in electromechanical design- Design for different types of loading- Electromotor and controls [15 hrs] Shaft design- Key- Rolling control Bearing [15 hrs] Belt drives chain drives- pulleys- Gears [15 hrs] Bolted connections- riveted connections- welded joints[15 hrs] Clutches- Brakes- couplings[15 hrs]

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
	Quizzes	2	10% (10)	3 and 8	LO #1, #2 and #6

Formative assessment	**Assignments**	2	10% (10)	4 and 13	LO#3, #5 and #6
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #1, #2 and #3
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #7
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Materials in electromechanical design
Week 2	Design for different types of loading
Week 3	Electromotor and controls
Week 4	Shaft design
Week 5	Key
Week 6	Rolling control Bearing
Week 7	Belt drives chain drives
Week 8	pulleys
Week 9	Gears
Week 10	Bolted connections
Week 11	riveted connections
Week 12	welded joints
Week 13	Clutches
Week 14	Brakes
Week 15	couplings

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	**Joseph E. Shigley, STANDARD HANDBOOK OF MACHINE DESIGN, 2nd Edition , McGraw Hill, 1996** **Richard G. Budynas, J. Keith Nisbett, Shigley's Mechanical Engineering Design, 8th Edition , McGraw Hill, 2006**	No

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Engineering and Numerical Analysis			**Module Delivery**	
Module Type	core			**Theory** **Tutorial**	
Module Code	STUMETC 365				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		3	**Semester of Delivery**		6
Administering Department		ETE	**College**	METC	
Module Leader	Read Khalid Hemeed		**e-mail**	Read.Khalid@stu.edu.iq	
Module Leader's Acad. Title		**Assist. Lecturer**	**Module Leader's Qualification**		Asst.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date		18/02/2025	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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. An understanding of engineering and numerical analysis. 2. understanding of the concept engineering and numerical analysis 3. Solution of problems involving engineering and numerical analysis. 4. Selection and application of appropriate analysis techniques. 5. Solution of problems involving engineering and numerical analysis. 6. At the end of the year the student should be able demonstrate knowledge and understanding of the concept engineering and numerical analysis.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Able to recognizethesolution of non-LinearEquations byNumerical MethodsClosed Methods(Bracketing methods)Searching method Bisection methods.UnderstandOpen Methods (iterative methods) Newton – Raphson Secant method. 2. Able to Recognize Curves Fitting the Least square method linear regression Polynomial regression.Understand the Linearization of nonlinear models. 3. Discuss the Interpolation Gregory – Newton interpolation formula Forward difference backward difference Center difference Gauss forward-Gauss backwardandUnderstandLagrange Interpolation. 4. Describe the Numerical Solution of linear equations systems Direct Methods- Gauss show elimination method Gauss – Jordan method.Indirect Methods Gauss - Jacobi method Gauss – Siedel method. 5. Identify the Numerical Differentiation Derivatives based on Newton'sforward interpolation Derivatives based on Newton's backward interpolation. UnderstandNumerical integration Midpoint rule-Trapezoidal rule-Simpson's (1/3) rule.. 6. Discuss Simpson's (3/8) rule of Double Integration.Understandthe Numerical solution of ordinary differential equations (1st order) Euler's methodModified Euler's method. 7. Able to Recognize the Runge-Kutta method 2 nd order 4 th order and understand Partial DifferentialEquationsClassification of PDESolution of PDE byseparation of variables. 8. Discuss the Wave Equation and understandHeat Equation. 9. Explain the Laplace Equation and understand the Solution of Ordinary Differential Equations by Power seriesClassification of ODE. 10. Identify the Solution Methods Undetermined Coefficients Method. And understand the Fresenius Method Case I. 11. Explain the Fresenius Method Case IIand Case III. 12. Able to recognize Z transform Sequences- Table of Z – Transform andUnderstand Properties of Z – Transform. 13. Able to Recognize the Inverse Z – Transform. Understand solving the recurrence relations. 14. Able to recognize theFourier transform Complex Fourier series.Understandsome special functions and their transforms even functions-Odd functions- Top-hat function. 15. Able to recognize the Properties of Fourier transform Linearity. UnderstandTime shaftingFrequency shafting

Indicative Contents المحتويات الإرشادية	Part A –Numerical Methods Solution of non-LinearEquations byNumerical MethodsClosed Methods(Bracketing methods)Searching methods Bisection methods.Open Methods (iterative methods) Newton – Raphson Secant method.Curves Fitting the Least square method linear regression -Polynomial regression. Linearization of nonlinear models. Interpolation Gregory – Newton interpolation formula Forward difference backward difference Center difference Gauss forward-Gauss backward and Lagrange Interpolation. Numerical Solution of linear equations systems Direct Methods- Gauss show elimination method Gauss – Jordan method. Indirect Methods Gauss - Jacobi method Gauss – Siedel method. Numerical Differentiation Derivatives based on Newton'sforward interpolation Derivatives based on Newton's backward interpolation. Numerical integration Midpoint rule-Trapezoidal rule-Simpson's (1/3) rule [20hrs] Simpson's (3/8) rule Double Integration. Numerical solution of ordinary differential equations (1st order) Euler's method-Modified Euler's method. Able to Recognize the Runge-Kutta method 2 nd order 4 th order[6hrs] Part B –DifferentialEquations Differential Equations Classification of PDESolution of PDE by separation of variables. Wave Equation and understandHeat Equation. Laplace Equation Solution of Ordinary Differential Equations by Power seriesClassification of ODE. Solution Methods Coefficients Method. And understand the Fresenius Method Case I. Fresenius Method Case II and Case III. [18hrs] Z transform Sequences- Table of Z – Transform and Understand Properties of Z – Transform, Inverse Z – Transform. Understand solving the recurrence relations. Fourier transforms Complex Fourier series.Some special functions and their transforms even functions- Odd functions- Top-hat function. Properties of Fourier transform Linearity,Time shaftingFrequency shafting[16hrs]

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

Module Evaluation تقييم
المادة الدراسية

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

Delivery Plan (Weekly Syllabus)
المنهاج الاسبوعي النظري

	Material Covered
Week 1	solution of non-Linear Equations by Numerical Methods. Closed Methods (Bracketing methods)Searching method Bisection methods. Open Methods (iterative methods) Newton – Raphson Secant method.
Week 2	Curves Fitting- the Least square method -linear regression -Polynomial regression. Linearization of nonlinear models.
Week 3	Interpolation Gregory – Newton interpolation formula- Forward difference- backward difference- Center difference- Gauss forward-Gauss backward and Lagrange Interpolation.

Week 4	The Numerical Solution of linear equations systems- Direct Methods- Gauss show elimination method Gauss – Jordan method. Indirect Methods Gauss - Jacobi method Gauss – Siedel method.
Week 5	Numerical Differentiation- Derivatives based on Newton's forward interpolation- Derivatives based on Newton's backward interpolation- Numerical integration- Midpoint ruleTrapezoidal rule-Simpson's (1/3) rule.
Week 6	Simpson's (3/8) rule of Double Integration, Numerical solution of ordinary differential equations (1st order) Euler's method-Modified Euler's method.
Week 7	Runge-Kutta method 2 nd order 4 th order, Partial Differential Equations Classification of PDESolution of PDE by separation of variables.
Week 8	Wave Equation,Heat Equation.
Week 9	The Laplace Equation, the Solution of Ordinary Differential Equations by Power seriesClassification of ODE.
Week 10	Solution Methods Undetermined Coefficients Method, Fresenius Method Case I.
Week 11	Fresenius Method Case II and Case III.
Week 12	Z transform Sequences- Table of Z – Transform, Properties of Z – Transform.
Week 13	Inverse Z – Transform, solving the recurrence relations.
Week 14	The Fourier transform Complex Fourier series,some special functions and transforms even function- Odd functions- Top-hat function.
Week 15	Able to recognize the Properties of Fourier transform Linearity,Time shaftingFrequency shafting

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Moin, P. (2010). Frontmatter. In Fundamentals of Engineering Numerical Analysis (pp. I-Iv).Cambridge: Cambridge University Press	NO
Recommended Texts		No
Websites		

Grading Scheme مخطط الدرجات

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

Success Group (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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	English language/3			**Module Delivery**	
Module Type	Basic				
Module Code	STUMETC 355				
ECTS Credits	3				
SWL (hr/sem)	75			**Theory**	
Module Level		3	**Semester of Delivery**		5
Administering Department		ETE	**College**	METC	
Module Leader	Wael Hussien Zayer		**e-mail**	wael.zayer@stu.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date		18/02/2025	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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. Develop students skills in understanding the grammars of English. 2. Develop students' speaking skills in English. 3. Develop students' listening skills in English. 4. Develop students' reading skills in English. 5. Develop students' reading skills in English.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Understand the rule of Tenses, Question words. Words with two meanings, Adjectives ending in -ed and -ing as Vocabulary 2- Understand the usage of Present Simple / Continuous, Short answers. Making conversation, Things I like doing as Vocabulary. 3- Understand the grammars of past Simple or Continuous. In, at, on as Vocabulary . 4- Understand the grammars of Count / Uncount nouns, Articles. Having dinner together as Vocabular . 5- Understand the grammars of Verb patterns, Future forms. Phrasal verbs - literal as Vocabulary. 6- Understand the grammars of superlatives. Synonyms as Vocabulary. 7- Understand the grammars of Present Perfect, For and since. Antonyms as Vocabulary. 8- Understand the grammars of should / must / have to. So and such as Vocabulary. 9- Understand the grammars of Past Perfect and Past Simple, Joining sentences. Question tags as Vocabulary. 10- Understand the grammars of Passives. Words that go together as Vocabulary. 11- Understand the grammars Present Perfect Simple / Continuous. Thank you and goodbye as Vocabulary. 12- Understand the grammars First conditional. Prepositions as Vocabulary. 13- Understand the grammars of Second conditional. Phrasal verbs, idiomatic as Vocabulary. 14- Understand the grammars of Tenses. Adverbs as Vocabulary.

Indicative Contents المحتويات الإرشادية	The grammars of Tenses, Question words, Present Simple / Continuous, Short answers, Past Simple or Continuous. Words with two meanings, Adjectives ending in -ed and -ing, Making conversation, Things I like doing, in, at, on as Vocabulary. [6] The grammars of Count / Uncount nouns, Articles, Verb patterns, Future forms, Superlatives. Having dinner together, Verb patterns, Future forms, Synonyms as Vocabulary. [6] The grammars of Present Perfect, For and since, should / must / have to, Past Perfect and Past Simple, Joining sentences . Antonyms, So and such, Question tags as Vocabulary. [6] The grammars of Passives, Present Perfect Simple / Continuous, First conditional. Words that go together, hank you and goodbye, prepositions as Vocabulary. [6] The grammars of second conditional, Tenses. Phrasal verbs - idiomatic, Adverbs as Vocabulary. [4]

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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	42	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Unit one : Agree with me Grammar: Tenses, Question words Vocabulary: Words with two meanings, Adjectives ending in -ed and -ing
Week 2	Unit two : At the doctor's Grammar: Present Simple / Continuous, Short answers Vocabulary: Making conversation, Things I like doing
Week 3	Unit three: Bad news Grammar: Past Simple or Continuous Vocabulary: in, at, on
Week 4	Unit four : Good news Grammar: Count / Uncount nouns, Articles Vocabulary: Having dinner together
Week 5	Unit Five : Making conversation Grammar: Verb patterns, Future forms Vocabulary: Phrasal verbs - literal
Week 6	Unit six : On the phone Grammar: Superlatives Vocabulary: Synonyms

Week 7	Unit seven : Grammar: Present Perfect, For and since Vocabulary: Antonyms
Week 8	Unit eight : Grammar: should / must / have to 1, should / must / have to 2 Vocabulary: So and such
Week 9	Unit nine : Grammar: Past Perfect and Past Simple, Joining sentences Vocabulary: Question tags
Week 10	Unit ten: Grammar: Passives 1, Passives 2 Vocabulary: Words that go together
Week 11	Unit eleven: Grammar: Present Perfect Simple / Continuous Vocabulary: Thank you and goodbye
Week 12	Unit twelve: Grammar: First conditional Vocabulary: Prepositions
Week 13	Unit thirteen: Grammar: Second conditional Vocabulary: Phrasal verbs - idiomatic
Week 14	Unit fourteen: Grammar: Tenses Vocabulary: Adverbs
Week 15	assessment

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	New headway, Liz and John Soars, OXFORD	No
Recommended Texts	English Grammar in Use, 5th Edition by Raymond Murphy.	No
Websites	https://elt.oup.com/student/headway/preint4/?cc=global&selLanguage=en	

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	راس ب	(0-44)	Considerable amount of work required

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Theory of machines	**Module Delivery**	
Module Type	Core	**Theory** **Lecture** **Lab**	
Module Code	STUMETC 354		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	3	**Semester of Delivery**	5
Administering Department	ETE	**College**	METC
Module Leader	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.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	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 fundamentalof the static and dynamic problem Static method - dynamic method. 2. To understand the linear and angular velocity, Velocity and acceleration problems. 3. The use of Spur gear theory, Parameters of the spur gear. 4. To evaluate the Gear train theory, Theory of belt drives. 5. To develop knowledge of balancing theory, Turning moment diagram and flywheel. 6. To understand the Theory of friction clutch, Theory used in the analysis of friction clutch, Cone clutch, Centrifugal clutches.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Interview of the static and dynamic problem, Static method - dynamic method, Slider Crank Mechanism. 2. Linear and angular velocity - power, torque, moment of inertia and acceleration. 3. Understanding of Velocity and acceleration diagram, Velocity and acceleration problem. 4. Spur gear theory, Direct Methods-Involute of the spur gear.The Governor Parameters of the spur gear. 5. Review of all the application and different problem of the spur gear. 6. Gear train theory, compound gear train, inverted gear train,relevant problems. Theory of belt drives, Modification for V – grooved pulley, Examples and problem. 7. Discussion and review of the previous topics. 8. 1- Balancing theory, Static and dynamic balance- Balancing of masses rotating in the same plane. 2- Balancing of masses rotating in the different planes –Dalby's method - Dynamic forces at bearings - Examples and problem. 3- Turning moment diagram and flywheel, Single cylinder double acting - Four stroke cycle. Max fluctuation of energy, Dimensions of the flywheel rim. 4- Theory of friction clutch, Plate clutches, Theory used in the analysis of friction clutch. 5- Adjustment of toggle mechanism, Cone clutch, Centrifugal clutches. 6- Discussion and review of the previous topics.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – define of velocity and acceleration Interview of the static and dynamic problem, Static method - dynamic method, Linear and angular velocity - power, torque, moment of inertia and acceleration.Understanding of Velocity and acceleration diagram, Velocity and acceleration problem.Slider Crank Mechanism. [21hrs] Part B – Spur Gear Spur gear theory, Direct Methods-Involute of the spur gear.The Governor Parameters of the spur gear.Review of all the application and different problem of the spur gear.[14hrs] Part C – Gear Train and belts Gear train theory, compound gear train, inverted gear train, relevant problems.Theory of belt drives, Modification for V – grooved pulley, Examples and problem.[14hrs] Revision problems [7hrs] Part D – Balancing theory Balancing theory, Static and dynamic balance- Balancing of masses rotating in the same plane.Balancing of masses rotating in the different planes –Dalby's method - Dynamic forces at bearings - Examples and problem.[14hrs] Part D – Theory of flywheel clutches Turning moment diagram and flywheel, Single cylinder double acting - Four stroke cycle. Max fluctuation of energy, Dimensions of the flywheel rim.Theory of friction clutch, Plate clutches, Theory used in the analysis of friction clutch.Adjustment of toggle mechanism, Cone clutch, Centrifugal clutches. [21 hrs] Discussion and review of the problems. [7hrs]

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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	41	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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	5% (5)	5 and 13	LO #1, #2 and #6, #8
	Assignments	2	5% (5)	4 and 12	LO #3, #4 and #6, #7
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Lab report and Lab exam	7, 1	15% (15)		
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	7	LO #1 - #7
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Interview of the static and dynamic problem, Static method - dynamic method, Slider Crank Mechanism
Week 2	Linear and angular velocity - power, torque, moment of inertia and acceleration.
Week 3	Understanding of Velocity and acceleration diagram, Velocity and acceleration problem.
Week 4	Spur gear theory, Direct Methods-Involute of the spur gear.The Governor Parameters of the spur gear.
Week 5	Review of all the application and different problem of the spur gear.
Week 6	Gear train theory, compound gear train, inverted gear train, relevant problems.
Week 7	Theory of belt drives, Modification for V – grooved pulley, Examples and problem.
Week 8	Mid-term Exam
Week 9	Balancing theory, Static and dynamic balance- Balancing of masses rotating in the same plane.
Week 10	Balancing of masses rotating in the different planes –Dalby's method - Dynamic forces at bearings - Examples and problem.
Week 11	Turning moment diagram and flywheel, Single cylinder double acting - Four stroke cycle. Max fluctuation of energy, Dimensions of the flywheel rim.
Week 12	Theory of friction clutch, Plate clutches, Theory used in the analysis of friction clutch.
Week 13	Adjustment of toggle mechanism, Cone clutch, Centrifugal clutches.
Week 14	Discussion and review of the previous topics.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Slider Crank Mechanism.
Week 2	Rope Belt Friction.
Week 3	The Governor.
Week 4	Balancing of Rotating Masses.
Week 5	Gear Trains.
Week 6	Fly Wheel.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Theory of Machines and Mechanisms idu.ac.id https://ftp.idu.ac.id › uploads › ebook › tdg › The... John J. Uicker, Emeritus Dean of ... Kinematics and Dynamics of Machine Systems	No
Recommended Texts	Books and Literatures in different kinds of theory of machines.	No

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Heat transfer and Hydraulic systems			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab**	
Module Code	STUMETC **352**				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		3	**Semester of Delivery**		5
Administering Department		ETE	**College**	METC	
Module Leader	Mahmoud Aziz Muhammad		**e-mail**	mahmmodaziz@stu.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date		18/02/2025	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 heat transfer modes concepts. 2. To define the theoretical basics of the conduction heat transfer Coincided with a laboratory experiment. 3. To define the theoretical basics of the forced and free convective heat transfer Coincided with a laboratory experiment. 4. To define the theoretical basics of the radiation heat transfer. 5. To define the theoretical basics of the heat exchangers Coincided with a laboratory. 6. To define the theoretical basics of the mixed modes of heat transfer.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Able for solving the heat conduction questions through different geometrical shapes (plane wall, cylinder, sphere) 2- Able for solving the questions deals with extended surfaces 3- Able for solving the questions deals with conduction through two dimensional fields analytically and numerically 4- Able for solving the questions deals with conduction through one and two dimensional fields analytically and numerically in unsteady state conditions 5- Introduce the basics of fluid flow and the related equations 6- Introduce the temperature distribution through the boundary layer and calculating the heat transfer by forced convection 7- Introduce the temperature distribution through the boundary layer and calculating the heat transfer by free convection 8- Introduce the calculating approach of the heat radiated and exchanged from different bodies temperatures 9- Introduce the student to the main equations for designing heat exchangers
Indicative Contents المحتويات الإرشادية	Conduction heat transfer (1D) [21 hrs] Heat transfer through fins- Two dimensional steady state heat conduction- One and Two dimensional unsteady state heat conduction [21hrs] Convective heat transfer- Forced convection- Natural convection- Thermal radiation [35 hrs] Heat exchangers [28 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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluationتقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (5)	8 and 13	LO #3 and #4
	Assignments	2	5% (5)	12 and 14	LO#5 and #6
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #5
	Lab reports and lab exam	15, 1	15% (15)	1-15, 8	All, 1-6
Summative assessment	**Midterm Exam**	1.5hr	10% (10)	7	LO #1 - #6
	Final Exam	2.5hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1-Week 3	Conduction heat transfer (1D)
Week 4	Heat transfer through fins
Week 5	Two dimensional steady state heat conduction
Week 6	One and Two dimensional unsteady state heat conduction
Week 7	Convective heat transfer
Week 8	Forced convection
Week 9	Natural convection
Week 10-11	Thermal radiation
Week 12-15	Heat exchangers

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	linear Heat Conduction
Week 2	
Week 3	
Week 4	
Week 5	Radial Heat Conduction
Week 6	
Week 7	
Week 8	
Week 9	calibration of Thermocouple
Week 10	Cross-Flow Heat Exchanger
Week 11	Gear Trains Radiation Heat Transfer
Week 12	Boiling Heat Transfer
Week 13	
Week 14	
Week 15	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**

Required Texts	-Heat Transfer, ten edition,(J, P.Holman,2002). -Fundamental of heat and mass transfer,(F.P.Incropera,1981).	No

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks %	Definition
Success Group (50 - 100)	**A -** Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Industrial Engineering			**Module Delivery**	
Module Type	core			Theory Lecture	
Module Code	STUMETC 363				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	3	**Semester of Delivery**	6		
Administering Department	ETE	**College**	METC		
Module Leader	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.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	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq		
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0		

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 provide a knowledge of Industrial engineering. 2. Illustration and discussion the principles of the scope of Industrial Engineering and the Management Process. 3. To understand of the fundamentals of production and the productivity.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize solving minimization problems 2. Recognize graphical Solution 3- Recognize assignment Model 4- Recognize maximization problems 5- Recognize assignment Model 6- Recognize d Vogal's Approximation Method - 7- Recognize stone Method 8- Recognize spanning Tree Technique 9- Recognize sequencing Models 10-Recognize processing N Jobs through One Machine 11-Recognize processing N Jobs through Two Machines 12-Recognize processing N Jobs through Three machines- inventory control models & material requirement planning 13- Recognize quality control

Indicative Contents المحتويات الإرشادية	The production and the productivity -Computing Productivity Factors that affect Productivity-Productivity Improvement Break Even Analysis [20 hrs] Solving Minimization Problems-Solving Maximization Problems Assignment Model [15 hrs] Transportation Model- Setting up Transportation Problem Developing an Initial Solution- Northwest Corner Method- Least–Cost Method [15 hrs] Vogal's Approximation Method -Stepping Stone Method Network Models - Minimal – Spanning Tree Technique- Sequencing Models -Processing N Jobs through One Machine Processing N Jobs through Two Machines- Processing N Jobs through Three Machines- Inventory Control Models & Material Requirement Planning [15 hrs] Reliability- Quality Control -Statistical Concepts in Quality Control- Statistical Limit Theorem and Quality Control- Control Charts- Control Charts for Variables- Six Sigma, ISO,TQM [5 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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	78	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	72	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	8 and 13	LO #3 and #4
	Assignments	2	10% (10)	12 and 14	LO#5 and #6
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #5
Summative assessment	**Midterm Exam**	1hr	10% (10)	7	LO #1 - #6
	Final Exam	2hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	The production and the productivity
Week 2	Computing Productivity
Week 3	Factors that affect Productivity
Week 4	Productivity Improvement Break Even Analysis
Week 5	Solving Minimization Problems
Week 6	Solving Maximization Problems
Week 7	Solving maximization problems
Week 8	Assignment Model
Week 9	Transportation Model- Setting up Transportation Problem
Week 10	Developing an Initial Solution
Week 11	Northwest Corner Method- Least–Cost Method
Week 12	Vogal's Approximation Method -Stepping Stone Method
Week 13	Network Models - Minimal – Spanning Tree Technique- Sequencing Models - Processing N Jobs through One Machine
Week 14	Processing N Jobs through Two Machines- Processing N Jobs through Three Machines- Inventory Control Models & Material Requirement Planning
Week 15	Reliability- Quality Control -Statistical Concepts in Quality Control- Statistical Limit Theorem and Quality Control- Control Charts-Control Charts for Variables- Six Sigma, ISO,TQM

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	**Hamdy A. Taha " Operations Research : an introduction" 6th edition (1997), Prentice-Hall.**	No

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Synchronous and special Machines			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab** **Tutorial**	
Module Code	STUMETC 361				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		3	**Semester of Delivery**		6
Administering Department		ETE	**College**	METC	
Module Leader	Ahmed Thamer Radhi		**e-mail**	ahmed.radhi@stu.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		Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date		18/02/2025	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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	13. To provide a knowledge of synchronous & special machines . 14. Illustration and discussion the principles of synchronous & special machines, description of the machine, as well as its operation in synchronous & special machines. 15. To analyses existing of synchronous & special machines and contribute to new designs.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Able to recognize synchronous generators Composition and working principle Ways to stir coils. Understand Equivalent circuit and phase diagram Armature reaction-Voltage regulation. Able to recognize the E.M.F. Understand open and short circuit Characteristics, generators work in parallel, load angle control. Discuss the characteristics of the power angle of the machines with prominent cylindrical rotor and understand the conditions for generators to work in parallel, transient stability of synchronousgenerators work with infinite bars. Describe the synchronous motor's composition and working principle. Understand the Equivalent circuit and phase diagram principle of a DC motor. Identify the Steady-state properties. Understand synchronous motor ratings. Discuss the power angle curve. Understand the Velocity-torque curve. Able to recognize the effect of field current change on the properties of synchronous motors and understand synchronous capacitors. Discuss the special machines, single phase induction motors' composition and working principle and understand of equivalent circuit and phase diagram, positive and negative sequence analysis. Explain the split phase motor Identify the universal motors' composition, working principle, equivalent circuit and phase diagram. understand the repulsion motor's composition, working principle equivalent circuit and phase diagram properties. Explain the step motors' composition, working principle, equivalent circuit and phase diagram. Understand variable impedance motors. Able to recognize the Linear and nonlinear analysis of Market circles characteristics. Able to Recognize the permanent magnet synchronous motors, composition , working principle, equivalent circuit and phase diagram. Understand DC motors with permanent magnets composition, working principle, equivalent circuit and phase diagram. Able to recognize the brushless DC motors composition, working principle, equivalent circuit and phase diagram. Understand servo 'motors composition, working principle, equivalent circuit and phase diagram. Able to recognize the synchronizers composition, working principle, equivalent circuit and phase diagram Understand modern technologies to control the speed of electric motors.

Indicative Contents المحتويات الإرشادية	Part A –synchronous generators Synchronous generators composition and working principle. Ways to stir coils- Equivalent circuit- phase diagram- armature reaction- voltage regulation- .open and short circuit characteristics- Generators work in parallel- Load angle control- The Characteristics of the power angle of the machines with prominent cylindrical rotor- Voltage ratings, speed, frequency, power, and power factor Directorthogonal axes theory and understand the Conditions for generators to work in parallel Transient stability of synchronousgenerators work with infinite bars. [24hrs] Synchronous motor's Composition and working principle. Equivalent circuit and phase diagram principle of a DC motor. Steady-state properties. Synchronous motor ratings. The power angle curve. The Velocity-torque curve. Effect of field current change on the properties of synchronous motors,and synchronous capacitors.Special machines Single phase induction motors' Composition and working principle, of Equivalent circuit and phase diagram, positive and negative sequence analysis. Split phase motor permanent expansion motor starting capacitorMotorshaded pole motor,Speed controlmethods. universal motors' Composition and working principle Equivalent circuit and phase diagram Properties Speed control methods the Repulsion motor's Composition and working principle Equivalent circuit and phase diagramProperties. [56hrs] Part B - step motors' Composition Step motors' Composition and working principle Equivalent circuit and phase diagram. Variable impedance motorspermanent magnet motors hybrid engines Different stirring methods Momentum prediction theory. Linear and nonlinear analysis of Market circles -characteristics, Speed control methods, Impedance motors Composition and working principle Torque prediction ability controllers motors characteristics. Types of impedance motors variable impedance keyed impedance Speed control methods. [16hrs] Permanent magnet synchronous motors Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis. DC motors with permanent magnets Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis.Brushless DC motors Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis. Servo motors' Composition and working principles Equivalent circuit and phase diagram AC and DC servo motors Speed control methods. Synchronizers Composition and working principle Equivalent circuit and phase diagram Speed control methods. Modern technologies to control the speed of electric motors digital signal processor technology Programmable field gate array technology Hybrid technology. [24hrs]

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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	124	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	51	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	3
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (5)	5 and 8	LO #1, #3 and #6
	Assignments	2	5% (5)	4 and 14	LO #3 and #6, #13
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #5, #8 and #10
	Lab Report and Lap Exam	15, 1	15%(15)	1-15,8	LO #1- #15, LO #1- #8
Summative assessment	**Midterm Exam**	1.5hr	10% (10)	8	LO #1 - #7
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Synchronous generators Composition and working principle- ways to stir coils- Equivalent circuit and phase diagram-Armature reaction-Voltage regulation.
Week 2	E.M.F- Open and short circuit characteristics- generators work in parallel -Load angle control.
Week 3	Characteristics of the power angle of the machines with prominent cylindrical rotor- Voltage ratings, speed, frequency, power, and power factor Direct-orthogonal axes theory, conditions for generators to work in parallel- Transient stability of synchronousgenerators work with infinite bars.
Week 4	Synchronous motor's Composition and working principle-Equivalent circuit and phase diagram-principle of a DC motor. The Special machines- single phase induction motors'- composition and working principle- Equivalent circuit and phase diagram, positive and negative sequence analysis.
Week 5	Steady-state properties, synchronous motor ratings.
Week 6	Power angle curve. Velocity-torque curve
Week 7	The Effect of field current change on the properties of synchronous motors,and synchronous capacitors.
Week 8	Special machines- single phase induction motors'- composition and working principle- equivalent circuit and phase diagram, positive and negative sequence analysis.
Week 9	Split phase motor permanent expansion motor starting capacitor motor shaded pole motor ,speed control methods.
Week 10	the universal motors' Composition and working principle Equivalent circuit and phase diagram Properties Speed control methods , Repulsion motor's Composition and working principle Equivalent circuit and phase diagramProperties.
Week 11	Step motors' Composition and working principle Equivalent circuit and phase diagram. Variable impedance motors permanent magnet motors hybrid engines Different stirring methods Momentum prediction theory.
Week 12	Linear and nonlinear analysis of Market circles -characteristics Speed control methods Impedance motors Composition and working principle Torque prediction ability controllers motors characteristics. Types of impedance motors variable impedance keyedimpedance Speed control methods.
Week 13	Permanent magnet synchronous motors Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis. DC motors with permanent magnets composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis.

Week 14	Able to recognize the Brushless DC motors Composition and working principle Equivalent circuit and phase diagram Magnetic circuit analysis.Servo 'motors Composition and working principles Equivalent circuit and phase diagram AC and DC servo motors Speed control methods.
Week 15	Synchronizers Composition and working principle Equivalent circuit and phase diagram Speed control methods. Modern technologies to control the speed of electric motors digital signal processor technology Programmable field gate array technology Hybrid technology

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Alternator Regulation
Week 2	Alternator Characteristics
Week 3	Load Test on a Three Phase Induction Motor
Week 4	Open Circuit and Short Circuit Test on a Three Induction Motor
Week 5	Synchronous Motor Operation
Week 6	Load Test on Synchronous Motor and Measurement of Power Angle
Week 7	Determination of Parameters of Synchronous Machine
Week 8	: NO load operation of 3 phasesynchronous machine as generator
Week 9	Short circuit test of the three-phasesynchronous generator
Week 10	Connecting the three-phase synchronous alternator in parallel with network
Week 11	Obtaining the V curve of the synchronous motor operating it at load
Week 12	Short circuit test for the 3-phasesynchronous generator
Week 13	Power factor correction in three-phase circuit
Week 14	Power factor correction using 3 phase synchronous motor
Week 15	discussion

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**

Required Texts	1- A Textbook of Electrical Technology Volume II, AC and DC machines,B.L. THERAJA. A.K. THERAJA, 20062. 2- Electrical Machines and Transformers –Principles and Applications, P. F. Ryff, D.Platnick and J. A. Karnas, Printice Hall	NO
Recommended Texts	Electrical Machinery_Dr. P S Bimbhra	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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Air conditioning and cooling systems	**Module Delivery**	
Module Type	Core	**Theory** **Lecture** **Lab**	
Module Code	STUMETC 483		
ECTS Credits	8		
SWL (hr/sem)	200		
Module Level	4	**Semester of Delivery**	8
Administering Department	ETE	**College**	METC
Module Leader	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.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	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 fundamental of air conditioning and refrigeration principles, psychometric processes and psychometric chart, air mixing process. 2. To understand the estimation of cooling load and the use of the related properties of various buildings materials. 3. The use of relevance charts of duct system designs and fan power. 4. To evaluate the heating load of buildings. 5. To develop knowledge of understanding piping systems of cold and hot water supplies. 6. To understand the Carnot and ideal vapor compression cycles and refrigeration systems. The absorption refrigeration cycle.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Describe of basic concepts of air conditioning and comfort properties.Understanding of thepsychometric chart principles and various air processes. 2. Understanding of principles of the by-pass factor and air mixing processes. 3. Understanding of cooling load estimations of buildings. Learning the use of various properties of materials. 4. Skills of solving cooling load problems, estimations of the required cooling load. Developing knowledge of duct system designs of conditioned air. 5. Understanding of the use of the required fan power for proper air supplies. 6. Studding piping system design of cold and hot water and relevant applied examples. 7. Estimations of heating load and reviewing various material types. 8. 9. Discussion and review of the previous topics. 10. Define the refrigeration concept, Carnot and ideal vapor compression cycles with relevant examples. 11. Reviewing relevant examples of Carnot and ideal vapor compression cycles. 12. The absorption refrigeration cycle, advantages and disadvantages, basic concepts. 13. The use of solar absorption refrigeration systems. 14. Discussion and review of the previous topics.

Indicative Contents المحتويات الإرشادية	<u>Part A – define of basic air conditioning concepts and psychometric chart</u> Describe of basic concepts of air conditioning and comfort properties. Understanding of the psychometric chart principles and various air processes. Understanding of principles of the by-pass factor and air mixing processes. [16hrs] <u>Part B – Cooling load, duct design, fan power</u> Understanding of cooling load estimations of buildings. Learning the use of various properties of materials. Skills of solving cooling load problems, estimations of the required cooling load. Developing knowledge of duct system designs of conditioned air. Understanding of the use of the required fan power for proper air supplies. [32hrs] <u>Part C – Piping systems, heating load</u> Studding piping system design of cold and hot water and relevant applied examples. Estimations of heating load and reviewing various material types. [16hrs] Revision problems [8hrs] <u>Part D – Refrigeration</u> Define the refrigeration concept, Carnot and ideal vapor compression cycles with relevant examples. Reviewing relevant examples of Carnot and ideal vapor compression cycles. The absorption refrigeration cycle, advantages and disadvantages, basic concepts.The use of solar absorption refrigeration systems. [32hrs] Discussion and review of the problems. [8hrs]

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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	124	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	5% (5)	5 and 10	LO #3, #4 and #4, #8
	Assignments	2	5% (5)	2 and 12	LO #3, #4 and #6, #7
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	14	LO #5, #8 and #13
	Lab report and Lab exam	7, 1	15% (15)	1-15, 8	All, 1-6
Summative assessment	**Midterm Exam**	1.5hr	10% (10)	7	LO #1 - #6
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Describe of basic concepts of air conditioning and comfort properties. Understanding of the psychometric chart principles and various air processes.
Week 2	Understanding of principles of the by-pass factor and air mixing processes.
Week 3	Understanding of cooling load estimations of buildings. Learning the use of various properties of materials.
Week 4	Skills of solving cooling load problems, estimations of the required cooling load.
Week 5	Developing knowledge of duct system designs of conditioned air.
Week 6	Understanding of the use of the required fan power for proper air supplies.
Week 7	Studding piping system design of cold and hot water and relevant applied examples.
Week 8	Mid-term Exam
Week 9	Estimations of heating load and reviewing various material types.
Week 10	Discussion and review of the previous topics.
Week 11	Define the refrigeration concept, Carnot and ideal vapor compression cycles with relevant examples.
Week 12	Reviewing relevant examples of Carnot and ideal vapor compression cycles.
Week 13	The absorption refrigeration cycle, advantages and disadvantages, basic concepts. The use of solar absorption refrigeration systems.
Week 14	Discussion and review of the previous topics.
Week 15	Final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Effect ofwindspeedon relative humidity
Week 2	Psychometric processes
Week 3	Learn about the main air conditioning and refrigeration system
Week 4	Air Conditioner Unit performance
Week 5	Heat pump unit performance
Week 6	Electric Refrigerator Training Panel

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	1- Dr. Abbas A.S. Al-Jeebori, "Fundamentals of Air conditioning and Refrigeration"' Al-Qadisiya University, 2006. 2- مبادىء هندسة التكييف الهواء والتثليج, الدكتورخالد احمد الجودي, كلية الهندسة-جامعة البصرة, ١٩٩٨ 3- Wilbert F., Stoecker and Lekold W. Jones, “Refrigeration and Air conditioning", McGraw-Hill, 1982. 4- "ASHRAE fundamentals Handbook for air conditioning and Refrigeration", SI, 1997.	No
Recommended Texts	Books and Literatures in different kinds of air conditioning and Refrigeration.	No
Websites	https://www.youtube.com/watch?v=1TPKbia4NC0	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Automation and Control	**Module Delivery**	
Module Type	core	**Theory Lecture**	
Module Code	STUMETC 473		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	4	**Semester of Delivery**	7
Administering Department	ETE	**College**	METC
Module Leader	Wael Hussein Zayer	**e-mail**	wael.zayer@stu.edu.iq
Module Leader's Acad. Title	Professor	**Module Leader's Qualification**	Ph.D.
Module Tutor	Name (if available)	**e-mail**	E-mail
Peer Reviewer Name	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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. It provides a working knowledge of control systems. 2. Illustration and discussion the principles of control systems and system description. 3. To select a suitable control system for a given use based on considerations of application and performance. 4. To be able to create a new control system model stable that will have some desirable properties. 5. To understand the limits of control systems and the change of their properties with use.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. An understanding of automation control and representation. List 2. the various techniques associated with automation control and representation. 3. Summarize what is meant by a basic of automation control and systems. 4. Discuss the structure, properties and application on of different automation control. 5. It provides a working knowledge of Automation and control. 6. Illustration and discussion the principles of Automation and control. 7. The ability to analyze and Solve problems of control systems .

Indicative Contents المحتويات الإرشادية	Part A –various automation and control types, structure and Theory of representation classification of automation and control, Advanced of control system , applications-Types. [15 hrs] Basic elements of automation and production control system- types of Advanced automation function and industry levels types and properties, Hardware components to control the automation process. [15 hrs] Intelligent control systems (artificial neural network). Effective functions used in artificial networks ,Topology of neural networks ,Types of neural networks Neural network controller models [15 hrs] ,Implementation of fuzzy groups-Fuzzy inference systems ,The control infrastructure is fuzzy -Genetic algorithm (introduction and biological background) [15 hrs] Genetic algorithm steps, Genetic algorithm operator ,Microprocessor (brief description and definition). [15 hrs] Revision problem classes [6 hrs] <u>Part B –</u>PLC Characteristics, uses, and programming of the microprocessor Microcontroller ,Differences between microprocessor and microcontroller [15 hrs] ,Microcontroller chip ,Introduction to PLC Definitions Functions and features of PLC Basics of plc block diagram . [7 hrs] Building PLC in automated systemsDescription (operating system and application software) of the plc [15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ 15 اسبوع ا

Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	111	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	7
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 #3, #4
	Assignments	2	10% (10)	2 and 12	LO #3, #4 and #6, #7
	Projects	1	10% (10)	Continuous	All
	Report	1	10% (10)	13	LO #4
Summative assessment	**Midterm Exam**	1.5 hr	10% (10)	7	LO #1 - #4
	Final Exam	2.5 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to control and automation technology
Week 2	Basic elements of automation and production control system
Week 3	Advanced automation function and industry levels
Week 4	Hardware components to control the automation process
Week 5	DC sensors, actuators and servo motors
Week 6	z transform for control systems
Week 7	Intelligent control systems (artificial neural network).
Week 8	Effective functions used in artificial networks

Week 9	Topology of neural networks, Types of neural networks ,Neural network controller models
Week 10	Implementation of fuzzy groups
Week 11	Fuzzy inference systems , The control infrastructure is fuzzy
Week 12	Genetic algorithm (introduction and biological background)
Week 13	Genetic algorithm steps, Genetic algorithm operator
Week 14	Microprocessor (brief description and definition)**,** Characteristics, uses, and programming of the microprocessor
Week 15	Microcontroller **,** Differences between microprocessor and microcontroller, **Microcontroller chip**
Week 16	Introduction to PLC Definitions Functions and features of PLC Basics of plc block diagram

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Modern Control Engineering, Katsuhiko Ogata. . Automatic Control System, S. Hasan Saeed.	No
Recommended Texts	Modern Control Engineering Automatic Control System	No
Websites	http://docs.znu.ac.ir/members/pirmohamadi_ali/Control/Katsuhiko%20Ogata%20_%20Modern%20Control%20Engineering%205th%20Edition.pdf	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Computer Aided Design and Manufacturing	**Module Delivery**	
Module Type	**core**	**Theory** **Lecture** **Lab**	
Module Code	STUMETC **474**		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	4	**Semester of Delivery**	7
Administering Department	ETE	**College**	METC
Module Leader	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.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	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 provide a knowledge of computer aided design and manufacturing (CAM CAD). 2. Learn to draw in 2D and 3D. 3. Drawing some manufacturing drawings by auto CAD.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Solution of problems involving basic CAD CAM 2. Selection and application of appropriate analysis techniques Observation 3. and recording of experimental data . 4. Preparation of technical report.
Indicative Contents المحتويات الإرشادية	Part A –application of AutoCAD overview of AutoCAD-Ways to enter the command, Ways to enter the command. [15 hrs] Full explanation of drawing, line, circle, square orrectangle.etc [15 hrs] Execute key board drawing on. [10 hrs] The right application for everything. [15 hrs] Part B –2D&3D drawing Learn to draw in2D& 3D. [25 hrs] Drawing some manufacturing drawings by AutoCAD. [7 hrs] Introduction to finite element method-Solve problems by finite element method[15 hrs].

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	41	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2
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	5% (5)	5 and 10	LO #1 and #3
	Assignments	2	5% (5)	6 and 8	LO #3, and #4
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #4
	Lab reports and lab exam	15, 1	15% (15)	1-15, 8	All, 1-6
Summative assessment	**Midterm Exam**	2hr	10% (10)	7	LO #1 - #3
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered

Week 1	An overview of AutoCAD-ways to enter the command
Week 2	Ways to enter the command.
Week 3-4	Full explanation of drawing, line, circle, square or rectangle.
Week 5-6	Execute keyboard drawing on.
Week 7-8	The right application for everything.
Week 9-10	Learn to draw in2D
Week 11-12	Learn to draw in3D.
Week 13-14	Drawing some manufacturing drawings by AutoCAD.
Week 15	Introduction to finite element method-Solve problems by finite element method

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1-3	Way to enter the command
Week 4-6	Full explanation of drawing, line, circle, square orrectangle.etc
Week 8-9	Execute keyboard drawing
Week 10	The right application for everything
Week 11-12	Learn to drawn 2D
Week 13-14	Learn to drawn 3D
Week 15	Drawing some manufacturing drawing by AutoCAD

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	Computer Aided Design and Manufacturing, C.B. Besant, 1986 CAD/CAM, Mc Mahan and Browne, 1998. Computer Aided Manufacture, Chang and Richard, 2006. CAD/CAM Principles and Applications, Rao, 2010.	No
Recommended Texts	CAD/CAM Principles and Applications, Rao, 2010. Computer Aided manufacturing, S. Vishal, 2013	No
Websites	1- https://www.amazon.com/Cad-Cam-Principles-Applications-3Ed/dp/0070681937	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Electromechanical Devices	**Module Delivery**	
Module Type	core	**Theory** **Lecture** **Lab**	
Module Code	STUMETC 472		
ECTS Credits	7		
SWL (hr/sem)	175		
Module Level	4	**Semester of Delivery**	7
Administering Department	ETE	**College**	METC
Module Leader	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.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	Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 provide a knowledge of electromechanical devices. 2- Illustration and discussion the principles of electromechanical devices. 3- The student should be able demonstrate knowledge and understanding of the concepts, theory and application of electromechanical devices
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	Upon completion of the course, the student will be able to demonstrate a proficiency in basic electromechanical devices with strong emphasis on motors. 1- understand the Components of Servo-Mechanisms. 2- understand the working concept of Transducers 3- understand Reduction Rules 1. understand the operation of Sensors 2. understand Industrial Detection Sensor 3. understand the operation of Relays 4. understand Pressure Control Systems 5. understand Flow Rate Control Systems
Indicative Contents المحتويات الإرشادية	Components of Servo-Mechanisms- Transducers- Reduction Rules. [21 hrs] Sensors- Industrial Detection Sensor- Gears. [21 hrs] Relays- Theoretical and Experimental- Pressure Control Systems. [21 hrs] Flow Rate Control Systems- Level Control Systems- PLC Applications [42 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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluationتقييم
المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	5% (5)	8 and 13	LO #3 and #4
	Assignments	2	5% (5)	12 and 14	LO#5 and #6
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #5
	Lab reports and lab exam	15, 1	15% (15)	1-15, 8	All, 1-6
Summative assessment	**Midterm Exam**	1.5hr	10% (10)	7	LO #1 - #6
	Final Exam	2.5hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Components of Servo-Mechanisms
Week 2	Transducers
Week 3	Reduction Rules
Week 4	Sensors
Week 5	Industrial Detection Sensor
Week 6	Gears
Week 7	Relays
Week 8	Theoretical and Experimental
Week 9	Pressure Control Systems
Week 10	Flow Rate Control Systems
Week 11	Level Control Systems
Week 12	
Week 13	
Week 14	
Week 15	PLC Applications

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Characteristics of a Signal Conditioning Circuits
Week 2	Characteristics of a Signal Converter Circuits

Week 3	Temperature Characteristics of the LM 35 Integrated Circuit
Week 4	Pneumatic system control
Week 5	SELF – HOLDING CIRCUIT
Week 6	CLOSED LOOP ON-OFF CONTROL OFTHE LEVELWITH PRESSURE SENSOR
Week 7	Open loop and Closed loop control for D.C motor
Week 8	Speed and Position Control by using Thyristor
Week 9	Stepper Motor Operation and Control Mode

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electromechanical Devices & Components Illustrated Sourcebook 1st Edition by Brian Elliott (Author)	No

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	English language/4			**Module Delivery**	
Module Type	Basic				
Module Code	STUMETC **484**				
ECTS Credits	3				
SWL (hr/sem)	75			**Theory Lecture**	
Module Level	4		**Semester of Delivery**		8
Administering Department	ETE		**College**	METC	
Module Leader	Wael Hussein Zayer		**e-mail**	wael.zayer@stu.edu.iq	
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**		Ph.D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name	Ahmed thamer radhi		**e-mail**	Ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date	18/02/2025		**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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. Develop students skills in understanding the grammars of English. 2. Develop students' speaking skills in English. 3. Develop students' listening skills in English. 4. Develop students' reading skills in English. 5. Develop students' reading skills in English.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• Understand the rule of Auxiliary verbs. Words that go together Vocabulary • Understand the usage of Active / Passive, Present Simple or Continuous 1, Present Simple or Continuous 2. Free time activities, Jobs as Vocabulary. • Understand the grammars of Past Simple or Continuous, Past Simple or Past Perfect, Past tenses. Giving opinions, Silent letters Vocabulary . • Understand the grammars of have to / be allowed to, Modal verbs. Phrasal verbs as Vocabulary . • Understand the grammars of I think / I don't think + will. Prefixes as Vocabulary. • Understand the grammars of questions with like, what, which and who. -ed and -ing adjectives, Adjective + noun as Vocabulary. • Understand the grammars Present Perfect, Present Perfect Active / Passive, Time expressions. : Likes and dislikes as Vocabulary. • Understand the grammars of Reduced infinitive, Verb patterns. Body idioms as Vocabulary. • Understand the grammars of Conditionals 1, Conditionals 2. Words with similar meaning as Vocabulary. • Understand the grammars of Articles, Possessives. Compound nouns 1, Compound nouns 2as Vocabulary. • Understand the grammars Modal verbs of probability: Past, Modal verbs of probability: Present. Expressing attitude as Vocabulary. • Understand the grammars of reported speech. Clichés as Vocabulary. • Understand the grammars of reporting verbs. Phrasal verbs 2 as Vocabulary. • Understand the grammars of will/going to. Requests and offers as Vocabulary.

Indicative Contents المحتويات الإرشادية	The grammars of Auxiliary verbs, Active / Passive, Present Simple or Continuous 1, Present Simple or Continuous 2, Past Simple or Continuous, Past Simple or Past Perfect, Past tenses. Words that go together, Free time activities, Jobs, Giving opinions, Silent letters as Vocabulary. [12] The grammars of have to / be allowed to, Modal verbs, I think / I don't think + will, Questions with like, What, which and who. Phrasal verbs, Prefixes, -ed and -ing adjectives, Adjective + noun as Vocabulary. [12] The grammars of Present Perfect, Present Perfect Active / Passive, Time expressions, Reduced infinitive, Verb patterns, Conditionals 1, Conditionals 2. Likes and dislikes, Body idioms, words with similar meaning as Vocabulary. [12] The grammars of articles, possessives, Modal verbs of probability: Past, Modal verbs of probability: Present , Reported speech . Compound nouns 1, Compound nouns 2, Expressing attitude, Clichés, as Vocabulary. [12] The grammars of reporting verbs, will / going to . Phrasal verbs 2, requests and offers as Vocabulary. [8]

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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	63	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	12	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Unit one : Expressing attitude Grammar: Auxiliary verbs Vocabulary: Words that go together
Week 2	Unit two : Making a hotel reservation Grammar: Active / Passive, Present Simple or Continuous 1, Present Simple or Continuous 2 Vocabulary: Free time activities, Jobs
Week 3	Unit three: Making small talk Grammar: Past Simple or Continuous, Past Simple or Past Perfect, Past tenses Vocabulary: Giving opinions, Silent letters
Week 4	Unit four : Making the right noises Grammar: have to / be allowed to, Modal verbs Vocabulary: Phrasal verbs
Week 5	Unit Five : Grammar: I think / I don't think + will Vocabulary: Prefixes
Week 6	Unit six : Grammar: Questions with like, What, which and who Vocabulary: -ed and -ing adjectives, Adjective + noun

Week 7	Unit seven : Grammar: Present Perfect, Present Perfect Active / Passive, Time expressions Vocabulary: Likes and dislikes
Week 8	Unit eight : Grammar: Reduced infinitive, Verb patterns Vocabulary: Body idioms
Week 9	Unit nine : Grammar: Conditionals 1, Conditionals 2 Vocabulary: Words with similar meaning
Week 10	Unit ten: Grammar: Articles, Possessives Vocabulary: Compound nouns 1, Compound nouns 2
Week 11	Unit eleven: Grammar: Modal verbs of probability: Past, Modal verbs of probability: Present Vocabulary: Expressing attitude
Week 12	Unit twelve: Grammar: Reported speech Vocabulary: Clichés
Week 13	Unit thirteen: Grammar: Reporting verbs Vocabulary: Phrasal verbs 2
Week 14	Unit fourteen: Grammar: will / going to Vocabulary: Requests and offers
Week 15	assessment

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	New headway, Liz and John Soars, OXFORD	No
Recommended Texts	English Grammar in Use, 5th Edition by Raymond Murphy.	No
Websites	https://elt.oup.com/student/headway/int/?cc=global&selLanguage=en	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Microprocessors and Microcontrollers			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab**	
Module Code	STUMETC 482				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level		4	**Semester of Delivery**		8
Administering Department		ETE	**College**	METC	
Module Leader	Wael Hussein Zayer		**e-mail**	wael.zayer@stu.edu.iq	
Module Leader's Acad. Title		Professor	**Module Leader's Qualification**		Ph. D.
Module Tutor	Name (if available)		**e-mail**	E-mail	
Peer Reviewer Name		Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date		18/02/2025	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 provide a knowledge of microprocessors and microcontrollers. 2- Illustration and discussion the principles of microprocessors and microcontrollers in digital systems, description of the digital control concepts using microprocessors and micro controllers and it`s applications. 3- To understand the hardware and software of the 8086 microprocessor and 8051 microcontroller 4- To understand the 8086 microprocessor and 8051 microcontroller architecture and assembly language.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Able to recognize the Block diagram of Intel 8086. Understand the 8086 instruction set and its classification 2. Able to recognize the 8086 emulators. Understand Numbering and coding systems with 8086 emulators. 3. Able to recognize the 8086 microprocessor data transfer instruction (MOV, XCHG, IN, OUT). Understand the 8086 microprocessor addition and subtraction (ADD, SUB). 4. Discuss the 8086 microprocessor multiplication and division (MUL, DIV).and Understandthe8086 microprocessor increment and decrement (INC, DEC). 5. Describe the 8086 microprocessor logical instructions (AND, OR, XOR, NOT). and understand the 8086 microprocessor logical instructions (SHIFT &ROTATE) 6. Identify the 8086 microprocessor control transfer instructions (JMP, LOOP, and CMP) and understand the flag control instructions. 7. Discuss the string manipulation instructions. Understand the a sci code manipulation instructions. 8. Able to recognize the software interrupts instructions, block diagram of Intel 8051 microcontroller. 9. Discuss the EDSim51 Emulator for the 8051 microcontrollers. Understand the 8051 Instruction Set and Assembly programming 10. Explain the 8051 microcontroller data transfer instruction. Understand the 8051 microcontroller arithmetic instructions 11. Identify the 8051 microcontroller loop and jump instructions. Understand the 8051 microcontroller call instructions. 12. Explain the 8051 microcontroller time delay instructions. Understand the led display using the 8051 microcontrollers. 13. Able to Recognize the Interfacing of the 8051 microcontrollers with the 7- Segment Display. Understand the stepper Motor Control Using the 8051 Microcontroller 14. Able to Recognize the Digital Analog Converter Interfacing with the 8051 Microcontroller. Understand the analog to Digital Converter Interfacing with the 8051 Microcontroller. 15. Able to Recognize the DC Motor Speed Control using the 8051 microcontrollers. Understand the 8051 Microcontroller-based system design

Indicative Contents المحتويات الإرشادية	Part A -Intel 8086 Block diagram of Intel 8086. 8086 instruction set and its classification8086 emulators. Numbering and coding systems with 8086 emulators. 8086 microprocessor data transfer instruction (MOV, XCHG, IN, OUT). 8086 microprocessor addition and subtraction (ADD, SUB).The 8086 microprocessor multiplication and division (MUL, DIV). 8086 microprocessor increment and decrement (INC, DEC).8086 microprocessor logical instructions (AND, OR, XOR, NOT). 8086 microprocessor logical instructions (SHIFT &ROTATE) , 8086 microprocessor control transfer instructions (JMP, LOOP, and CMP)[42 hrs] Flag control instructions. String manipulation instructions. Understand the asci code manipulation instructions. Software interrupts instructions[20 hrs] Part B - Intel 8051microcontroller The 8086 microprocessor logical instructions (SHIFT &ROTATE),and 8086 microprocessor control transfer instructions (JMP, LOOP, and CMP). Flag control instructions. Discuss the String manipulation instructions. Asci code manipulation instructions. Software interrupts instructions. Block Diagram of Intel 8051 microcontroller.EDSim51 Emulator for the 8051 microcontrollers. The 8051 Instruction Set and Assembly Programming, 8051 microcontroller data transfer instruction. 8051 microcontroller arithmetic instructions, 8051 microcontroller loop, and jump instructions. 8051 microcontroller call instructions. [24hrs] 8051 microcontroller time delay instructions. Led display using the 8051 microcontrollers .Interfacing of the 8051 microcontrollers with the 7- Segment Display. Stepper Motor Control Using the 8051 microcontroller digital Analog Converter Interfacing with the 8051 Microcontroller. Analog to Digital Converter Interfacing with the 8051 Microcontroller. DC Motor Speed Control using the 8051 microcontrollers.8051 Microcontroller-Based System Design[38hrs]

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 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	124	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	5% (5)	5 and 12	LO #4 and #8
	Assignments	2	5% (5)	4 and 14	LO #3 and #13
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #8
	Lab Report and Lap Exam	15, 1	15%(15)	1-15,8	LO #1- #15, LO #1- #8
Summative assessment	**Midterm Exam**	1.5hr	10% (10)	8	LO #1 - #7
	Final Exam	2.5hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Block diagram of Intel 8086. 8086 instruction set and its classification
Week 2	The 8086 emulators. Numbering and coding systems with 8086 emulators.
Week 3	The 8086 microprocessor data transfer instruction (MOV, XCHG, IN, OUT). 8086 microprocessor addition and subtraction (ADD, SUB).

Week 4	The 8086 microprocessor multiplication and division (MUL, DIV). the 8086 microprocessor increment and decrement (INC, DEC).
Week 5	The 8086 microprocessor logical instructions (AND, OR, XOR, NOT). The 8086 microprocessor logical instructions (SHIFT &ROTATE)
Week 6	8086 microprocessor control transfer instructions (JMP, LOOP, and CMP). Flag control instructions.
Week 7	String manipulation instructions. Asci code manipulation instructions.
Week 8	Software interrupts instructions. Block Diagram of Intel 8051 microcontroller.
Week 9	EDSim51 Emulator for the 8051 microcontrollers. The 8051 Instruction Set and Assembly Programming
Week 10	8051 microcontroller data transfer instruction. The 8051 microcontroller arithmetic instructions
Week 11	The 8051 microcontroller loop and jump instructions. 8051 microcontroller call instructions.
Week 12	The 8051 microcontroller time delay instructions. Led display using the 8051 microcontrollers.
Week 13	Interfacing of the 8051 microcontrollers with the 7- Segment Display. Stepper Motor Control Using the 8051 Microcontroller
Week 14	Digital Analog Converter Interfacing with the 8051 Microcontroller. Analog Digital Converter Interfacing with the 8051 Microcontroller.
Week 15	The DC Motor Speed Control using the 8051 microcontrollers.8051 Microcontroller-Based System Design

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Block diagram of Intel 8086, 8086 instruction set and its classification
Week 2	8086 emulator, Numbering and coding systems with8086 emulator
Week 3	The 8086 microprocessor data transfer instruction (MOV, XCHG,IN, OUT)
Week 4	The 8086 microprocessor addition and subtraction (ADD, SUB), The 8086 microprocessor multiplication and division (MUL,DIV), The 8086 microprocessor increment and decrement (INC, DEC)
Week 5	Lab 5: The 8086 microprocessor logical instructions (AND, OR, XOR, NOT), The 8086 microprocessor logical
Week 6	Lab 6;The 8086 microprocessor control transfer instructions (JMP, LOOP,CMP), Flag control instructions

Week 7	Lab 7; String manipulation instructions, Asci code manipulation instructions,
Week 8	Lab 8: : Software interrupts instructions, Block Diagram of Intel 8051microcontroller
Week 9	Lab 9: EDSim51 Emulator for 8051 microcontrollers, The 8051 Instruction Set and assembly Programming
Week 10	Lab 10: The 8051 microcontroller data transfer instruction, The 8051 microcontroller arithmetic instructions
Week 11	Lab 11: The 8051 microcontroller loop and jump instructions, the 8051 microcontroller call instructions
Week 12	Lab 12: The 8051 microcontroller time delay instructions, Led display Using the 8051 microcontroller
Week 13	Lab 13: Interfacing the 8051 microcontrollers with the 7-Segment Display, Stepper Motor Control Using the8051 Microcontroller
Week 14	Lab 14: Stepper Motor Control Using the8051 Microcontroller, Analog to Digital Converter Interfacing with the 8051Microcontroller
Week 15	Lab 15: DC Motor Speed Control Using the 8051 Microcontroller, 8051 Microcontroller-Based System Design

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	THE INTEL MICROPROCESSORS 8086/8088 Architecture, Programming, and Interfacing, Eighth Edition, by Barry B. Brey, PEARSON 2009.	NO
Recommended Texts	THE 8051 MICROCONTROLLER AND EMBEDDED SYSTEMS Using assembly and C, second Edition, by Muhammad Ali Mazidi, PEARSON 2005.	No

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Power Electronics and Drive			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab**	
Module Code	STUMETC 471				
ECTS Credits	7				
SWL (hr/sem)	175				
Module Level		4	**Semester of Delivery**		7
Administering Department		ETE	**College**	METC	
Module Leader	Ahmed Thamer Radhi		**e-mail**	ahmed.radhi@stu.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		Ahmed thamer radhi	**e-mail**	Ahmed.radhi@stu.edu.iq	
Scientific Committee Approval Date		18/02/2025	**Version Number**	1.0	

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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 provide a knowledge of Power electronics and drive. 2- Illustration and discussion the principles of power electronics and drive. 3- To select a suitable electronics and drive for a given use based on considerations of application and performance 4- To be able to create a new power electronics and drive system model that will have some desirable properties. 5- To acquire in-depth knowledge of power electronic circuits for realtime applications. 6- To solve problems in power electronics. 7- To analyze power electronics using existing modern tools for enhancement of knowledge.

Module Learning Outcomes مخرجات التعلم للمادة الدراسية	- Describe the role of Power Electronics as an enabling technology in various applications such as flexible production systems, energy conservation, renewable energy, transportation etc. - Identify a switching power-pole as the basic building block and to use pulse Width Modulation to synthesize the desired output. - Design the switching power-pole using the available power semiconductor devices, their drive circuitry. - Learn the basic concepts of operation of dc-dc converters in steady state in continuous and discontinuous modes and be able to analyze basic converter topologies. - Using the average model of the building block, quickly simulate the dynamic performance of dc-dc converters and compare them with their switching counterparts. - Design controllers for dc-dc converters in voltage and peak-current mode. - Design, using simulations, the interface between the power electronics equipment and single-phase and three-phase utility using diode rectifiers and analyze the total harmonic distortion. - Design the single-phase power factor correction (PFC) circuits to draw sinusoidal currents at unity power factor. - Learn basic magnetic concepts, analyze transformer-isolated switch-mode power supplies and design high-frequency inductors and transformers. - Learn basic concepts of soft-switching and their applications to dc-dc converters, compact fluorescent lamps (CFL) and induction heating. - Learn the requirements imposed by electric drives (dc and ac) on converters and synthesize these converters using the building block approach. - Understand, simulate and design single-phase and three-phase thyristor converters. - Learn the role of Power Electronics in utility-related applications which are becoming extremely important.

Indicative Contents المحتويات الإرشادية	Part A –various Power electronics and drivetypes, structure and Theory of representation Introduction to power semiconductor devices and their applications, single phase and three phase ACDC converter (Rectifier) ,DC-AC converter (Inverter). [15 hrs] DC-DC converter (DC chopper) ,AC-AC converter (AC voltage regulator and cycloconverter). [15 hrs] Revision problem classes [6 hrs] Part B –Speed control of DC motors ,Second semester exam-1 st attempt [15 hrs] Speed control of AC motors (Induction and Synchronous motors),Second semester exam-2nd attempt ,General review[15 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	109	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	7
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	66	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**175**		

Module Evaluation

تقيم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	5% (5)	5 and 8	LO #3 and #6
	Assignments	2	5% (5)	8 and 14	LO #4 and #13
	Projects	1	5% (5)	Continuous	All
	Report	1	10% (10)	13	LO #3, #4 and #5
	Lab reports and lab exam	15, 1	15% (15)	1-15, 8	All, 1-6
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 power semiconductor devices and their applications
Week 2	Single phase and three phase ACDC converter (Rectifier)
Week 3	
Week 4	
Week 5	DC-AC converter (Inverter)
Week 6	DC-DC converter (DC chopper)
Week 7	AC-AC converter (AC voltage regulator and cyclo converter)
Week 8	
Week 9	Speed control of DC motors
Week 10	
Week 11	
Week 12	Speed control of AC motors (Induction and Synchronous motors)

Week 13	
Week 14	
Week 15	

Delivery Plan (Weekly Lab. Syllabus)
المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Single phase half wave uncontrolled rectifier R-load & RL-load
Week 2	Single phase full wave (mid-point) or center tap uncontrolled rectifier R-load
Week 3	Single phase full wave uncontrolled rectifier (bridge) R-load &RL-load
Week 4	Three phases half wave uncontrolled rectifier R-load & RL-load
Week 4	Three phases full wave uncontrolled rectifier (bridge) R-load &RL-load
Week 5	Characteristics of (SCR) Thyristor
Week 6	R-trigger circuit of (SCR) ,UJT trigger circuit of (SCR)
Week 7	Single phase full wave (mid-point) or center tap controlled rectifier R-load ,
Week 8	Single phase full wave controlled rectifier (bridge) R-load &RL-load
Week 9	Three phases half wave controlled rectifier , R-load & RL-load
Week 10	Three phases full wave controlled rectifier (bridge) R-load &RL-load
Week 11	Characteristics of DIAC ,
Week 12	Characteristics of TRIAC
Week 13	Characteristics of MOSFET
Week 14	Characteristics of MOSFET
Week 15	Characteristics of IGBT

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	**Available in the Library?**

Required Texts	Power Electronics and Motor Drive Systems 1st Edition - November 8, 2016 Author: Stefanos Manias	No
Recommended Texts	Power Electronics in Motor Drives (E-book)	No
Websites	https://shop.elsevier.com/books/power-electronics-and-motor-drive-systems/rogers/978-0-12-811798-9	

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	راس ب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	Signals and systems			**Module Delivery**	
Module Type	core			**Theory** **Lecture** **Lab**	
Module Code	STUMETC 481				
ECTS Credits	8				
SWL (hr/sem)	200				
Module Level	4	**Semester of Delivery**	8		
Administering Department	ETE	**College**	METC		
Module Leader	Raed Khalid Hemeed	**e-mail**	Raed.khalid@stu.edu.iq		
Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**	Asst.		
Module Tutor	Name (if available)	**e-mail**	E-mail		
Peer Reviewer Name	Ahmed Thamer Radhi	**e-mail**	ahmed.radhi@stu.edu.iq		
Scientific Committee Approval Date	18/02/2025	**Version Number**	1.0		

Relation with other Modules العلاقة مع المواد الدراسية الاخرى			
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. 2. To provide a knowledge of Signals and systems. 3. Illustration and discussion the principles of Signals and systems. 4. The ability to analyze and solve problems. To be able to create a new signals and systems that will have some desirable properties. 5. To understand the limits of signals and systems properties.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	An understanding of signals and systems and operation. 1. 2. List the various terms associated with signals and systems. 3. 4. Summarize what is meant by a basic of signals and systems selection. Discuss the structure, properties and application on of different signals and systems. 5. Known the operation of signals and systems according to modern techniques methods that support all applications. 6. Identify the principle of different techniques of analysis's . 7. Identify the properties of different analyses techniques.

Indicative Contents المحتويات الإرشادية	Part A signals and system types , analyses, theory Representation of basic signals and sequences in MATLAB , plot continuous and discrete time, plot discrete-time signal in Matlab, plot special signals with discrete time , elementary transformations of the independent variable in Matlab. [15 hrs] Revision problem classes [6 hrs] <u>Part B –Properties of materials</u> Operations on continuous signals, fourier transform and its Properties, sampling Theorem, autocorrelation & cross correlation Between Signals. [15 hrs] Convolution between two signals, discrete fourier transform (DFT) & Inverse DFTC computation ,fast fourier transform (FFT). [15 hrs] Implementation of LP FIR Filters, Implementation of HP FIR Filters.[10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The key strategy for presenting this module will be to stimulate students' engagement in the tasks while also refining and strengthening their critical thinking abilities. This will be accomplished through courses, interactive tutorials, and the consideration of various sorts of experiments incorporating certain sample activities that are attractive to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوع ا			
Structured SSWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	124	**Structured SSWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	8
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	76	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5

Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	200

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Representation of basic Signals and Sequences in MATLAB
Week 2	Plot Continuous and Discrete Time
Week 3	Plot Discrete-Time Signal In Matlab
Week 4	Plot Special signals with discrete time
Week 5	Elementary transformations of the independent variable in Matlab
Week 6	Operations on Continuous signals
Week 7	Fourier Transform and its Properties
Week 8	Sampling Theorem

Week 9	Autocorrelation & Cross correlation Between signals
Week 10	Convolution between Two signals
Week 11	Discrete Fourier Transform (DFT)
Week 12	Inverse DFT Computation
Week 13	Fast Fourier Transform (FFT)
Week 14	Implementation of LP FIR Filters
Week 15	Implementation of HP FIR Filters

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Representation of Basic Signals and Sequences in MATLAB
Week 2	Plot continuous and discrete time basic signals
Week 3	Plot Discrete-Time Signal in MATLAB
Week 4	Plot Special signals with discrete time
Week 5	Elementary transformations of the independent variable in MATLAB
Week 6	Operations on Continuous signals
Week 7	Fourier Transform and its Properties
Week 8	Sampling Theorem
Week 9	Autocorrelation & Cross correlation between signals
Week 10	Convolution between Two signals
Week 11	Discrete Fourier Transform (DFT)
Week 12	Inverse DFT computation
Week 13	Fast Fourier Transform (FFT)
Week 14	Implementation of LP FIR Filters
Week 15	Implementation of HP FIR Filters

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**

Required Texts	Hwei P. Hsu, " Theory and Problems of signals and systems", McGraw-Hill, 1995. -	No
Recommended Texts	Fundamentals of Signals and Systems, Benoit Boulet & Boston Massachusetts, 2005	No
Websites	https://mlichouri.files.wordpress.com/2013/10/fundamentals-of-signals-and-systems.pdf	

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	راس ب	(0-44)	Considerable amount of work required

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