



نموذج وصف البرنامج الأكاديمي



الجامعة : الوطنية للعلوم والتكنولوجيا

الكلية / المعهد : كلية التقنية الهندسية

القسم العلمي : قسم هندسة تقنيات الحاسوب

اسم البرنامج الأكاديمي او المهني : بكالوريوس هندسة تقنيات الحاسوب

اسم الشهادة النهائية : بكالوريوس هندسة تقنيات الحاسوب

النظام الدراسي : مسار بولونيا

تاريخ اعداد الوصف: 2026-2025

تاريخ ملء الملف :

التوقيع :
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التاريخ: ١٠/٢٩ / ٢٠٢٥

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التاريخ: ١٠/٢٩ / ٢٠٢٥

دقق الملف من قبل
شعبة ضمان الجودة والأداء الجامعي
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التاريخ: ١٥/١٠ / ٢٠٢٥

التوقيع:



مصادقة السيد العميد

الاستاذ الدكتور
عادل عباس علوان
عميد كلية التقنية الهندسية

National University of Science and Technology

الجامعة الوطنية للعلوم والتكنولوجيا



First Cycle – bachelor's degree (B.Eng.)
Department of **Computer Engineering Techniques**
Engineering Technical College
NUST

(بكالوريوس - هندسة تقنيات الحاسوب) الدورة الاولى (الكلية التقنية الهندسية - الجامعة الوطنية للعلوم والتكنولوجيا)



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1. Mission & Vision Statement

Vision Statement

To produce highly qualified and motivated graduates through a rigorous curriculum of theory and emphasize the technical application that develops the ability to solve problems, build systems, and develop and implement computer driven solutions, individually and in teams.

Mission Statement

Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for public health and safety and cultural, societal, and environmental concerns.

2. Program Specification

Program code:	CET	ECTS	240
Duration:	4 levels, 8 Semesters	Method of Attendance:	Full Time

The Computer Engineering Techniques program is designed to provide students with the skills to improve themselves by preparing them for a career in the digital sector. Students will learn how to administer and support the computing infrastructure of an organization. The curriculum consists of an integrated set of courses that builds a solid theoretical foundation for the students. Once the foundation is established, the program develops domain-specific skills in the fields of digital and analog system design, database development and administration, mobile communications, networking, artificial intelligence, and programming. In its entirety, the program aims to prepare the students for careers in companies where they will be involved with the design, implementation, and operation of computer systems. Moreover, the students will be provided with a knowledge of Internet technologies sufficient for the design and management of network information systems.

Level 1 builds a solid foundation for the student in mathematics and computer essentials, suitable for progression to all program modules. Program-specific core topics are covered at Level 2 preparing for application-specific led modules at levels 3 and 4.

At Levels 2, 3, and 4 IT students cover designing and administering complex network systems, database systems, and designing security solutions related to cyber-security. Students acquire programming skills in Python and C ++, the basics of routing and switching, designing IT networks and wide area network technologies in addition to mobile networks and information theory. Eventually, IT graduates will gain knowledge, skills, and competencies that are industry-oriented and market-driven.

The research ethos is developed and fostered from the start via practical's, which are either embedded in lecture modules or taught in dedicated practical modules, research seminars, and tutorials. There is a compulsory field course in Level 1, which students must pass in order to progress into Level 2, and optional field courses in Levels 2, 3, and 4. At Level 4 all students carry out an independent research project.

3. Program Goal

Computer Engineering Techniques is a field that involves the application of engineering and technological principles to the design, development, and maintenance of computer hardware, software, and network systems. To be successful in this field, professionals need to possess specific competencies. Below are some of the essential competencies for the Department of computer engineering techniques:

- 1. Programming Skills:** Proficiency in programming languages is essential for computer technology engineers to have expertise in programming languages such as C++, Matlab, and Python. They should be able to develop, test, and maintain programs that meet the needs of users.
- 2. Mathematical Skills:** They should be skilled in mathematical concepts such as algebra, trigonometry, and calculus, as they play a vital role in the design, development, and testing of computer components and systems.
- 3. Knowledge of Computer Hardware Skills:** Specialists should have a solid knowledge of computer hardware, including processors, memory, storage, and other essential components, and this is covered in computer organization, Microprocessors, and advanced computer architecture subjects.
- 4. Networking Skills:** Professionals should be able to design, configure, troubleshoot, and maintain computer networks and their protocols of operation besides the security of the network and the Internet in general.
- 5. Communication Systems Skills:** Proficiency in different types of communication systems: analog, digital, and mobile communication give the computer technology engineer a solid foundation for his field of operation in the future.
- 6. System Design and Troubleshooting Skills:** Specialists should have the skills to design and implement systems and also to identify and diagnose system malfunctions before applying corrective action and this is covered through many subjects such as instruments and measurement, control systems, real-time systems, microcontrollers, and other.
- 7. Problem-Solving Skills:** In this field, professionals are expected to have excellent problem-solving skills, as they are responsible for identifying and assessing complex problems and designing effective solutions, and this is mostly covered in subjects like project management and information theory besides engineering analysis.

8. **Electrical and Electronics Skills:** Solid foundation skills in electrical and electronics circuits and systems, their design and implementation are also crucial.
9. **Database Management Skills:** Knowledge of database structure, queries, and management is essential to ensure the optimum working of software applications.
10. **Research and Development Skills:** Specialists must be up to date on technological trends and keep themselves informed about emerging technologies and industry best practices.

In summary, Computer Engineering Techniques Specialist include hardware and software configuration, programming skills, networking and security knowledge, troubleshooting, database management, collaboration, communication, time management, custom solutions designing, and research and development. Overall, possessing these competencies equips Computer Engineering Techniques Specialist Professionals with the requisite skills to design, implement and maintain computer systems and networks effectively.

4. Student Learning Outcomes

The Department of Computer Engineering Technique requires professionals to possess generic competencies in addition to the technical skills and knowledge required to perform their roles effectively. Below are some of the generic competencies required by the Department of Computer Engineering Techniques:

1. **Analytical Thinking:** The ability to identify and analyze complex problems and provide practical solutions is essential for professionals in this field.
2. **Continuous Learning:** Keeping up to date with new technologies, tools, and techniques is crucial for professionals to remain competitive.
3. **Adaptability:** Being able to adapt and navigate changes is essential as the technology landscape is ever-changing.
4. **Creativity:** The ability to think creatively and innovate helps to develop new solutions and products.
5. **Teamwork:** Professionals must be able to work collaboratively with colleagues, clients, and other stakeholders to achieve the desired results.

6. **Communication Skills:** Effective communication skills are essential to understanding and articulating technical issues to colleagues, clients, and other stakeholders in a clear and concise manner.
7. **Project Management:** Competence in project management is essential, including planning, organization, and resource allocation.
8. **Time Management:** The ability to manage time is crucial to ensure project milestones are met.
9. **Leadership:** Professionals must be able to motivate and lead teams to achieve project objectives.
10. **Custom Solutions Designing:** The ability to design, develop, and maintain custom software applications and solutions, catering to end-user business requirements.

In conclusion, professionals in the Department of Computer Engineering Techniques must possess both technical and generic competencies to excel in their roles. Analytical thinking, continuous learning, adaptability, creativity, teamwork, communication skills, project management, time management, leadership, and customer service are among the essential generic competencies required. These competencies help to enhance competence and promote good performance in the department of computer engineering techniques.

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6. Credits, Grading and GPA

Credits

Middle Technical University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 30 hrs student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

GRADING SCHEME				
مخطط الدرجات				
Group	Grade	التقدير	Marks (%)	Definition
Success Group	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

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

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

CGPA of a 4-year B.Sc. degree:

$$CGPA = [(1st^{th} \text{ module score} \times ECTS) + (2nd^{th} \text{ module score} \times ECTS) + \dots] / 240$$

7. Curriculum/Modules

Semester 1 | 30 ECTS credits | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET1101	Digital Fundamentals	88	88	6.00	C	
CET1102	Electrical Engineering Fundamentals	88	76	6.00	C	
CET1103	Mathematics I	59	76	5.00	B	
CET1104	Engineering Drawing	59	46	5.00	B	
CET1105	Engineering Workshops	60	48	6.00	B	
CET1106	English Language (Beginner)	45	17	2.00	S	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET1201	Digital Systems	88	79	6.00	C	CET1101
CET1202	Electrical Circuits	88	76	6.00	C	CET1102
CET1203	Programming Essentials	88	76	6.00	C	
CET1204	Mathematics II	59	46	5.00	B	CET1103
CET1205	Human Rights and Democracy	59	40	4.00	S	
NUST1206	Arabic Language	45	19	3.00	S	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET2101	Engineering Mathematics	59	76	5.00	B	CET1204
CET2102	Object Oriented Programming	88	76	6.00	B	
CET2103	Computer Organization & Architecture	74	76	6.00	C	
CET2104	Electronics Fundamentals	88	44	5.00	C	CET1202
CET2105	Communication Fundamentals	74	33	5.00	C	
CET2106	English Language (Intermediate)	45	17	3.00	S	

Semester 4 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET2201	Advanced Engineering Mathematics	59	88	5.00	B	CET2101
CET2202	Python Programming	74	76	5.00	B	
CET2203	Microprocessors	102	46	6.00	C	CET2103
CET2204	Analog Communications	74	42	5.00	C	CET2105
CET2205	Electronics Circuits	60	36	5.00	C	CET2104
CET2206	Instrumentation and Measurement	60	33	4.00	C	

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET3101	Operating Systems	74	76	5.00	C	
CET3102	Control Engineering Fundamentals	74	64	5.00	C	
CET3103	Digital Signal Processing	74	40	5.00	C	
CET3104	Digital Controllers	74	46	5.00	C	
CET3105	Digital Communications	74	47	5.00	C	CET2105
CET31XX	Elective	74	33	5.00	E	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET3201	Advanced Control Systems	74	76	5.00	C	CET3102
CET3202	Computer Network Fundamentals	88	46	6.00	C	
CET3203	Database Systems	88	46	6.00	C	
CET3204	Engineering Analysis	74	46	5.00	C	
CET3205	English Language (Advanced)	45	19	3.00	S	
CET32XX	Elective	74	74	5.00	E	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET4101	Information Theory and Coding	88	76	6.00	C	
CET4102	Computer Networks Protocols	88	46	6.00	C	CET3202
CET4103	Mobile Communications	74	46	5.00	C	CET3105
CET4104	Engineering Management	74	46	5.00	B	
CET4105	Professional Ethics	45	17	3.00	S	
CET41XX	Elective	74	76	5.00	E	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET4201	Fiber Optics Communication	74	64	5.00	C	
CET4202	Advanced Computer Technology	74	33	5.00	C	
CET4203	Network Security & Cybersecurity	74	33	5.00	C	
CET4204	Cloud Computing	74	33	5.00	C	
CET4205	Project	74	67	5.00	C	
CET42XX	Elective	74	76	5.00	E	

Elective Subjects:

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET3106	Real-Time Systems	74	76	5.00	E	
CET3107	Parallel Computing	74	76	5.00	E	
CET3206	Digital Image Processing	74	76	5.00	E	
CET3207	IoT Fundamentals	74	76	5.00	E	
CET4106	Artificial Intelligence	74	76	5.00	E	
CET4107	Web Design	74	76	5.00	E	
CET4108	Distributed Computing & Systems	74	76	5.00	E	
CET4206	Reconfigurable Computing Systems	74	76	5.00	E	
CET4207	Wireless Sensor Networks	74	76	5.00	E	
CET4208	Optimization Algorithms	74	76	5.00	E	

8. Contact

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National University of Science and Technology

الجامعة الوطنية للعلوم والتكنولوجيا



First Cycle – bachelor's degree (B.Eng.)
Department of **Computer Engineering Techniques**
Engineering Technical College
NUST

(بكالوريوس - هندسة تقنيات الحاسوب) الدورة الاولى (الكلية التقنية الهندسية - الجامعة الوطنية للعلوم والتكنولوجيا)



1. Overview
2. Undergraduate Modules 2023-2024
3. Contact

1 – Overview

the program of Computer Engineering Techniques to gain the Bachelor of Science degree. The program delivers (48) Modules with (6000) total student workload hours and 240 total ECTS. The module delivery is based on the Bologna Process.

Module 1

Code	Course/Module Title	ECTS	Semester
CET1101	Digital Fundamentals	6	1
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3	88	88
Description			
To be able to deal with the number systems and codes. To understand the functionality of logic gates. To have a skill to use the logic gates in designing logic circuit. To have a skill to simplify the digital circuits. To learn the simplification process, Boolean expression, Demorgans law, and Karnaugh map. To understand the principles for designing logic circuit. To understand adder, subtractor, decoder, encoder, multiplexer, demultiplexer, and comparator circuits			

Module 2

Code	Course/Module Title	ECTS	Semester
CET1102	Electrical Engineering Fundamentals	6	1
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3	88	76
Description			
type something like: The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.			

Module 3

Code	Course/Module Title	ECTS	Semester
CET1103	Mathematics I	5	1

Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4		59	76
Description			
This module will primarily focus on encouraging students to participate in the activities, as well as refining and developing their critical thinking skills. This will be achieved through lectures, tutorials, discussions, and grading activities.			

Module 4

Code	Course/Module Title	ECTS	Semester
CET1104	Mathematics I	5	1
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4		59	76
Description			
This module will primarily focus on encouraging students to participate in the activities, as well as refining and developing their critical thinking skills. This will be achieved through lectures, tutorials, discussions, and grading activities.			

Module 5

Code	Course/Module Title	ECTS	Semester
CET1105	Engineering Workshops	5	1
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
	4	45	17
Description			
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 labs, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.			

Module 6

Code	Course/Module Title	ECTS	Semester
CET1106	English Language (Beginner)	2	1
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		60	48
Description			
The main strategies that will be adopted in delivering this module are: - Allow students to actively participate in the learning process with class discussions and exercises that support the initiative. - Use didactic questioning through questions to determine student understanding of the material			

Module 7

Code	Course/Module Title	ECTS	Semester
CET1201	Digital Systems	6	2
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3	88	79
Description			
<p>The main strategies that will be adopted in delivering this module are:</p> <ul style="list-style-type: none"> - Allow students to actively participate in the learning process with class discussions and exercises that support the initiative. - Use didactic questioning through questions to determine student understanding of the material 			

Module 8

Code	Course/Module Title	ECTS	Semester
CET1202	Electrical Circuits	6	2
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3	88	76
Description			
<p>This Course Specification prepares the student to be able to realize basic parameters in electrical engineering and how to link these parameters. It also makes him capable of solving electrical circuits using different theorems in addition to utilizing the dc theorems to solve ac circuits. Moreover, it goes into configuring 3 phase circuits, vectors, phase and total powers and to have the student being capable of linking electricity to magnetism.</p>			

Module 9

Code	Course/Module Title	ECTS	Semester
CET1203	Programming Essentials	6	2
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	88	76
Description			
<p>The main strategy that will be adopted in delivering this module is to encourage students' participation in learning and developing their skills in programming and logic thinking, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of lab experiments involving assignments and project design activities that are interesting to the students.</p>			

Module 10

Code	Course/Module Title	ECTS	Semester
CET1204	Mathematics II	5	2
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
5		59	46
Description			
This module will primarily focus on encouraging students to participate in the activities, as well as refining and developing their critical thinking skills. This will be achieved through lectures, tutorials, discussions, and grading activities.			

Module 11

Code	Course/Module Title	ECTS	Semester
CET1205	Human Rights and Democracy	4	2
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		46	40
Description			
<p>تشجيع الطلاب على المشاركة في مناقشات تفاعلية حول تطور حقوق الإنسان عبر التاريخ مشروعات بحثية توجيه الطلاب في إعداد مشروعات بحثية تستكشف تطور حقوق الإنسان في فترات تاريخية محددة استخدام التكنولوجيا تضمين وسائل تكنولوجية لتعزيز تفاعل الطلاب وتقديم المعلومات بشكل أكثر تفاعلية ورش العمل والتمثيل العملي إجراء ورش عمل تفاعلية وأنشطة تمثيل لفهم أعمق لمفاهيم حقوق الإنسان تقديم تقييم مستمر تقديم تقييم مستمر لفحص تقدم الطلاب وفهمهم لتطور حقوق الإنسان على مر العصور</p>			

Module 12

Code	Course/Module Title	ECTS	Semester
CET1206	Arabic Language	3	2
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
5		45	19
Description			
<p>اس رتاتيجيات التعلم والتعليم المستخدمة ف مادة اللغة تشمل مجموعة متنوعة من النهج والتقنيات ال رت تعزيز عملية التعلم للطلاب. من بي هذه الاس رتاتيجيات التفاعل النشط: يتم تشجيع الطلاب على المشاركة والمشاركة الفعالة ف الدروس من خلال 1. المناقشات الجماعية والأنشطة التفاعلية. التعلم التعاون: يشجع التعاون والتعاون بي الطلاب من خلال العمل الجماع والمشاري ع الجماعية، 2. حيث يتعاون الطلاب مع بعضهم البعض لتحقيق أهداف التعلم المحددة. التطبيق العملي: يتم توفت فرص للطلاب لتطبيق المفاهيم والمهارات المكتسبة ف سياقات عملية 3. وواقعية، مما يعزز التفاعل الفعال مع المادة. استخدام التقنيات الحديثة: يستفيد الطلاب من استخدام التكنولوجيا ف عملية التعلم، مثل 4.</p>			

Module 13

Code	Course/Module Title	ECTS	Semester
CET2101	Engineering Mathematics	5	3
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4		59	76
Description			

Module 14

Code	Course/Module Title	ECTS	Semester
CET2102	Object Oriented Programming	6	3
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3	88	76
Description			

Module 15

Code	Course/Module Title	ECTS	Semester
CET2103	Computer Organization & Architecture	6	3
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	74	76
Description			

Module 16

Code	Course/Module Title	ECTS	Semester
CET2104	Electronics Fundamentatls	5	3
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	88	44
Description			

Module 17

Code	Course/Module Title	ECTS	Semester
CET2105	Communication Fundamentals	5	3
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	88	33
Description			

Module 18

Code	Course/Module Title	ECTS	Semester
CET2106	English Language (Intermediate)	3	3
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		45	17
Description			

Module 19

Code	Course/Module Title	ECTS	Semester
CET2201	Advanced Engineering Mathematics	5	4
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4		59	88
Description			

Module 20

Code	Course/Module Title	ECTS	Semester
CET2202	Python Programming	5	4
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	74	76
Description			

Module 21

Code	Course/Module Title	ECTS	Semester
CET2203	Microprocessors	6	4
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	4	102	76
Description			

Module 22

Code	Course/Module Title	ECTS	Semester
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CET2204	Analog Communications	5	4
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	74	42
Description			

Module 23

Code	Course/Module Title	ECTS	Semester
CET2205	Electronics Circuits	5	4
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	60	36
Description			

Module 24

Code	Course/Module Title	ECTS	Semester
CET2206	Instrumentation and Measurement	4	4
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	60	33
Description			

Module 25

Code	Course/Module Title	ECTS	Semester
CET3101	Operating Systems	5	5
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	74	64
Description			

Module 26

Code	Course/Module Title	ECTS	Semester
CET3102	Control Engineering Fundamentals	5	5
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	75	46
Description			

Module 27

Code	Course/Module Title	ECTS	Semester
CET3103	Digital Signal Processing	5	5
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	74	40
Description			

Module 28

Code	Course/Module Title	ECTS	Semester
CET3104	Digital Controllers	5	5
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	2	74	46
Description			

Module 29

Code	Course/Module Title	ECTS	Semester
CET3105	Digital Communications	5	5
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	74	47
Description			

Module 30

Code	Course/Module Title	ECTS	Semester
CET31xx	Elective	5	5
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	74	30
Description			

Module 31

Code	Course/Module Title	ECTS	Semester
CET3201	Advanced Control Systems	5	6
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	74	76
Description			

Module 32

Code	Course/Module Title	ECTS	Semester
CET3202	Computer Network Fundamentals	6	6
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
4	2	88	76
Description			

Module 33

Code	Course/Module Title	ECTS	Semester
CET3203	Database Systems	6	6
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	88	46
Description			

Module 34

Code	Course/Module Title	ECTS	Semester
CET3204	Engineering Analysis	5	6
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	74	46
Description			

Module 35

Code	Course/Module Title	ECTS	Semester
CET3205	English Language (Advanced)	3	6
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		45	19
Description			

Module 36

Code	Course/Module Title	ECTS	Semester
CET32xx	Elective	5	6
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		74	74
Description			

Module 37

Code	Course/Module Title	ECTS	Semester
CET4101	Information Theory and Coding	6	7
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	88	74
Description			

Module 38

Code	Course/Module Title	ECTS	Semester
CET4102	Computer Networks Protocols	6	7
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	3	88	46
Description			

Module 39

Code	Course/Module Title	ECTS	Semester
CET4103	Mobile Communications	5	7
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	74	46
Description			

Module 40

Code	Course/Module Title	ECTS	Semester
CET4104	Engineering Management	5	7
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	74	46
Description			

Module 41

Code	Course/Module Title	ECTS	Semester
CET4105	Professional Ethics	3	7
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3		45	17
Description			

Module 42

Code	Course/Module Title	ECTS	Semester
CET41xx	Elective	5	7
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
3	2	74	76
Description			

Module 43

Code	Course/Module Title	ECTS	Semester
CET4201	Fiber Optics Communication	5	8
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	74	64
Description			

Module 44

Code	Course/Module Title	ECTS	Semester
CET4202	Advanced Computer Technology	5	8
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	74	33
Description			

Module 45

Code	Course/Module Title	ECTS	Semester
CET4203	Network Security & Cybersecurity	5	8
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	74	33
Description			

Module 46

Code	Course/Module Title	ECTS	Semester
CET4204	Cloud Computing	5	8
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
2	3	74	33
Description			

Module 47

Code	Course/Module Title	ECTS	Semester
CET4205	Project	5	8
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)
5		74	76
Description			

Module 48

Code	Course/Module Title	ECTS	Semester	
CET42xx	Elective	5	8	
Class (hr/w)	L ect/Lab./Prac./Tutor	SSWL (hr/sem)	USWL (hr/w)	
3	2	74	76	
Description				
CET3106	Real-Time Systems	74	76	5
CET3107	Parallel Computing	74	76	5
CET3206	Digital Image Processing	74	76	5
CET3207	IoT Fundamentals	74	76	5
CET4106	Artificial Intelligence	74	76	5
CET4107	Web Design	74	76	5
CET4108	Distributed Computing & Systems	74	76	5
CET4206	Reconfigurable Computing Systems	74	76	5
CET4207	Wireless Sensor Networks	74	76	5
CET4208	Optimization Algorithms	74	76	5

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2. Credits, Grading and GPA

Credits

Middle Technical University is following the Bologna Process with the European Credit Transfer System (ECTS) credit system. The total degree program number of ECTS is 240, 30 ECTS per semester. 1 ECTS is equivalent to 30 hrs student workload, including structured and unstructured workload.

Grading

Before the evaluation, the results are divided into two subgroups: pass and fail. Therefore, the results are independent of the students who failed a course. The grading system is defined as follows:

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

Calculation of the Cumulative Grade Point Average (CGPA)

1. The CGPA is calculated by the summation of each module score multiplied by its ECTS, all are divided by the program total ECTS.

CGPA of a 4-year B.Sc. degree:

$$CGPA = [(1st^{th} \text{ module score} \times ECTS) + (2nd^{th} \text{ module score} \times ECTS) + \dots] / 240$$

3. Curriculum/Modules

Semester 1 | 30 ECTS credits | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET1101	Digital Fundamentals	88	88	6.00	C	
CET1102	Electrical Engineering Fundamentals	88	76	6.00	C	
CET1103	Mathematics I	59	76	5.00	B	
CET1104	Engineering Drawing	59	46	5.00	B	
CET1105	Engineering Workshops	60	48	5.00	B	
CET1106	English Language (Beginner)	45	17	3.00	S	

Semester 2 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET1201	Digital Systems	88	79	6.00	C	CET1101
CET1202	Electrical Circuits	88	76	6.00	C	CET1102
CET1203	Programming Essentials	88	76	6.00	C	
CET1204	Mathematics II	59	46	5.00	B	CET1103
CET1205	Human Rights and Democracy	59	40	4.00	S	
CET1206	Arabic Language	45	19	3.00	S	

Semester 3 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET2101	Engineering Mathematics	59	76	5.00	B	CET1204
CET2102	Object Oriented Programming	88	76	6.00	B	
CET2103	Computer Organization & Architecture	74	76	6.00	C	
CET2104	Electronics Fundamentals	88	44	5.00	C	CET1202
CET2105	Communication Fundamentals	74	33	5.00	C	
CET2106	English Language (Intermediate)	45	17	3.00	S	

Semester 4 | 30 ECTS | 1 ECTS = 30 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET2201	Advanced Engineering Mathematics	59	88	5.00	B	CET2101
CET2202	Python Programming	74	76	5.00	B	
CET2203	Microprocessors	102	46	6.00	C	CET2103
CET2204	Analog Communications	74	42	5.00	C	CET2105
CET2205	Electronics Circuits	60	36	5.00	C	CET2104
CET2206	Instrumentation and Measurement	60	33	4.00	C	

Semester 5 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET3101	Operating Systems	74	76	5.00	C	
CET3102	Control Engineering Fundamentals	74	64	5.00	C	
CET3103	Digital Signal Processing	74	40	5.00	C	
CET3104	Digital Controllers	74	46	5.00	C	
CET3105	Digital Communications	74	47	5.00	C	CET2105
CET31XX	Elective	74	33	5.00	E	

Semester 6 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET3201	Advanced Control Systems	74	76	5.00	C	CET3102
CET3202	Computer Network Fundamentals	88	46	6.00	C	
CET3203	Database Systems	88	46	6.00	C	
CET3204	Engineering Analysis	74	46	5.00	C	
CET3205	English Language (Advanced)	45	19	3.00	S	
CET32XX	Elective	74	74	5.00	E	

Semester 7 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET4101	Information Theory and Coding	88	76	6.00	C	
CET4102	Computer Networks Protocols	88	46	6.00	C	CET3202
CET4103	Mobile Communications	74	46	5.00	C	CET3105
CET4104	Engineering Management	74	46	5.00	B	
CET4105	Professional Ethics	45	17	3.00	S	
CET41XX	Elective	74	76	5.00	E	

Semester 8 | 30 ECTS | 1 ECTS = 25 hrs

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET4201	Fiber Optics Communication	74	64	5.00	C	
CET4202	Advanced Computer Technology	74	33	5.00	C	
CET4203	Network Security & Cybersecurity	74	33	5.00	C	
CET4204	Cloud Computing	74	33	5.00	C	
CET4205	Project	74	67	5.00	C	
CET42XX	Elective	74	76	5.00	E	

Elective Subjects:

Code	Module	SSWL	USSWL	ECTS	Type	Pre-request
CET3106	Real-Time Systems	74	76	5.00	E	
CET3107	Parallel Computing	74	76	5.00	E	
CET3206	Digital Image Processing	74	76	5.00	E	
CET3207	IoT Fundamentals	74	76	5.00	E	
CET4106	Artificial Intelligence	74	76	5.00	E	
CET4107	Web Design	74	76	5.00	E	
CET4108	Distributed Computing & Systems	74	76	5.00	E	
CET4206	Reconfigurable Computing Systems	74	76	5.00	E	
CET4207	Wireless Sensor Networks	74	76	5.00	E	
CET4208	Optimization Algorithms	74	76	5.00	E	

4. Contact

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Republic of Iraq - Ministry of Higher Education and Scientific Research
National University of Science and Technology (NUST)
Bachelor's degree in **Computer Techniques** (First cycle)
Four years (Eight semesters) - 240 ECTS credits - **1 ECTS = 25 hr**
Program Curriculum (2026 - 2025)

جمهورية العراق - وزارة التعليم العالي والبحث العلمي
الجامعة الوطنية للعلوم والتكنولوجيا
بكالوريوس في هندسة تقنيات الحاسوب (الدورة الأولى)
أربع سنوات (ثمانية فصول دراسية) - 240 وحدة ائتمانية = 25 ساعة
المناهج الدراسية للعام (2026 - 2025)



Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)							Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code		
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Semr (hr/w)	CL (hr/w)								Lect (hr/w)	Lab (hr/w)
UGI	One	1	CET1101	Digital Fundamentals	مقدمة الرقمية	English	2	2	2					4	64	86	150	6.00	C			
		2	CET1102	Electrical Engineering Fundamentals	مقدمة هندسة الكهرباء	English	2	2	2					4	64	86	150	6.00	C			
		3	CET1103	Mathematics I	الرياضيات I	English	2				1				3	48	77	125	5.00	S		
		4	CET1104	Engineering Drawing	هندسة الرسم الهندسي	English	2		3						3	48	77	125	5.00	S		
		5	CET1105	Engineering Workshops	ورش عمل هندسية	English	2		4						4	64	86	150	6.00	S		
		6	MTU1002	English Language I	اللغة الانجليزية I	English	1	1	11	0		1		0	3	33	17	50	2.00	B		
						Total		7	1	11	0	1		0	21	321	429	750	30.00			
	Two	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)							Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code	
			1	CET1201	Digital Systems	الأنظمة الرقمية	English	2	2	2						4	64	86	150	6.00	C	CET1101
			2	CET1202	Electrical Circuits	الدوائر الكهربائية	English	2	2	2						4	64	86	150	6.00	C	CET1102
			3	CET1203	Programming Essentials	أسس البرمجة	English	2	2	2						4	64	86	150	6.00	C	
			4	CET1204	Mathematics II	الرياضيات II	English	2				1				3	48	77	125	5.00	S	CET1103
			5	MTU1006	Democracy and Human Rights	الديمقراطية وحقوق الانسان	Arabic	2	2							3	33	17	50	2.00	B	
			6	MTU1001	Arabic Language I	اللغة العربية I	Arabic	2	2	1	0		1		0	4	34	41	75	3.00	B	
				Total		13	0	7	0	1		0	25	340	410	750	30					
UGII	Three	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)							Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code	
			1	CET1201	Engineering Mathematics	الرياضيات الهندسية	English	2				1				3	48	77	125	5.00	S	
			2	CET1202	Object Oriented Programming	البرمجة التوجّهية	English	2	2	2						4	79	71	150	6.00	S	CET1204
			3	CET1203	Computer Organization and Applications	تركيب الحاسوب وتطبيقات	English	2	2	2						4	64	61	125	5.00	C	
			4	CET1204	Electronics Fundamentals	مقدمة الإلكترونيات	English	2	2	2						4	64	61	125	5.00	C	CET1202
			5	CET1205	Communication Fundamentals	أسس الاتصالات	English	2	2	2						4	64	61	125	5.00	C	
			6	MTU1003	English Language II	اللغة الانجليزية 2	English	1	1	1	0		2		0	3	33	17	50	2.00	B	
					Total		13	1	8	0	2		0	25	385	365	750	30				
	Four	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)							Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code	
			1	CET1201	Advanced Engineering Mathematics	الرياضيات الهندسية المتقدمة	English	2				1				3	48	77	125	5.00	S	CET1201
			2	CET1202	Python Programming	البرمجة بلغة بايثون	English	2	2	2						4	64	36	100	4.00	S	
			3	CET1203	Microprocessors	المعالجات الدقيقة	English	2	2	2						4	64	61	125	5.00	C	
			4	CET1204	Analog Communications	الاتصالات التماثلية	English	2	2	2						4	64	61	125	5.00	C	CET1205
			5	CET1205	Electronics Circuits	الدوائر الإلكترونية	English	2	2	2						4	64	61	125	5.00	C	CET1204
6			CET1206	Instrumentation and Measurement	الأجهزة والقياس	English	2	2	2						4	64	36	100	4.00	C		
				Total		14	0	10	0	1		0	26	401	349	750	30					

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code												
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Seam (hr/w)																			
UGIII	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code												
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Seam (hr/w)																			
							1	CET3201	Advanced Control Systems	نظم التحكم المتقدمة	English	2									2				4	64	61	125	5.00	C	
							2	CET3202	Computer Network Fundamentals	أسسيات شبكات الحاسوب	English	2									2				4	64	61	125	5.00	C	CET3102
							3	CET3203	Database Systems	قواعد البيانات	English	2									2				4	64	61	125	5.00	C	
							4	CET3204	Engineering Analysis	التحليل الهندسي	English	2									2				4	64	61	125	5.00	C	
5	CET3205	Data communications	الشبكات البعيدة	English	2		2				4	64	61	125	5.00	C															
6	CET32XX	Elective	مادة اختيارية	English	2		2				4	64	61	125	5.00	E															
					Total	12	0	12	0	0	0	24	384	366	750	30															
UGIV	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code												
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Seam (hr/w)																			
							1	CET4101	Information Theory and Coding	نظرية المعلومات و الترميز	English	2									2				4	64	61	150	6.00	C	
							2	CET4102	Computer Networks Protocols	بروتوكولات شبكات الحاسوب	English	2									2				4	64	86	150	6.00	C	
							3	CET4103	Mobile Communications	الاتصالات المتنقلة	English	2									2				4	64	86	150	6.00	C	
							4	CET4104	Engineering Management	الادارة الهندسية	English	2									2				4	64	61	125	5.00	S	
5	MTU1008	Professional Ethics	أخلاقيات المهنة	Arabic	2						3	33	17	50	2.00	B															
6	CET41XX	Elective	مادة اختيارية	English	2		2				4	64	61	125	5.00	E															
					Total	12	0	10	0	0	0	23	353	397	750	30															
UGIV	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w)						Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code												
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Seam (hr/w)																			
							1	CET4201	Fiber Optics Communication	الاصالات البصرية	English	2									2				4	64	61	125	5.00	C	
							2	CET4202	Advanced Computer Technology	تكنولوجيا الحاسوب المتقدمة	English	2									2				4	64	61	125	5.00	C	
							3	CET4203	Network Security & Cybersecurity	امنية الشبكات واالن الامن السيبراني	English	2									2				4	64	61	125	5.00	C	
							4	CET4204	Cloud Computing	الحوسبة السحابية	English	2									2				4	64	61	125	5.00	C	
5	CET4205	Project	مشروع	English	2		2	2			2	62	63	125	5.00	C															
6	CET42XX	Elective	مادة اختيارية	English	2		2				4	64	61	125	5.00	E															
					Total	10	0	12	2	0	0	22	382	368	750	30															
					Total	93	2	82	2	5	0	190	2950	3050	6000	240.0		Must be 240 ECTS													

Level	Semester	No.	Module Code	Module Name in English	اسم المادة باللغة العربية	Language	SSWL (hr/w)						Exam			ECTS	Module Type	Prerequisite Module(s) Code	
							CL (hr/w)	Lect (hr/w)	Lab (hr/w)	Pr (hr/w)	Tut (hr/w)	Sem (hr/w)	hr/sem	SSWL hr/sem	U/SSWL hr/sem				SSWL hr/sem
UGIII	5		CET3106	Real-Time Systems	النظم الزمنية الحقيقية	English	2		2				4	64	61	125	5.00	E	
			CET3107	Parallel Computing	الحوسبة المتوازية	English	2		2				4	64	61	125	5.00	E	
			CET3206	Digital Image Processing	معالجة الصور الرقمية	English	2		2				4	64	61	125	5.00	E	
	6		CET3207	IoT Fundamentals	المبادئ التأسيسية للإنترنت الأشياء	English	2		2				4	64	61	125	5.00	E	
			CET4105	Artificial Intelligence	الذكاء الاصطناعي	English	2		2				4	64	61	125	5.00	E	
			CET4106	Web Design	تصميم المواقع الإلكترونية	English	2		2				4	64	61	125	5.00	E	
UGIV	7		CET4107	Distributed Computing & Systems	النظم الحوسبية الموزعة	English	2		2			4	64	61	125	5.00	E		
			CET4206	Reconfigurable Computing Systems	نظم الحوسبة القابلة لإعادة التكوين	English	2		2				4	64	61	125	5.00	E	
			CET4207	Wireless Sensor Networks	شبكات المستشعرات اللاسلكية	English	2		2				4	64	61	125	5.00	E	
	8		CET4208	Optimization Algorithms	خوارزميات التحسين	English	2		2			4	64	61	125	5.00	E		

Note: The student should complete 4 weeks of Summer Internships to fulfill the requirements of the Bachelor's degree

Structured SWL (hr/w) type	CL	Lab	Pr	Tut	Lect	Seminar	Module Type	Basic learning activities		Core learning activity		Support or related learning activity		Elective learning activity		SSWL: Student Workload	SSWL: Structured SWL	U/SSWL: Unstructured SWL	
								B	C	S	E								

Note: Columns O, Q and R are programmed, protected and should not be edited



المستوى الأول

الفصل الأول

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Digital Fundamentals		Module Delivery
Module Type	Core		✓ Theory Lecture ✓ Lab Tutorial Practical Seminar
Module Code	CET1101		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Reem Jamal	e-mail	Reem84j@mtu.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Msc.
Module Tutor	Dr.Adnan Allawi Ftaiet	e-mail	adnan.alameri@nust.edu.iq
Peer Reviewer Name	Asst. Prof. Alhamzah Taher Mohammed	e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29 / 10 / 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

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. To be able to deal with the number systems and codes. 2. To understand the functionality of logic gates. 3. To have a skill to use the logic gates in designing logic circuit. 4. To have a skill to simplify the digital circuits. 5. To learn the simplification process, Boolean expression, Demorgans law, and Karnaugh map.. 6. To understand the principles for designing logic circuit. 7. To understand adder, subtractor, decoder, incoder, multiplexer, demultipleaer, and comparator circuits.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Recognize each type of number systems. 2. Identify the process of converting between number systems. 3. Summarize the types of logic gates. 4. Discuss the use of each gate. 5. Describe design of logic circuit by using logic gats. 6. Explain the simplification processes. 7. Explain Boolean expression and Demorgan's law. 8. Explain the Karnaugh map for different numbers of bits. 9. Discuss the design of logic circuit before and after simplification. 10. Explain the combinational logic circuit. 11. Identify the adder, subtractor, decoder, encoder, multiplexer, demultiplexer, comparator circuits, and code conversion. 12. Identify the basic circuit elements and their applications
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>--Number systems - decimal, binary, octal, and hexadecimal number system, conversion, operation. [8 hrs]</p> <p>-Codes- excess-3,gray code, conversions, operations, complements [8 hrs]</p> <p>--Logic gates-NOT, AND, OR, NOR, NAND, XOR, XNOR. [5 hrs]</p> <p>--Logic simplification-Boolean theorem and Demorgans law. [10 hrs]</p> <p>--Karnaugh map-SOP, POS, and don't care. [10 hrs]</p> <p>--Arithmetic operations Part A- adder, parallel binary adder, subtractor, adder-subtractor [10 hrs]</p> <p>--Arithmetic operations Part B- multiplexer, demultiplexer, decoder, encoder, comparator, and code conversion. [10 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطلاب موزع على ١٥ اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	62	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعياً	4.1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	88	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعياً	5.9
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Number systems (decimal, binary, octal, conversions, operations)
Week 2	Number systems (hexadecimal, BCD, conversions, operations)
Week 3	Number systems (excess-3,gray code, conversions, operations, complements)
Week 4	Logic gates (AND,OR,NOT,NAND,NOR,XOR,XNOR)
Week 5	Logic simplification (Boolean theorem)
Week 6	Logic simplification (Demorgan's theorem)
Week 7	Karnaugh maps(2-variables,3-variables,)
Week 8	Karnaugh maps (4-variables (SOP,POS,don't care))
Week 9	Karnaugh maps (5-variables, (SOP,POS,don't care))
Week 10	Midterm exam
Week 11	Arithmetic operations
Week 12	Arithmetic operations (decoder, encoder)
Week 13	Arithmetic operations (Multiplexer, Demultiplexer)
Week 14	Arithmetic operations (comparators)
Week 15	Arithmetic operations (code conversion)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	logic gates (NOT, AND,OR)
Week 2	Logic gates (NOR.NAND)
Week 3	Logic gates (XOR,XNOR)
Week 4	Boolean theorem
Week 5	Demorgan's law
Week 6	Karnaugh map
Week 7	SOP
Week 8	POS, don't care
Week 9	Combinational circuit (half adder, full adder)
Week 10	Combinational circuit (Half subtractor, full subtractor)
Week 11	Decoder and Encoder circuits
Week 12	Multiplexer and Demultiplexer circuits
Week 13	Comparator circuit
Week 14	Code conversion circuits

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Digital Fundamentals by Floyed	Yes
Recommended Texts	Digital circuit analysis and design with Simulink modeling by Steven T. Karris	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Engineering Fundamentals	Module Delivery	
Module Type	Core	<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CET1102		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	1
Administering Department	CET	College	EETC
Module Leader	Omar Ibrahim Mustafa	e-mail	Omar-ibrahim@mtu.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Msc
Module Tutor	Dr.Ahmed Mahmood Azeiz	e-mail	a31320008@gmail.com
Peer Reviewer Name	Assist prof. Alhamzah Taher	e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29 / 10 / 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

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. To develop problem solving skills and understanding of circuit theory through the application of techniques. 2. To understand voltage, current and power from a given circuit. 3. This course deals with the basic concept of electrical circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform Thevenin's Norton's Theorem.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of DC circuits in an electric circuit. 9. Discuss the various properties of resistors. 10. Explain the two Kirchhoff's laws used in circuit analysis. 11. Identify the basic circuit elements, Maximum Power Transfer Theorem and Reciprocity Theorem. 12. Describe Thevenin's theorem and Norton's theorem and how they work
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>1- Definition: Symbols and Abbreviations, Units, Electric Circuit & It's Element. The Direct Current Network. , Ohms low, Charge, Force, Work, Power.(20 hr)</p> <p>2-Circuit Theory: DC circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction (20 hr)</p> <p>3-Revision problem classes : Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, Conversion Delta To Star Connection, Superposition Method, Maximum Power Transfer Theorem, Reciprocity Theorem (20 hr)</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	62	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	88	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.9
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Symbols And Abbreviations, Units, Electric Circuit & It's Element.
Week 2	The Direct Current Network. Ohms low.
Week 3 and Week 4	Series Circuits (Resistance in Series) Voltage Divider Rule.
Week 5	Parallel Circuits(Resistances in Parallel) Current Divider Rule.
Week 6	Open and Short Circuits, Source Transformation,
Week 7	Series-Parallel Circuits Transformation.
Week 8	Kirchhoff's Laws: - Kirchhoff's current law (KCL) and. Their Use In Network Analysis.
Week 9	Kirchhoff's voltage law (KVL).and Their Use In Network Analysis
Week 10	Midterm exam
Week 11	Conversion Delta To Star Connection And Conversion Star To Delta Connection ,
Week 12	Superposition Method ,
Week 13	Thevenin's Theorem , Norton's Theorem
Week 14	Maximum Power Transfer Theorem
Week 15	Reciprocity Theorem

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	How to use ammeter, voltmeter and ohmmeter.
Week 2	Apply Ohm's Law
Week 3	Apply Kirchhoff's law to measure current
Week 4	Apply Kirchhoff's law to measure voltages
Week 5	Superposition Method
Week 6	Norton's Theorem.
Week 7	Thévenin's Theorem.
Week 8	Delta To Star Connection And Conversion Star To Delta Connection

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Mathematics I		Module Delivery
Module Type	Suport or related learning activity		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET1103		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Hala A. Hashim	e-mail	hala.solomon@gmail.com
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Waleed Sadeq Jaaywel	e-mail	wzz07224waleed@gmail.com
Peer Reviewer Name	Assist prof. Alhamzah Taher	e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29 / 10 / 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

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. This course deals with differential and integral calculus.2. To develop problem solving skills and understanding of preliminaries to differential calculus.3. To understand differentiation, and differentiation methods.4. To perform applications using the derivative.5. To get a good grasp of Integrals, and Integration methods.6. To understand the relationship between differentiation and integration.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Recognize Line and Circle Equation and related evaluating formulas.2. List the various terms associated with Functions and their Types.3. Discuss the Limit and Continuity of a Function.4. Describe the Definition of a derivative as a limit, Differentiation Rules, and various types of Function's Derivatives.5. Identify when to use different Differentiation Methods.6. Discuss the Curve Sketching process, and the L'Hospital's Rule.7. Analyze Taylor and Maclaurin Series.8. Identify the Indefinite Integrals.9. Explain the Integration Methods u-substitution, By parts.10. Explain the Integration Methods Involving Trigonometric Functions, Trigonometric substitution.11. Explain the Integration Method Rational Functions by Partial Fractions.12. Explain the Integration Methods Functions Involving Roots, and Functions Involving Quadratics.13. Recognize the Definite Integral and its Application Area Under a Curve.14. Discuss the Definite Integral Applications Arc Length, Average Value of a Function.15. Discuss the Definite Integral Applications Areas Between Two Curves.
<p>Indicative Contents المحتويات الإرشادية</p>	<p><u>Part A - Preliminaries to differential calculus.</u> This part includes the Line and Circle Equation and related evaluating formulas and parameters. Furthermore, main mathematical Functions characteristics Domain, Range, Odd, Even, and their Types. Finally, The Limit and Continuity of a Function Laws, the behavior At Infinity, followed by important Special Limits, then the Continuity Conditions. [9 hrs] + Revision problem classes in weekly tutorials [3 hrs]</p> <p><u>Part B – Differential calculus.</u> This part will take in details the first key subject of the semester, the Differentiation process from the prospective of Definition as limit, Differentiation Rules, and Function-Derivative Table. Which will be followed by Differentiation Methods namely the Implicit, Logarithmic, and The Chain Rule. Furthermore, four Applications of differentiation will be discussed the Curve Sketching, L'Hospital's Rule, and Taylor and Maclaurin Series. [12 hrs] + Revision problem classes in weekly tutorials [5 hrs]</p>

	<p>Part C – Integral calculus.</p> <p>This part discusses the second key subject the Integration of functions. Followed by dissecting the main Integration Methods, u-substitution, By parts, Involving Trigonometric Functions, Trigonometric substitution, Rational Functions by Partial Fractions, Functions Involving Roots, and Functions Involving Quadratics. Furthermore, it will consider six definite Integral applications, namely The Area Under a Curve, Arc Length, Average Value of a Function, and Areas Between two Curves. [22 hrs] + Revision problem classes in weekly tutorials [8 hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>This module will primarily focus on encouraging students to participate in the activities, as well as refining and developing their critical thinking skills. This will be achieved through lectures, tutorials, discussions, and grading activities.</p>

Student Workload (SWL) الحمل الدراسي للطالب موزع على ١٥ اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.13
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	78	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.2
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	LO #1 - 9
	Assignments	2	20% (10)	5,10	LO # 1 - 4, LO # 6-9
	Projects / Lab.	N/A			
	Report	1	10% (10)		LO # 1 - 14
Summative assessment	Midterm Exam	2 hr	10% (10)	5	LO # 1-11
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Line and Circle Equation. Functions (Domain, Range, Odd, Even, Types.)
Week 2	The Limit and Continuity of a Function (Laws, At Infinity, Special Limits, Continuity Conditions.)
Week 3	Differentiation (Definition as limit, Differentiation Rules, Function-Derivative Table.)
Week 4	Differentiation Methods (Implicit, Logarithmic, The Chain Rule.)
Week 5	Midterm Exam
Week 6	Applications of Differentiation (Curve Sketching, L'Hospital's Rule.), Applications of Differentiation (Taylor and Maclaurin Series.)
Week 7	Introduction to Indefinite Integrals, Integration Methods (u-substitution, By parts.)
Week 8	Integration Methods (Involving Trigonometric Functions, Trigonometric substitution.)
Week 9	Integration Methods (Integration of Rational Functions by Partial Fractions.)
Week 10	Midterm Exam
Week 11	Integration Methods (Functions Involving Roots, Functions Involving Quadratics.)
Week 12	Midterm Exam
Week 13	Definite Integral and Applications (Definite Integral, Area Under a Curve.)
Week 14	Definite Integral and Applications (Arc Length, Average Value of a Function.)
Week 15	Definite Integral and Applications (Areas Between two Curves)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Tutorial)

المنهاج الاسبوعي الاضافي

	Material Covered
	Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Joel R. Hass, Christopher E. Heil, Maurice D. Weir, "Thomas' Calculus: Early Transcendentals", Pearson Education, 14th Edition, (January 1, 2017), ISBN-13: 978-0134439020.	Yes
Recommended Texts	Anthony Croft, Robert Davison, "Mathematics for Engineers: A Modern Interactive Approach", Prentice Hall, 3rd edition, (January 1, 2008), ISBN-13: 978-0132051569.	No
Websites	https://www.khanacademy.org/math/differential-calculus	

Grading Scheme

منظط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Engineering Drawing		Module Delivery
Module Type	Suport or related learning activity		<input type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET1104		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Rawaa dawood Salim	e-mail	rawaadawood@mtu.edu.iq
Module Leader's Acad. Title	Asst. lecturer	Module Leader's Qualification	MSC.
Module Tutor	Fatima Hameed Khayoun	e-mail	dr.oras@mtu.edu.iq
Peer Reviewer Name	Dr. Mahmoud Shuker Mahmoud	e-mail	mahmoud.shukur@mtu.edu.iq
Scientific Committee Approval Date	29 / 10 / 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

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. To develop spatial visualization skills: Enhance your ability to visualize and mentally manipulate objects in three-dimensional space based on two-dimensional drawings. Strengthen your spatial awareness and improve your understanding of complex engineering design 2. Learn sketching and taking field dimensions. 3. Take data and transform it into graphic drawings. 4. Learn basic engineering drawing formats. 5. Learn basic AutoCAD skills. 6. Learn how to draw 2D drawings in AutoCAD.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Identify the basic of AutoCAD 2. Explain Drawing settings 3. How to drawing: Point, Line, Multiline, P line, Spline, X line, Rectangle. 4. How to drawing: Donut, Polygon, Circle, Arc, Ellipse 5. List Modify Tools Identify: Erase, Undo, Redo, Explode, Move, Copy, Rotate, Mirror, 6. Identify Array, Align, Scale, Stretch, Lengthen, Trim, Extend, Break, Join, Chamfer, Fillet. 7. Explain Zoom, Pan. 8. How to assign: Dimension - Linear, Aligned, Radius, Diameter, Center Mark, Angle, Arc length, Continuous, Baseline, Tolerance, Dimension Space, Dimension Break, Jogged radius, Ordinate dimensions. 9. Dealing with: Text, Style, M text, Scale text, Spell, 10. Knowing the Hatching Objects. 11. Drawing 3d modeling. 12. Drawing the Exercises .
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>--AutoCAD Software, drawing settings, Drawing Tools, Line, Circle, Arc, Ellipse, Donut, Polygon, Rectangle, Point, Multiline, P line, Spline, X line. [20 hrs.]</p> <p>--Modify Tools Erase, Undo, Redo, Explode, Move, Copy, Rotate, Mirror, Array, Align, Scale, Stretch, Lengthen, Trim, Extend, Break, Join, Chamfer, Fillet. [4 hrs.]</p> <p>--Display Control Zoom, Pan, Redraw, Clean Screen. [4 hrs.]</p>

	<p>--Dimension - Linear, Aligned, Radius, Diameter, Center Mark, Angle, Arc length, Continuous, Baseline, Tolerance, Dimension Space, Dimension Break, Jogged radius, Ordinate dimensions. [4 hrs.]</p> <p>--Hatching Objects [4hrs]</p> <p>--Text, Style, M text, Scale text, Spell, [4 hrs.]</p> <p>--3D MODELLING, Convert 2D to 3D, Solid Editing [20 hrs.]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<ol style="list-style-type: none"> 1. Familiarize with the Software: Before diving into engineering drawing concepts, it's important to become familiar with the AutoCAD software. This includes understanding the user interface, basic tools, and commands. with introductory tutorials or online resources that cover the basics of AutoCAD. 2. Step-by-Step Instructions: Break down complex drawing tasks into smaller, manageable steps. Provide step-by-step instructions and demonstrations using AutoCAD, showing students how to execute each step effectively. This approach helps students understand the workflow and build their confidence. 3. Visual Aids and Examples: Utilize visual aids, such as slides, diagrams, and examples, to reinforce concepts. Show real-world engineering drawings and explain how they were created using AutoCAD. Visual representations can enhance understanding and make abstract concepts more tangible. 4. Group Activities and Collaboration: Promote collaboration among students by assigning group activities or projects. This allows them to work together, share knowledge, and learn from one another. Encourage students to discuss their approaches and problem-solving techniques related to engineering drawing in AutoCAD. 5. Provide Feedback: Regularly provide constructive feedback on students' drawings. Highlight areas for improvement, suggest alternative methods, and point out common mistakes. This feedback loop is crucial for students to refine their skills and develop a deeper understanding of engineering drawing principles.

Student Workload (SWL)

الحمل الدراسي للطالب موزع على ١٥ اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 11	LO #1-3, 4 and 11
	Assignments	2	10% (10)	4,11	1-3, 3-10
	Projects / Lab.	10	20% (20)	Continuous	
	Report				
Summative assessment	Midterm Exam	3 hr	10% (10)	7	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

	Material Covered
Week 1	Introducing of Engineering Drawing
Week 2	Drawing settings of AutoCAD
Week 3	Drawing Tools Point, Line ,Multiline, P line, Spline, X line.
Week 4	Rectangle, Donut, Polygon

Week 5	Circle, Arc, Ellipse
Week 6	Modify Tools Erase, Undo, Redo, Explode, Move, Copy, Rotate, Mirror, Array, Align, Scale, Stretch, Lengthen, Trim, Extend, Break, Join, Chamfer, Fillet. Display Control Zoom, Pan, Redraw, Clean Screen.
Week 7	Mid exam
Week 8	Dimension - Linear, Aligned, Radius, Diameter, Center Mark, Angle, Arc length, Continuous, Baseline, Tolerance, Dimension Space, Dimension Break, Jogged radius, Ordinate dimensions
Week 9	Annotation Tools Text, Style, M text, Scale text, Spell
Week 10	Hatching Objects
Week 11,12	3D modeling
Week13	Convert 2D To 3D
Week 14	Solid Editing
Week 15	Exercises drawing
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Introduction to AutoCAD 2010 By Alf Yarwood Copyright 2009	Yes
Recommended Texts	An Introduction to Autodesk Inventor 2010 and AutoCAD 2010 Unbnd Edition by Randy Shih	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering Workshops		Module Delivery	
Module Type	Support or related learning activity		<input type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CET1105			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	1	Semester of Delivery		1
Administering Department	CET	College	EETC	
Module Leader	Raya Majid Hameed		e-mail	Rayamajid89@mtu.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	MSc	
Module Tutor	M.Sc.Ali Ashoor Issa		e-mail	ali.a.issa@nust.edu.iq
Peer Reviewer Name	Dr. Mahmoud Shuker Mahmoud		e-mail	mahmoud.shukur@mtu.edu.iq
Scientific Committee Approval Date	29 / 10 / 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

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<p>The objective of studying Electrical, Electronic, and Mechanical workshops is to enable students to acquire the necessary skills and knowledge to deal with electrical, electronic, and mechanical systems and devices. This subject aims to teach students how to diagnose faults, repair systems, and perform maintenance on these systems and devices.</p> <p>By studying Electrical, Electronic, and Mechanical workshops, students can understand the principles of electricity, electronics, and mechanics, as well as how to read engineering diagrams and use various tools and equipment to work on them. They also learn how to diagnose faults, repair them, and properly maintain different devices in a safe manner.</p> <p>In general, studying this subject aims to prepare students to become skilled technicians in the field of electrical, electronic, and mechanical engineering. They can work in areas such as industrial maintenance and repair, electrical and electronic installations, automation and robotics, medical devices, and other modern technologies</p>
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>The learning outcomes of studying Electrical, Electronic, and Mechanical workshops include:</p> <ol style="list-style-type: none">1. Acquisition of diagnostic and repair skills: Students learn how to analyze problems, identify faults in electrical, electronic, and mechanical systems, and implement appropriate repair procedures.2. Understanding of electrical, electronic, and mechanical principles: Students gain knowledge of engineering and technical fundamentals related to electricity, electronics, and mechanics, including reading engineering diagrams and practical understanding of circuits, electronic devices, and mechanical components.3. Development of practical work skills: Students have the opportunity to learn hands-on and practice using various tools and equipment used in electrical, electronic, and mechanical workshops.4. Ability to perform preventive maintenance: Students learn how to maintain systems and devices and carry out preventive maintenance to ensure proper and sustainable performance.5. Enhancement of teamwork and communication skills: Studying Electrical, Electronic, and Mechanical workshops promotes collaboration among students and the ability to work as a team in problem-solving and executing practical projects.6. Knowledge and Understanding: a. Demonstrate a comprehensive understanding of the principles and concepts related to electrical and mechanical

	<p>workshop operations. b. Identify and explain the safety measures and regulations applicable to electrical and mechanical workshops.</p> <p>7. Describe the different tools, machines, and materials used in electrical and mechanical workshops.</p> <p>8. Practical Skills: a. Apply safe working practices and use appropriate personal protective equipment (PPE) in electrical and mechanical workshop environments. b. Demonstrate proficiency in using various tools and equipment for turning, filing, drilling, welding, and assembly.</p> <p>9. Perform practical tasks related to electrical and mechanical workshop operations accurately and efficiently. d. Apply problem-solving techniques to troubleshoot and rectify common issues encountered in electrical and mechanical workshop activities.</p> <p>10. Critical Thinking and Analysis: a. Analyze and evaluate different turning processes, instrumentation measures, and cutting tools used in the workshop. b. Assess the quality of filing processes and choose appropriate rasps and tools for different filing tasks.</p> <p>11. Evaluate the drilling processes and select suitable drilling tools based on specific requirements. d. Analyze welding processes, including oxy-acetylene and arc welding, and determine safety precautions and best practices.</p> <p>12. Communication and Collaboration: a. Effectively communicate and collaborate with peers in group projects and workshop activities. b. Present findings, results, and recommendations related to electrical and mechanical workshop tasks in a clear and concise manner.</p> <p>13. Professional and Ethical Responsibility: a. Demonstrate ethical behavior and responsibility in adhering to safety regulations, environmental considerations, and industry standards in electrical and mechanical workshop practices</p> <p>14. Overall, studying this subject prepares students to enter the job market in various technical and engineering fields, such as industrial maintenance, electrical and electronic installations, automation and robotics, medical devices, and other modern technologies.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Electronic workshop</u></p> <p>In this part, we will learn how to check the elements in the electrical circuits, what is the way each element works, how to check it, and find out what is damaged and replace it. [14 hrs.]</p> <p>We will also talk about conductors and semiconductors [10 hrs.]</p> <p><u>Part B – Electrical workshop</u></p> <ol style="list-style-type: none"> 1. Principles of Industrial Safety in Electrical Workshops [4 hrs.] 2. Tools Used in Electrical Workshops [5 hrs.] 3. Power Sources and Characteristics [5 hrs.] 4. Multimeter and Wire Size Measurement [5 hrs.] <p><u>Part C – Mechanical workshop</u></p> <ol style="list-style-type: none"> 1. Different Types of Welding Irons and Spot Welding [4 hrs.] 2. Electric Transformers [5 hrs.] 3. Electric Circuits and Transformer Operation [5 hrs.] 4. Types of Electric Motors [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 labs, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب موزع على ١٥ اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.73
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, 11	LO #1-4, LO #8-11
	Assignments	1	5% (10)	12	LO # 1-14
	Projects / Lab.	2	20% (10)	Continuous	ALL
	Report	1	5% (10)	13	ALL
Summative assessment	Midterm Exam	4 hr	10% (10)	8	LO # 1-7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي للمختبر

Electronic, Electrical , Mechanical Workshops

	Material Covered
Week 1,2	<ul style="list-style-type: none">❖ Use different measuring devices in the workshop❖ 1- Principles of Industrial Safety in Electrical Workshops.2- Different Types of Welding Irons (with different capacities) and Spot Welding
Week 3,4	<ul style="list-style-type: none">❖ How to use irons, types of soldering used, and how to use absorbent soldering irons❖ 1- Electric Circuits and Transformer Operation.2- Electrical Installations and Types of Wiring (Surface and Concealed)
Week 5,6,7	<ul style="list-style-type: none">❖ Electronic components (resistor , inductors , capacitors)❖ 1- ONE LAMP CONTROLLED BY ONE SWITCH2- Parallel Wiring of Two Lamps with a Switch and Socket
Week 8	❖ Midterm Exam
Week 9 ,10	Electronic components(resistor , inductors , capacitors) Drawing a Staircase Lamp (Two-Way Switch) Circuit
Week 11,12	<ul style="list-style-type: none">❖ Electronic components (Battery , jumper, fuse, push button, switch, rotary switch)❖ 1-Introduction to Workshop Safety2- Turning Process and Instrumentation Measures
Week 13,14	<ul style="list-style-type: none">❖ Electronic components (Diode , Transistor, Transformer)❖ 1- Cutting Tools2-Practical Exercise - Horizontal Turning
Week 15	<ul style="list-style-type: none">❖ using bread board and Vero board, Building a Circuit on Breadboard, Building a Circuit on Vero board❖ 1- Turning Different Shapes2- Introduction to Filing Process (practical Exercise)
Week 16	Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1-Encyclopedia of Electronic Components Volume 1 (Charles Platt). 2- J. Smith and E. Johnson, "Electrical Engineering Workshop:Theory and Practice	Yes / online
Recommended Texts		No
Websites		

Grading Scheme

مخطط الدرجات

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

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

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	1-Encyclopedia of Electronic Components Volume 1 (Charles Platt). 2-J. Smith and E. Johnson, "Electrical Engineering Workshop:Theory and Practice	Yes / online
Recommended Texts		No
Websites		

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX – Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	English Language I		Module Delivery
Module Type	Basic learning activities		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET1106		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Oras Ahmed shareef	e-mail	dr.oras@mtu.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	PhD
Module Tutor	Zahra Ihsan Abdul Razzaq	e-mail	rawaadawood@mtu.edu.iq
Peer Reviewer Name	Dr. Osama Abbas Hussein	e-mail	Osama.abbas@mtu.edu.iq
Scientific Committee Approval Date	29 / 10 / 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	<ol style="list-style-type: none">1. know students with essential information in the English language in association with reading, writing and speaking skills, and knowing more English vocabulary.2. To understand pronouns, questions and short answers, tenses (present, past and future), adjective, adverb, prepositions of place, punctuation marks and practicing writing.3. This module works towards enhancing students' English language competencies along with their technical or professional knowledge.4. Enhance students' communication skills in English can result in better job opportunities in the future
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>The student will have the ability to:</p> <ol style="list-style-type: none">1. Know the English skills of reading, and writing.2. Recognize other English language skills such as: grammar, vocabulary.3. Understand and appreciate the importance of grammar aspects and vocabulary to increase the ability of communicating ideas about the English language.4. Understand pronouns, questions and short answers.5. Understand tenses present, past and future.6. Understand adjectives, adverbs, prepositions of place, and punctuation marks.7. Practicing reading and writing.8. Enhance students' communication skills in English.
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p>Part A: Parts of Sentence. Pronoun, question and short answer, adjective, adverb, prepositions of place. [14 hrs]</p> <p>Part B: Tenses Past Tense, Present Tense, and Future Tense. [8 hrs]</p> <p>Part C: Reading and Writing Punctuation marks, and practicing writing [8 hrs]</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>The main strategies that will be adopted in delivering this module are:</p> <ul style="list-style-type: none">- Allow students to actively participate in the learning process with class discussions and exercises that support the initiative.- Use didactic questioning through questions to determine student understanding of the material.- Writing an assignment and report that encourages students to clarify and organize their thinking and independently research and present on a topic.
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Student Workload (SWL)			
الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	50		

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

Delivery Plan (Weekly Syllabus)	
المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Unit 1: Grammar: Types of Pronouns Vocabulary: Everyday objects, Plurals Reading and Writing Skill
Week 2	Unit 2: Grammar: Pronoun, Questions Vocabulary: Countries, Adjective and Nouns Reading and Writing Skill
Week 3	Unit 3: Grammar: Negatives, Questions and short answer Vocabulary: Jobs, Personal Information Reading and Writing Skill

Week 4	Unit 4: Grammar: Possessive adjectives, Possessive 's, common verbs (1): has/have, love, like, work. Vocabulary: The family, The alphabet Reading and Writing Skill
Week 5	Unit 5: Present Simple, Questions Vocabulary: Sport, Food and Drink, Verb phrase, Languages and nationalities, Adjective + noun. Reading and Writing Skill
Week 6	Unit 6: Grammar: Adverbs of frequency (sometimes, always, never), Questions and Negatives. Vocabulary: The Time, Word that go together Reading and Writing Skill
Week 7	Unit 7: Grammar: Question words, Pronouns (subject, object, possessive), that and this. Vocabulary: Adjectives Reading and Writing Skill Grammar: There is/There are, Prepositions of place Vocabulary: Rooms and furniture, Place of town Reading and Writing Skill
Week 8	Mid exam
Week 9	Unit 9: Grammar: Past Simple Tense - regular verbs Vocabulary: years, have, do, go Reading and Writing Skill
Week 10	Unit 10: Grammar: Past Simple Tense - irregular verbs, Questions and Negatives, Time expression, ago. Vocabulary: Weekend activities, Sport and leisure Reading and Writing Skill
Week 11	Unit 11: Grammar: can/can't, Adverbs, Request and offers. Vocabulary: Verb + noun, Adjective + noun, Opposite adjective Reading and Writing Skill
Week 12	Unit 12: Grammar: Would like, some and any, like and would like Vocabulary: Places and town, In cafe Reading and Writing Skill
Week 13	Unit 13: Grammar: Present Continuous Tense Vocabulary: Colors, Clothes, Opposite verbs Reading and Writing Skill
Week 14	Unit 14: Grammar: Future Tense, going to Vocabulary: Forms of transport Reading and Writing Skill
Week 15	Grammar: Punctuation Marks, Grammar revision Vocabulary: Vocabulary revision Reading and Writing Skill
Week 16	Preparatory week before the final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	New Headway Plus/ Beginner, John and Liz Soars, Oxford University Press	No
Recommended Texts	Understanding and Using English Grammar, 5 th Edition, Betty S. Azar Stacy A. Hagen.	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

المستوى الأول

الفصل الثاني

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Digital Systems		Module Delivery
Module Type	Core		✓ Theory Lecture ✓ Lab Tutorial Practical Seminar
Module Code	CET1201		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	2
Administering Department	CET	College	EETC
Module Leader	Reem Jamal	e-mail	Reem84j@mtu.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Msc.
Module Tutor	Dr.AdnanAllawi Ftaiet	e-mail	adnan.alameri@nust.edu.iq
Peer Reviewer Name	Assist prof. Alhamzah Taher	e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29 / 10 / 2025	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CET1101	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. To understand the flip flop operation. 2. To understand the latches operation. 3. This course deals with the designing of logic systems. 4. To understand the principles of counter circuits. 5. To understand the shift registers. 6. To have a skill to design ADC and DAC.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Discuss the flip-flops. 2. Recognize the differences between flip-flops and latches. 3. List the applications of flip-flops. 4. Summarize what is meant by the logic systems. 5. Explain the counter circuits and discuss the difference between synchronous and asynchronous counter. 6. Discuss the types of asynchronous counter circuits. 7. Discuss the types of synchronous circuit. 8. Identify the shift registers. 9. Discuss the operations of each types of shift registers. 10. Discuss the shift register counter. 11. Explain the principles of ADC and DAC. 12. Explain the design for each type of ADC and DAC.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>--Flip-Flops – SR latch, T latch, D latch. [10 hrs]</p> <p>--Flip-Flops- JK FF, edge triggered, and conversion from one type to another. [10 hrs]</p> <p>--Counters- Asynchronous, synchronous counters, Decade, up-down counters, and counter decoding. [15 hrs]</p> <p>--Shift-registers - serial in/serial out, serial in/parallel out, parallel in/serial out, parallel in/parallel out, bidirectional , shift register counter (Johnson counter, Ring counter)) [10 hrs]</p> <p>--Multivibrators- definition, astable, bistable, mono-stable, and 555 timer [5 hrs]</p> <p>--A/D convertors modeling -flash ADC, tacking ADC, slope ADC ,successive approximation ADC, digital ramp ADC, delta sigma ADC. [5 hrs]</p> <p>--D/A convertors modeling -R/2R DAC, R/2nR DAC. [5 hrs]</p>
<p>Learning and Teaching Strategies</p>	

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب موزعة على ١٥ اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	62	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	88	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.9
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Flip-flops and latches(SR latch, D latch)
Week 2	Flip-Flops(T-latch, JK)
Week 3	Flip-Flops(edge triggered, master-slave)
Week 4	Flip-flops (conversion from one type to another, flip flop applications)
Week 5	Asynchronous counter
Week 6	Synchronous counter
Week 7	Decade, up-down counter
Week 8	Cascade counter, Counter decoding
Week 9	Shift-registers (serial in/serial out, serial in/parallel out, parallel in/serial out, parallel in/parallel out)
Week 10	Midterm exam
Week 11	Shift-registers (bidirectional , shift register counter), Johnson counter, Ring counter
Week 12	Multivibrators (definition, astable, bistable)
Week 13	Multivibrators (monostable, 555 timer)
Week 14	A/D convertors (flash ADC, tracking ADC, slope ADC ,successive approximation ADC, digital ramp ADC, delta sigma ADC)
Week 15	D/A convertors (R/2R DAC, R/2 ⁿ R DAC)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	SR ff, T ff
Week 2	D ff, JK ff
Week 3	Master-slave ff
Week 4	asynchronous counter (2-bit,3-bit)

Week 5	asynchronous counter(4-bit, modulus counter)
Week 6	synchronous counter (2-bit, 3-bit)
Week 7	synchronous counter (decade, up-down counter)
Week 8	Cascade counter, counter decoding
Week 9	Serial in-serial out, parallel in-parallel out shift register
Week 10	Serial in-parallel out, parallel in- serial out SR
Week 11	Johnson counter, ring counter
Week 12	multivibrator
Week 13	Analogue to digital convertor
Week 14	Digital to analogue convertor

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Digital Fundamentals by Floyed	Yes
Recommended Texts	Digital circuit analysis and design with Simulink modeling by Steven T. Karris	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electrical Circuits		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET1202		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	1	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Omar Ibrahim Mustafa	e-mail	Omar-ibrahim@mtu.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	Master's
Module Tutor	Dr.Ahmed Mahmood Azeiz	e-mail	a31320008@gmail.com
Peer Reviewer Name	Assist prof. Alhamzah Taher	e-mail	alhamza_tm@yahoo.com
Scientific Committee Approval Date	29 / 10 / 2025	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Electrical Engineering Fundamentals	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. To develop problem solving skills and understanding of circuit theory through the application of techniques Alternating Waveforms (A.C). 2. To understand voltage, current and power from a (A.C) circuit. 3. Deals with the basic concept of electrical (A.C) circuits. 4. This is the basic subject for all electrical and electronic circuits. 5. To understand Kirchhoff's current and voltage Laws problems. 6. To perform Thevenin's Norton's Theorem.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of AC circuits in an electric circuit. 9. Discuss the various properties of resistors. 10. Explain the two Kirchhoff's laws used in circuit analysis. 11. Identify the basic circuit elements, Maximum Power Transfer Theorem and Superposition's method 12. Describe Thevenin's theorem and Norton's theorem and how they work IN AC Circuits.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Definition:</u> - The Alternating Current Network Types of Alternating Waveforms, Generation of Alternating Current, and Definitions related to Alternating Waveforms The Alternating Current Network.</p> <p>Ohms law, The Mean Values, The Effective Values, The Vector Diagram (40 hr)</p> <p><u>Circuit Theory in (A.C)</u> Ac circuits – Current and voltage definitions, Passive sign convention and circuit elements, Combining resistive elements in series and parallel. Kirchhoff's laws and Ohm's law. Anatomy of a circuit, Network reduction, Series Ac Circuits (R L C), Reviews for Complex Numbers and their mathematical operations (24 hr)</p>

	Fundamentals Resistive networks, voltage and current sources, Thevenin and Norton equivalent circuits, Conversion Delta To Star Connection, Superposition Method, Maximum Power Transfer Theorem, Superposition's method (24 hr)
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This Course Specification prepares the student to be able to realize basic parameters in electrical engineering and how to link these parameters. It also makes him capable of solving electrical circuits using different theorems in addition to utilizing the dc theorems to solve ac circuits. Moreover, it goes into configuring 3 phase circuits, vectors, phase and total powers and to have the student being capable of linking electricity to magnetism

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	62	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	88	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.9
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	5% (5)	8	LO #1-4
	Assignments	1	5% (5)	14	LO # 1- 11
	Projects / Lab.	10	20% (10)	Continuous	
	Report	10	10% (10)	12	LO # 1-12
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-9
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	The Alternating Current Network Types of Alternating Waveforms, Generation of Alternating Current, and Definitions related to Alternating Waveforms
Week 2	The Mean Values of Current and Voltage
Week 3	The Effective Vales of Current and Voltage
Week 4	Circuit Elements in the Phasor Domain
Week 5	The Vector Diagram
Week 6	Reviews for Complex Numbers and there mathematical operations
Week 7	Series Ac Circuits (R L C) ,Parallel Ac Circuits(R L C)
Week 8	Mid exam
Week 9	The Instantaneous Power and Mean Power of AC, Reactive and Apparent Power
Week 10	Using Kirchhoff's law's to solve AC circuits
Week 11	Using Superposition's method to solve AC circuits
Week 12	Using Thevenin's theorem, to solve AC circuits
Week 13	Using Norton's theorem to solve AC circuits
Week 14	3- Phase Current, 3- Phase System, Y- Connection Delta Connection.
Week 15	Transformers , The hysteresis losses , The eddy current losses

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: How to use measuring devices for alternating circuits (A.C) Osliscope, voltmeter and ammeter
Week 2	Lab 2: how to measure Alternating Waveforms
Week 3	Lab 3: Apply Ohm's Law
Week 4	Lab 4: Series Ac Circuits (R C)
Week 5	Lab 5: Series Ac Circuits (R L)
Week 6	Lab 6: Series Ac Circuits (R L C)
Week 7	Lab 7: Apply Kirchhoff's law to measure voltages
Week 8	Lab 8: Apply Kirchhoff's law to measure current

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	Fundamentals of Electric Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	Yes
Recommended Texts	DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents.	No
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Programming Essentials		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CET1203			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	1	Semester of Delivery		2
Administering Department	CET	College	EETC	
Module Leader	Dr. Loay Al-Saffar		e-mail	Loay.alsaffar@mtu.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	M.Sc.Kawther Abdulnabi Musaed		e-mail	Kawtharabdalnabi@gamil.com
Peer Reviewer Name	Dr. Osama Abbas Hussein		e-mail	osama.abbas@mtu.edu.iq
Scientific Committee Approval Date	29 / 10 / 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

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To develop problem solving skills and understanding of programming principles.2. To understand the logic behind programming.3. This course include using C++ as a programming language.4. This course include algorithm design.5. To understand how a programmer should prepare his work and think logically.6. To perform programming project using control statements, functions, and to deal with the data stored in an array or file.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Use of algorithms (Flowchart specifically).2. Explain how the program is written using C++ Programming language.3. Define and use of variables (Data types, Declaration of variables).4. Use of operators and its precedence (Assignment, Arithmetic operators, Relational and Logical operators, Bitwise Operators, Increment and decrement, Cast operator, and Conditional operator).5. Making Decisions (use of: if, if-else, and switch statements) and draw of Flowchart of if-else statement.6. Use of Loops (for, while, do-while), and use of break and continue statements with loops, and draw of Flowchart of loops.7. Use of Arrays (one and two dimensional).8. Use of Functions (Built-in function functions (Library functions), and User-Defined functions).9. Use of arguments passed by value and by reference, and use of Local and global variables.10. Use of Character sequences and string handling.11. Handling and processing text files in C++.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>- Introduction to computers and programming. Types of programs (Applications and Systems). Programming languages (Machine, Assembly, and High-level language). Introduction to Compilers, Interpreters, object file, and executable file.</p> <p>Introduction to C++ with a simple program implementation. Types of programming errors, Program development life cycle, Algorithms - Flowchart - .</p> <p>Header files, Standard Input/output instructions, Comments in C++. [15 hrs]</p> <p>-- Variables, Data Types, Declaration of variables, Constants, Statements.</p> <p>Operators (Assignment, Arithmetic operators, Relational and Logical operators,</p>

	<p>Bitwise Operators, Increment and decrement, Cast operator, and Conditional operator), Precedence of operators. [0 hrs]</p> <p>-- Making Decisions (if, if-else statements), Flowchart of if-else statement. Making Decisions (switch statement), using break statement with switch statement, Flowchart of switch statement. Loops (for, while, do-while), using break and continue statements with loops, Flowchart of loops. [1· hrs]</p> <p>-- Arrays (One dimensional and Two Dimensional) [0 hrs]</p> <p>-- Functions (Built-in function functions (Library functions), and User-Defined functions), Function prototype (Declaration), Function call, Passing arguments to a function, return statement, Value-Returning vs. Void (Non Value Returning) functions, Function with no argument and no return value, Function with no argument but return value, Function with argument but no return value, Function with argument and return value. Arguments passed by value and by reference, Recursion, Local and global variables. [10 hrs]</p> <p>-- Character sequences and string handling, ASCII table. [0 hrs]</p> <p>-- Handling and processing text files in C++ [0 hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The main strategy that will be adopted in delivering this module is to encourage students' participation in learning and developing their skills in programming and logic thinking, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of lab experiments involving assignments and project design activities that are interesting to the students.</p>

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	62	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.1
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	88	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.9
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	150		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	6	LO #1- 6
	Assignments	1	10% (10)	Continuous	LO #1-10
	Projects / Lab.	1	10% (10)	Continuous	LO #1-11
	Report	1	5% (10)	Continuous	LO #1, 11
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1 to 7
	Final Exam	4hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

	Material Covered
Week 1	Introduction (History of computers). Types of programs (Applications and Systems). Programming languages (Machine, Assembly, and High-level language).
Week 2	Introduction to Compilers, Interpreters, object file, and executable file. Types of programming errors, program development life cycle.
Week 3	Algorithms (Flowchart).
Week 4	Variables, Data Types, Declaration of variables, Constants, Statements, and Operators.
Week 5	Making Decisions (if, if-else statements), flowchart of if-else statement.
Week 6	Making Decisions (switch statement), using break statement with switch statement, flowchart of switch statement.

Week 7	Mid-term Exam
Week 8	Loops (while, do-while), using break and continue statements with loops, flowchart of loops.
Week 9	Arrays (One dimensional)
Week 10	Arrays (Two Dimensional)
Week 11	Functions: Built-in function functions (Library functions), and User-Defined functions), Function prototype (Declaration), function call, Passing arguments to a function, return statement, Local and global variables.
Week 12	Functions (Value-Returning) vs. Void (Non Value Returning) functions, function with no argument and no return value, function with no argument but return value, function with argument but no return value, function with argument and return value. Arguments passed by value and by reference.
Week 13	Character sequences and string handling, ASCII table.
Week 14	Handling and processing text files in C++
Week 15	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الأسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to C++ with a simple program implementation. Header files, Standard Input/output instructions, Comments in C++.
Week 2	Lab 2: Variables and Operators (Assignment, Arithmetic operators, Relational and Logical operators, Bitwise Operators, Increment and decrement, Cast operator, and Conditional operator), Precedence of operators.
Week 3	Lab 3: Making Decisions (if, if-else).
Week 4	Lab 4: Making Decisions (switch statements).
Week 5	Lab 5: Loops (for)
Week 6	Lab 6: Loops (while, and do-while)
Week 7	Lab 7: Arrays (1D)
Week 8	Lab 8: Arrays (2D)
Week 9	Lab 9: Functions
Week 10	Lab 10: Function types according to whether it take arguments and/or return a value or not.
Week 11	Lab 11: Character sequences and string handling.
Week 12	Lab 12: Text files

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	C++ How to Program, 6th Edition 2007 By P. J. Deitel - Deitel & Associates, Inc., H. M. Deitel - Deitel & Associates, Inc.	Yes
Recommended Texts	Starting Out with Programming Logic and Design (What's New in Computer Science), 5th Edition 2018 By Tony Gaddis	No
Websites	https://www.geeksforgeeks.org/c-plus-plus	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Mathematics II		Module Delivery
Module Type	Support or related learning activity		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET1204		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	1	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Hala A. Hashim	e-mail	hala.solomon@gmail.com
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Waleed Sadeq Jaaywel	e-mail	wzz07224waleed@gmail.com
Peer Reviewer Name	Assist prof. Alhamzah Taher	e-mail	alhamza_tm@yahoo.com
Scientific Committee Approval Date	29 / 10 / 2025	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CET 1103	Semester	1
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To Understand concepts of vectors and vector operations.2. To Understand concepts of linear algebra.3. To get a grasp of various methods to solve systems of linear equations.4. To Compute linear transformations.5. To be able to determine Eigenvalues and Eigenvectors.6. To perform matrix diagonalization.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Recognize Vectors concepts, notation and Operations.2. Discuss dot product, cross product, Orthogonal and orthonormal vectors.3. Discuss the terms Diagonal, Triangular, Symmetric, Square Matrix, Transpose of a Matrix.4. Describe the matrix operations {addition, subtraction, scalar multiplication, multiplication}.5. Identify Determinant and Inverse for Nonsingular matrices.6. Discuss aspects about System of Linear Equations (Linear Equations, Linear Equations Solution, Matrix equations.).7. Identify Row operations, row-echelon form "triangular", Rank of a Matrix, reduced row-echelon form, Augmented Matrix.8. Discuss Gaussian elimination.9. Explain Gauss–Jordan elimination and Solving Systems with Inverses.10. Explain Cramer's Rule.11. Explain Linear Combinations of Vector, span.12. Explain Linear Dependence and Independence, Basis and Dimension, Rank of a Matrix.13. Recognize Linear Transformations.14. Discuss Polynomials of Matrices, Characteristic Polynomial, Cayley–Hamilton Theorem.15. Discuss Eigenvalues and Eigenvectors, Diagonalizing Matrices.
<p>Indicative Contents المحتويات الإرشادية</p>	<p><u>Part A - Vectors.</u> This part includes Vectors definition, notation {Ordered set, Matrix, Unit vector}, Magnitude, Unit, Zero, negative, Direction, Operations on vectors {addition, subtraction, scalar multiplication}. In addition to Operations on vectors {dot product, cross product}, Orthogonal, orthonormal vectors. [6 hrs] + Revision problem classes in weekly tutorials [2 hrs]</p> <p><u>Part B – Matrices.</u> This part will take in details Matrices (Matrix, Diagonal, Triangular, Symmetric, Square Matrix, Transpose of a Matrix.), in addition to operations {addition, subtraction, scalar multiplication, multiplication}. Furthermore, Determinant, Inverse (Nonsingular). [10 hrs] + Revision problem classes in weekly tutorials [3 hrs]</p>

	<p>Part C – System of Linear Equations. This part discusses System of Linear Equations (Linear Equations, Linear Equations Solution, Matrix equations.), in addition to Row operations, row-echelon form “triangular”, Rank of a Matrix, reduced row-echelon form, Augmented Matrix. Furthermore, Gaussian elimination, Gauss–Jordan elimination, Solving Systems with Inverses, Cramer's Rule is described. [14 hrs] + Revision problem classes in weekly tutorials [4 hrs]</p> <p>Part D – Vector Spaces and Diagonalization. This part discusses Vector Spaces (Linear Combinations of Vector, span, Linear Dependence and Independence, Basis and Dimension, Rank of a Matrix, Linear Transformations. Furthermore, Diagonalization (Polynomials of Matrices, Characteristic Polynomial, Cayley–Hamilton Theorem, Eigenvalues and Eigenvectors, Diagonalizing Matrices.) [15 hrs] + Revision problem classes in weekly tutorials [5 hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This module will primarily focus on encouraging students to participate in the activities, as well as refining and developing their critical thinking skills. This will be achieved through lectures, tutorials, discussions, and grading activities.

Student Workload (SWL) الحمل الدراسي للطالب			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.13
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	78	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.2
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	20%	5,10	LO #1 - 4, LO # 6-9
	Assignments	2	15%	5,10	LO # 1 - 14, LO # 6-9
	Projects / Lab.	N/A			
	Report	5	5%	Cont.	LO # 1-15
Summative assessment	Midterm Exam	2 hr	10% (10)	5	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	Vectors (Definition, notation {Ordered set, Matrix, Unit vector}, Magnitude, Unit, Zero, negative, Direction, Operations on vectors {addition, subtraction, scalar multiplication}.)
Week 2	Vectors (Operations on vectors {dot product, cross product}, Orthogonal, orthonormal vectors.)
Week 3	Matrices (Matrix, Diagonal, Triangular, Symmetric, Square Matrix, Transpose of a Matrix.)
Week 4	Matrices (operations {addition, subtraction, scalar multiplication, multiplication}). Matrices (Determinant, Inverse (Nonsingular))
Week 5	Midterm Exam
Week 6	System of Linear Equations (Linear Equations, Linear Equations Solution, Matrix equations.)
Week 7	System of Linear Equations (Row operations, row-echelon form "triangular", Rank of a Matrix, reduced row-echelon form, Augmented Matrix.)
Week 8	System of Linear Equations (Gaussian elimination.), System of Linear Equations (Gauss–Jordan elimination, Solving Systems with Inverses.)
Week 9	System of Linear Equations (Cramer's Rule.)
Week 10	Midterm Exam
Week 11	Vector Spaces (Linear Combinations of Vector, span.). Vector Spaces (Linear Transformations.)
Week 12	Midterm Exam
Week 13	Vector Spaces (Linear Dependence and Independence, Basis and Dimension, Rank of a Matrix.)
Week 14	Diagonalization (Polynomials of Matrices, Characteristic Polynomial, Cayley–Hamilton Theorem.)
Week 15	Diagonalization (Eigenvalues and Eigenvectors, Diagonalizing Matrices.)
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Tutorial)

المنهاج الاسبوعي الاضافي

Material Covered

Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	David C. Lay, Judi J. McDonald, Steven R. Lay, "Linear Algebra and Its Applications", Pearson Education, 6th edition (July 10th 2020), ISBN-13: 978- 0136880929.	Yes
Recommended Texts	Gilbert Strang, " Linear Algebra and Its Applications", Cengage Learning, 4th edition, (January 1, 2006), ISBN-13: 978-0030105678.	No
Websites	https://www.udemy.com/course/linear-algebra-with-applications/	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Democracy and Human Rights		Module Delivery
Module Type	Basic learning activities		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET1205		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Wahaj Mohammed Isameel	e-mail	Wahaj.mohammed@mtu.edu.iq
Module Leader's Acad. Title	Asst Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	M.Sc.Noor Al-Wad Hakim Nasser	e-mail	Nassernoor.alwed@mtu.edu.iq
Peer Reviewer Name	Asst. Prof. Alhamzah Taher Mohammed	e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29 / 10 / 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

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> ١. التطور التاريخي لحقوق الإنسان: دراسة التطور التاريخي لفهم حقوق الإنسان من الحضارات القديمة إلى العصور الحديثة. ٢. حقوق الإنسان في الشرائع السماوية: التركيز على حقوق الإنسان في الإسلام وكيف تم تضمينها في الشريعة الإسلامية. ٣. اعتراف إقليمي بحقوق الإنسان: فحص اعتراف الأقاليم الأوروبي، الأمريكي، الإفريقي، الإسلامي، والعربي بحقوق الإنسان. ٤. دور المنظمات غير الحكومية: دراسة دور المنظمات مثل اللجنة الدولية للصليب الأحمر ومنظمة العفو الدولية في حماية حقوق الإنسان. ٥. الإطار القانوني الدولي والإقليمي: التركيز على المواثيق الدولية والإقليمية، مثل الإعلان العالمي لحقوق الإنسان. ٦. تحليل حقوق الإنسان في التشريعات الوطنية: دراسة كيفية ترجمة حقوق الإنسان في التشريعات الوطنية، مع التركيز على الدستور العراقي. ٧. تصنيف حقوق الإنسان وضماناتها: فهم مختلف أشكال حقوق الإنسان والضمانات الدستورية والقضائية والسياسية لحمايتها.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> ١. القدرة على وصف وتحليل التطور التاريخي لحقوق الإنسان منذ الحضارات القديمة حتى العصور الحديثة. ٢. القدرة على فحص حقوق الإنسان في حضارة وادي الرافدين وغيرها لفهم التأثير الثقافي على تطورها. ٣. تفسير حقوق الإنسان في الإسلام وفهم كيف تم تضمينها في الشريعة الإسلامية. ٤. القدرة على تحليل تطور حقوق الإنسان خلال العصور الوسطى والحديثة. ٥. الفهم الشامل لاعتراف الأقاليم الأوروبي، الأمريكي، الإفريقي، الإسلامي، والعرب بحقوق الإنسان. ٦. القدرة على تقييم دور منظمات مثل اللجنة الدولية للصليب الأحمر ومنظمة العفو الدولية في حماية حقوق الإنسان. ٧. القدرة على دراسة وتحليل المواثيق الدولية والإقليمية، بما في ذلك الإعلان العالمي لحقوق الإنسان. ٨. القدرة على فحص كيف تم ترجمة حقوق الإنسان في التشريعات الوطنية، مع التركيز على مثال الدستور العراقي. ٩. القدرة على تصنيف حقوق الإنسان إلى أشكال فردية وجماعية، وأجيال مثل الحقوق المدنية والسياسية والاقتصادية والاجتماعية. ١٠. القدرة على تحليل الضمانات الدستورية والقضائية والسياسية لحقوق الإنسان على الصعيدين الوطني والدولي والإقليمي.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>فهم التاريخ التطوري لحقوق الإنسان (٣ س)</p> <p>تحليل حقوق الإنسان في الحضارات القديمة (٣ س)</p> <p>فهم حقوق الإنسان في الشرائع السماوية (٣ س)</p> <p>تحليل حقوق الإنسان في العصور الوسطى والحديثة (٣ س)</p> <p>فهم الاعتراف الإقليمي بحقوق الإنسان (٣ س)</p> <p>تقدير دور المنظمات غير الحكومية (٣ س)</p> <p>فهم الإطار القانوني لحقوق الإنسان (٣ س)</p> <p>تحليل حقوق الإنسان في التشريعات الوطنية (٣ س)</p> <p>فهم أشكال وأجيال حقوق الإنسان (٣ س)</p> <p>تحليل ضمانات حقوق الإنسان (٣ س)</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>تشجيع الطلاب على المشاركة في مناقشات تفاعلية حول تطور حقوق الإنسان عبر التاريخ. مشروعات بحثية:</p> <p>توجيه الطلاب في إعداد مشروعات بحثية تستكشف تطور حقوق الإنسان في فترات تاريخية محددة. استخدام التكنولوجيا:</p> <p>تضمين وسائل تكنولوجية لتعزيز تفاعل الطلاب وتقديم المعلومات بشكل أكثر تفاعلية. ورش العمل والتمثيل العملي:</p> <p>إجراء ورش عمل تفاعلية وأنشطة تمثيل لفهم أعمق لمفاهيم حقوق الإنسان. تقديم تقييم مستمر:</p> <p>تقديم تقييم مستمر لفحص تقدم الطلاب وفهمهم لتطور حقوق الإنسان على مر العصور.</p>
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Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

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

Module Evaluation

تقييم المادة الدراسية

		Time/N umber	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1-4 , LO #4-9
	Assignments	2	20%	2, 12	LO # 1-4, LO #1,10
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-10
Summative assessment	Midterm Exam	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

الأسبوع الأول	التطور التاريخي لحقوق الانسان حقوق الانسان في الحضارات القديمة (حضارة وادي الرافدين، والحضارات القديمة الأخرى)
الأسبوع الثاني	حقوق الانسان في الشرائع السماوية مع التركيز على حقوق الانسان في الاسلام. حقوق الانسان في العصور الوسطى والحديثة.
الاسبوع الثالث	الاعتراف الاقليمي بحقوق الانسان على الصعيد الأوربي الأمريكي، الأفريقي، الإسلامي، العربي
الأسبوع الرابع	المنظمات غير الحكومية ودورها في حقوق الانسان اللجنة الدولية للصليب الاحمر، منظمة العفو الدولية، منظمة مراقبة حقوق الانسان المنظمة العربية لحقوق الانسان
الأسبوع الخامس	حقوق الانسان في المواثيق الدولية والاقليمية والتشريعات الوطنية. حقوق الانسان في المواثيق الدولية (الاعلان العالمي لحقوق الانسان العهدين الدوليين الخاصين بحقوق الانسان
الأسبوع السادس	حقوق الانسان في المواثيق الاقليمية (الاتفاقية الأوربية لحقوق الانسان الاتفاقية الأمريكية لحقوق الانسان الميثاق الأفريقي لحقوق الانسان الميثاق العربي لحقوق الانسان
الأسبوع السابع	امتحان منتصف الفصل الدراسي
الأسبوع الثامن	حقوق الانسان في التشريعات الوطنية (الدستور العراقي)
الأسبوع التاسع	اشكال واجبال حقوق الانسان: اشكال حقوق الانسان الحقوق الفردية، الحقوق الجماعية اجبال حقوق الانسان الجيل الاول الحقوق المدنية والسياسية)، (الجيل الثاني الحقوق الاقتصادية والاجتماعية)، (الجيل الثالث: حقوق الانسان الحديثة، الوعي الماني والبيئي
الأسبوع العاشر	ضمانات حقوق الانسان وحمايتها على الصعيد الوطني الضمانات الدستورية والقضائية والسياسية
الاسبوع الحادي عشر	ضمانات حقوق الإنسان وحمايتها على الصعيد الاقليمي والدولي (دور الامم المتحدة، دور المنظمات الاقليمية جريمة الإبادة الجماعية.
الاسبوع الثاني عشر	تصنيف الحريات العامة الحريات الأساسية والفردية حرية الامن والشعور بالاطمئنان حرية الذهاب والاياب، الحرية الشخصية
الأسبوع الثالث عشر	الحريات الفكرية والثقافية حرية الرأي حرية المعتقد حرية التعليم
الأسبوع الرابع عشر	حرية الصحافة حرية التجمع حرية تشكيل الجمعيات
الأسبوع الخامس عشر	الحريات الاقتصادية والاجتماعية حرية العمل، حرية التملك حرية التجارة والصناعة

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	١. "حقوق الإنسان في العالم العربي: القضايا والتحديات"، تأليف: علي حجازي وجمال شعت. الطبعة: الطبعة الثانية، العام: ٢٠١٧. ٢. "مبادئ حقوق الإنسان: المفاهيم والقضايا الحديثة"، تأليف: أحمد المجالي وغان حمدان. الطبعة: الطبعة الأولى، العام: ٢٠١٩.	Yes
Recommended Texts	١. "حقوق الإنسان والديمقراطية"، تأليف: مصطفى كامل محمود. الطبعة: الطبعة الأولى، العام: ٢٠١٥. ٢. "تاريخ حقوق الإنسان في العصور القديمة والوسطى"، تأليف: نبيل رزق. الطبعة: الطبعة الثالثة، العام: ٢٠١٢. ٣. "حقوق الإنسان في العراق: الواقع والتحديات"، تأليف: سعد الله عباس. الطبعة: الطبعة الأولى، العام: ٢٠١٤. ٤. "حقوق الإنسان في العراق: المفهوم والتطور"، تأليف: عبد الكريم السامرائي. الطبعة: الطبعة الأولى، العام: ٢٠١٨. ٥. "حقوق الإنسان في العراق: بين التحديات والآفاق"، تأليف: محمد السامرائي ولقاء الحربي. الطبعة: الطبعة الأولى، العام: ٢٠٢٠.	No
Websites	The Collage E-Library	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	Arabic Language		Module Delivery
Module Type	Basic learning activities		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET1206		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	1	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Abdulah Abdulrazak	e-mail	abdallaabdalrazak@mtu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc
Module Tutor	Yusr Hameed Hanon	e-mail	mohammed@mtu.edu.iq
Peer Reviewer Name	Dr. Osama Abbas Hussein	e-mail	osama.abbas@mtu.edu.iq
Scientific Committee Approval Date	29 / 10 / 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

<p>Module Aims أهداف المادة الدراسية</p>	<p>أهداف المادة الدراسية هي اني يكون الطالب قادراً على أن :</p> <ol style="list-style-type: none"> 1. يتعرف على أنواع الأخطاء اللغوية المشتركة وتوضيح أسبابها وكيفية تجنبها. 2. يتعلم القواعد المتعلقة بالتاء المربوطة والطويلة والتاء المفتوحة وكيفية كتابتها بشكل صحيح. 3. يتعلم قواعد كتابة الألف الممدودة والمقصورة واستخدام الحروف الشمسية والقمرية بشكل صحيح. 4. التعرف على الضاد والطاء ومعرفة كيفية التمييز بينهما في الكتابة. 5. يتعلم طرق كتابة الهمزة بشكل صحيح وفقاً للقواعد اللغوية. 6. التعرف على علامات الترقيم واستخدامها بشكل صحيح في النصوص. 7. يفهم الفروق بين الاسم والفعل والتمييز بينهما في الجمل. 8. يفهم المفاعيل وكيفية استخدامها بشكل صحيح في النصوص. 9. يتعلم الأرقام والعدد واستخدامها في التعبير عن الكميات. 10. يتجنب الأخطاء اللغوية الشائعة في سياقات عملية لتعزيز فهم القواعد وتحسين المهارات اللغوية. 11. يدرس النون والتنوين وفهم معاني حروف الجر واستخدامها بشكل صحيح في الجمل. 12. يركز على الجوانب الشكلية للخطاب الإداري وكيفية كتابته بأسلوب صحيح ومناسب. 13. التعرف على لغة الخطاب الإداري وفهم استخدامها في التواصل الإداري. 14. يفهم نماذج من المراسلات الإدارية لتطبيق المفاهيم والمهارات المكتسبة في الخطاب الإداري.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<p>مخرجات التعلم للمادة الدراسية هي:</p> <ol style="list-style-type: none"> 1. قدرة الطلاب على تحليل وتعريف الأخطاء اللغوية المشتركة وتطبيق القواعد الصحيحة لتجنبها. 2. القدرة على استخدام القواعد اللغوية المتعلقة بالتاء المربوطة والطويلة والتاء المفتوحة بشكل صحيح. 3. قدرة الطلاب على استخدام الألف الممدودة والمقصورة بشكل صحيح واستخدام الحروف الشمسية والقمرية بطريقة صحيحة. 4. تمكين الطلاب من التمييز بين الضاد والطاء وتطبيق القواعد الصحيحة في الكتابة. 5. القدرة على كتابة الهمزة بشكل صحيح وفقاً للقواعد اللغوية. 6. استخدام علامات الترقيم بشكل صحيح في النصوص المكتوبة. 7. فهم الطلاب للفروق بين الاسم والفعل وتمكينهم من استخدامها بشكل صحيح في الجمل. 8. القدرة على استخدام المفاعيل بشكل صحيح في النصوص المكتوبة. 9. استخدام الأرقام والعدد بطريقة صحيحة للتعبير عن الكميات. 10. التمكن من تطبيق الأخطاء اللغوية الشائعة في سياقات عملية وتصحيحها بشكل مناسب. 11. فهم استخدام النون والتنوين ومعاني حروف الجر واستخدامها بشكل صحيح في الجمل. 12. القدرة على كتابة الخطاب الإداري بأسلوب صحيح ومناسب وفهم لغة الخطاب الإداري. 13. تطبيق المفاهيم والمهارات المكتسبة في كتابة المراسلات الإدارية بشكل صحيح وفعال.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>المحتويات الإرشادية في مادة اللغة تشمل مجموعة من المفاهيم والمواضيع التي يتم تغطيتها خلال عملية التعلم. ومن بين المحتويات الإرشادية المهمة:</p> <ol style="list-style-type: none"> 1. مقدمة عن الأخطاء اللغوية والتعريف بالتاء المربوطة والتاء المطولة والتاء المفتوحة. (٤ ساعات) 2. قواعد كتابة الألف الممدودة والمقصورة والتعرف على الحروف الشمسية والقمرية. (٤ ساعات) 3. دراسة الضاد والطاء وتعلم طرق كتابتهما بشكل صحيح. (٤ ساعات) 4. تعلم كتابة الهمزة بشكل صحيح وفقاً للقواعد اللغوية. (٤ ساعات) 5. دراسة علامات الترقيم وتعلم استخدامها بشكل صحيح في النصوص اللغوية. (٤ ساعات) 6. التعرف على الاسم والفعل والتفريق بينهما وفهم القواعد المتعلقة بهما. (٤ ساعات) 7. دراسة المفاعيل وتعلم استخدامها في الجمل اللغوية. (٤ ساعات) 8. التعرف على الأعداد واستخدامها بشكل صحيح في العبارات والجمل. (٤ ساعات) 9. دراسة الأخطاء اللغوية الشائعة وتطبيقاتها في النصوص اللغوية. (٤ ساعات) 10. تعلم استخدام النون والتنوين وفهم معاني حروف الجر واستخدامها بشكل صحيح في الجمل. (٣ ساعات) 11. التعرف على الجوانب الشكلية للخطاب الإداري وفهم لغته وقواعده. (٣ ساعات) 12. دراسة نماذج من المراسلات الإدارية وتطبيقها في الكتابة. (٣ ساعات) <p>توفر هذه المحتويات الإرشادية للطلاب فهماً شاملاً للمفاهيم اللغوية وتعلم القواعد والتطبيقات العملية التي تساعدهم في تطوير مهاراتهم اللغوية.</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	استراتيجيات التعلم والتعليم المستخدمة في مادة اللغة تشمل مجموعة متنوعة من النهج والتقنيات التي تعزز عملية التعلم للطلاب. من بين هذه الاستراتيجيات:
	١. التفاعل النشط: يتم تشجيع الطلاب على المشاركة والمشاركة الفعالة في الدروس من خلال المناقشات الجماعية والأنشطة التفاعلية.
	٢. التعلم التعاوني: يشجع التعاون والتعاون بين الطلاب من خلال العمل الجماعي والمشاريع الجماعية، حيث يتعاون الطلاب مع بعضهم البعض لتحقيق أهداف التعلم المحددة.
	٣. التطبيق العملي: يتم توفير فرص للطلاب لتطبيق المفاهيم والمهارات المكتسبة في سياقات عملية وواقعية، مما يعزز التفاعل الفعال مع المادة.
	٤. استخدام التقنيات الحديثة: يستفيد الطلاب من استخدام التكنولوجيا في عملية التعلم، مثل استخدام الحواسيب والإنترنت للبحث والتعلم الذاتي.
	٥. توفير ردود فعل فورية: يتم توفير ردود فعل فورية وتقييم مستمر للطلاب، سواء عن طريق التقييمات الشفهية أو الكتابية، مما يساعدهم على تحسين أدائهم وتطوير مهاراتهم.
	٦. التنوع في وسائل التواصل: يتم استخدام مجموعة متنوعة من وسائل التواصل والتعليم، مثل المحاضرات التوضيحية، والمناقشات الجماعية، والأنشطة العملية، والعروض التقديمية، لتلبية احتياجات وأساليب التعلم المختلفة للطلاب.
	٧. باستخدام هذه الاستراتيجيات، يتم تعزيز التفاعل والتعلم الفعال للطلاب، و تحفيزهم على المشاركة واكتساب المعرفة والمهارات بشكل شامل وشيق.

Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

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

Module Evaluation

تقييم المادة الدراسية

		Time/N umber	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	20%	5, 10	LO #1-4 LO #4-9
	Assignments	2	10% (10)	2, 12	LO # 1-5, 5-12
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-12
Summative assessment	Midterm Exam	2 hours	20% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

٨-١	مقدمة عن الأخطاء اللغوية - التاء المربوطة والطويلة والتاء المفتوحة	الأسبوع الأول
١٤-٩	قواعد كتابة الالف الممدودة والمقصورة - الحروف الشمسية والقمرية	الأسبوع الثاني
١٩-١٥	الضاد والظاء	الاسبوع الثالث
٣٠-٢٠	كتابة الهمزة	الأسبوع الرابع
٣٦-٣١	علامات الترقيم	الأسبوع الخامس
٥٠-٣٧	الاسم والفعل والتفريق بينهما - المفاعيل	الأسبوع السادس
	الامتحان النصفى	الأسبوع السابع
٦١-٥١	العدد	الأسبوع الثامن
٦٩-٦٢	تطبيقات الأخطاء اللغوية الشائعة	الأسبوع التاسع والعاشر
٧٥-٧٠	النون والتنوين - معاني حروف الجر	الاسبوع الحادي عشر
٨٠-٧٦	الجوانب الشكلية للخطاب الإداري	الاسبوع الثاني عشر
٨٦-٨١	لغة الخطاب الإداري	الأسبوع الثالث عشر والرابع عشر
	نماذج من المراسلات الإدارية	الأسبوع الخامس عشر
	الاستعداد للامتحان النهائي	الأسبوع السادس عشر

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• ملزمة اللغة العربية (المعممة من وزارة التعليم العالي والبحث العلمي)	Yes
Recommended Texts		No
Websites	The Collage E-Library	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
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	C - Good	جيد	70 - 79	Sound work with notable errors
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Fail Group (0 - 49)	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F - Fail	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer fundamentals		Module Delivery
Module Type	Support or related learning activity		<input checked="" type="checkbox"/> Theory
Module Code	CET1207		<input type="checkbox"/> Lecture
ECTS Credits	3		<input checked="" type="checkbox"/> Lab
SWL (hr/sem)	75		<input type="checkbox"/> Tutorial
Module Level	1	Semester of Delivery	2
Administering Department	CET	College	EETC
Module Leader	Aseel Hameed Majeed	e-mail	aseel_Alnakkash@mtu.edu.iq
Module Leader's Acad. Title	Assis. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Hussein Mohi Hareez	e-mail	Hussein Mohi Hareez@mtu.edu.iq
Peer Reviewer Name	Dr. Mahmoud Shuker Mahmoud	e-mail	mahmoud.shukur@mtu.edu.iq
Scientific Committee Approval Date	29 / 10 / 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

<p>Module Objectives أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To learn and understand computer system work.2. To learn computer organization and architecture for computer.3. To understand input and output devices.4. To learn and understand storage devices.5. To learn hardware and software computer system.6. To understand computer network and the web technologies.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Study how computer works and its components.2. Understand memory function and storage.3. Understand how operating system works and its structure.4. Learn fundamentals of computer network.5. To have basic knowledge about computer security and protection.6. Learn how WWW web works and its technologies.7. Study how to use Microsoft application (Word, Excel, PowerPoint, Notepad).
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part One :</u></p> <p>Introduction to computer: characteristics, components, computer System Hardware, Organization and Architecture. [16 hrs.]</p> <p><u>Part Two :</u></p> <p>Input, Output, Storage devices and computer software. [8 hrs.]</p> <p><u>Part Three :</u></p> <p>Computer number systems and data representation. [8 hrs.]</p> <p><u>Part Four :</u></p> <p>Computer networks, the web technologies and computer viruses. [8 hrs.]</p>

	<p>Part Five :</p> <p>Applications program (MS Word, Excel, PowerPoint, Notepad). [16 hrs.]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The main strategy that will be adopted in delivering this module is to encourage students' participation in lecture discussions and lab sessions, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.</p>

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	34	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعيا	2.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	41	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.73
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	75		

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	1	10% (10)	12	LO #1, 2, 5,6
	Assignments	1	10% (10)	9	LO # 1-6
	Projects / Lab.	1	10% (10)	Continue	- LO # 1, 7
	Report	1	10% (10)	14	LO # 1, 7
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO # 1-5
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Computers: Characteristics of Computers, Components of a computer, Types of Computers, Computer System Hardware
Week 2	Computer Organization and Architecture: Central Processing Unit (CPU), Computer Memory, System bus, Motherboard, Expansion Slots, Built-in Components, External Connectors, Power Supplies, Ports and Interfaces
Week 3	Input Devices: Keyboard, Mouse, Track Ball, Joystick, Audio Input Devices, Capture Devices, Light Pen, Scanner, Barcode Reader, Digitizer, Magnetic Card Reader, Optical Character Recognition, Biometric
Week 4	Output Devices: Monitor, Printer, Plotter, Projector, Audio Output Devices
Week 5	Storage Devices: Hard Disk Drive, Slid State Drive, Optical Drives, External Hard Drive, Cloud Storage
Week 6	Computer Software: System software, Operating System, Types of Operating Systems, Functions of an Operating System, Windows Operating System, application software
Week 7	Midterm EXAM

Week 8	The Web Technologies and Internet: Concept of Internet, How the Web Work, World Wide Web, Client/Server System, Basic Internet Terminology, Types of Internet Connections, Understanding URL and IP addresses, Uses of Internet, E-Commerce
Week 9	Computer Viruses: Introduction to computer viruses, Types of computer viruses, Different virus expressions, how an antiviruses work, how to protect your system against viruses
Week 10	Application Program 1: Microsoft Word
Week 11	Application Program 1: Microsoft Word
Week 12	Application Program 2: Microsoft Excel
Week 13	Application Program 2: Microsoft Excel
Week 14	Application Program 3: Microsoft PowerPoint
Week 15	Application Program 3: Microsoft PowerPoint

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Computer Hardware Components: Case components, Motherboard, Power Supply, CPU, Memory, Hard Disk
Week 2	Input Devices: Keyboard, Mouse, Joy Stick, Light Pen, Track Ball, Scanner, Microphone, Bar-Code Reader
Week 3	Output Devices: Monitor, Printer, Plotter, Projector, Audio Output Devices
Week 4	Storage Devices: HDD, SSD, External Drives
Week 5	Operating System: Introduction to Microsoft Windows GUI,
Week 6	Installation Software: How to install a software application
Week 7	Midterm LAB EXAM no.1
Week 8,9	Application Program 1: Microsoft Word
Week 10,11	Application Program 2: Microsoft Excel
Week 12,13	Application Program 3: Microsoft PowerPoint
Week 14	Application Program 4: Notepad

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	S. M. Freund, et al, Discovering Computers and Microsoft Office 2016: A Fundamental Combined Approach, Cengage Learning, 2017	No
Recommended Texts	P. Deitel & H. Deitel, C++ How to Program, 10th Ed., Pearson, 2017	No
Recommended Texts	W. Stallings, Computer Organization and Architecture Designing for Performance, 10th Ed., Pearson, 2016	No
Websites	https://mdl.coie-nahrain.edu.iq	

Grading Scheme

مخطط الدرجات

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

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

المستوى الثاني

الفصل الأول

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering Mathematics		Module Delivery	
Module Type	S		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CET2101			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	2	Semester of Delivery		3
Administering Department	CET	College	EETC	
Module Leader	Hala A. Hashim		e-mail	hala.solomon@gmail.com
Module Leader's Acad. Title	Assistant Lecturer		Module Leader's Qualification	M.Sc.
Module Tutor	Saad Mohameed Abd Taima		e-mail	asaadde2018@gmail.com
Peer Reviewer Name	Asst. Prof. Alhamzah Taher Mohammed		e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CET1204	Semester	Two
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	<ol style="list-style-type: none">1. To develop problem solving skills and understanding of probability theory.2. To distinguish aspects of probability terminology.3. This course deals with the basic concept of Statistics.4. To understand graphical representation of data measures.5. To perform Simple Linear Regression.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none">1. Recognize Basic terminology.2. Describe Axioms for probability.3. Discuss Conditional probabilities and independent events.4. Explain random variable, Expectation and variance.5. understand Bayes Theorem, PDF and CDF.6. Define Expectation and variance of continuous random variables.7. Identify Binomial, Poisson and Normal Distribution.8. Discuss Joint and Marginal distributions aspects.9. Discuss the Distributions of sums of independent random variables.10. Explain Expectation and variance of sums of random variables, in addition to Covariance and correlation.11. Describe Conditional expectation and Prediction.12. Discuss Graphical Representation of frequency tables and charts, Measures of Central Tendency, and Dispersion.13. Get acquainted with Relationship Modelling, Pearson's Correlation Coefficient.14. Explain Significance of the correlation co-efficient and Simple Linear Regression.15. Describe Chi Square test for association, Chi Square test of goodness of fit.
Indicative Contents المحتويات الإرشادية	<p><u>Part A - Probability</u></p> <p>This part includes Sample spaces and events. Axioms for probability and their consequences. Conditional probabilities. Bayes' formula. Independent events. Definition of random variable. Discrete random variables. Expectation and variance. Bayes Theorem, Discrete Probability Distributions, The cumulative distribution function. Probability density function. Expectation and variance of continuous random variables. Binomial Distribution, Poisson Distribution, The Normal Distribution, Joint distribution functions. Marginal distributions. Independent random variables. Distributions of sums of independent random variables. Expectation and variance of sums of random variables. Covariance and correlation. Conditional expectation. Prediction. [33 hrs] + Revision problem classes in weekly tutorials [11 hrs]</p> <p><u>Part B - Statistics</u></p> <p>This part will take in details Graphical Representation - frequency tables and charts, Measures of Central Tendency, and Dispersion. Relationship Modelling, Pearson's Correlation Coefficient Significance of the correlation co-efficient, Simple Linear</p>

Regression Chi Square test for association, Chi Square test of goodness of fit [12 hrs] + Revision problem classes in weekly tutorials [4 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	This module will primarily focus on encouraging students to participate in the activities, as well as refining and developing their critical thinking skills. This will be achieved through lectures, tutorials, discussions, and grading activities.
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Student Workload (SWL)

الحمل الدراسي للطالب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1-4 , LO #5-9
	Assignments	2	20% (10)	4, 11	LO # 1-3 , LO # 4- 10
	Projects / Lab.	N/A			
	Report	1	10% (10)	15	LO # 1-14
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Basic terminology, Populations and Samples.
Week 2	Sample spaces and events. Axioms for probability and their consequences.
Week 3	Conditional probabilities. Bayes' formula. Independent events.
Week 4	Definition of random variable. Discrete random variables. Expectation and variance.
Week 5	Bayes Theorem, Discrete Probability Distributions, The cumulative distribution function.
Week 6	Probability density function. Expectation and variance of continuous random variables.
Week 7	Binomial Distribution, Poisson Distribution, The Normal Distribution
Week 8	Midterm Exam
Week 9	Joint distribution functions. Marginal distributions. Independent random variables. Distributions of sums of independent random variables.
Week 10	Expectation and variance of sums of random variables. Covariance and correlation.
Week 11	Conditional expectation. Prediction.
Week 12	Graphical Representation - frequency tables and charts, Measures of Central Tendency, and Dispersion.
Week 13	Relationship Modelling, Pearson's Correlation Co-efficient
Week 14	Significance of the correlation co-efficient, Simple Linear Regression
Week 15	Chi Square test for association, Chi Square test of goodness of fit
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Tutorial) المنهاج الاسبوعي الاضافي	
	Material Covered
Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.	

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	"Probability & Statistics for Engineers & Scientists", Ronald E. Walpole, Raymond H. Myers, Sharon L. Myers, Keying E. Ye, Pearson Education, 9th edition, (August 19, 2016), ISBN-13:978-1292161365.	Yes
Recommended Texts	"Essential Mathematics and Statistics for Science", Graham Currell, Antony Dowman, Wiley, 2nd edition (June 22, 2009), ISBN-13:978-0470694480.	No
Websites	https://users.cs.utah.edu/~jeffp/teaching/cs3130.html	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Object Oriented Programming		Module Delivery	
Module Type	S		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CET2102			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	2	Semester of Delivery		3
Administering Department	CET	College	EETC	
Module Leader	Loay Talib Ahmed		e-mail	Loay.alsaffar@mtu.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.	
Module Tutor	Dr. Taariq Ziad Qasim		e-mail	tariqk2011@gmail.com
Peer Reviewer Name	Dr. Osama Abbas Hussein		e-mail	osama.abbas@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	Version Number	1.0	

Relation with other Modules				
العلاقة مع المواد الدراسية الأخرى				
Prerequisite module	Programming Essentials / CET1203		Semester	2
Co-requisites module	None		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. Understand and apply object-oriented programming principles.2. Design and implement object-oriented solutions to programming problems.3. Utilize C++ libraries and frameworks for application development.4. Implement data abstraction and encapsulation for secure and efficient code.5. Plan and execute testing strategies for reliable programs.6. Debug and optimize program performance for efficient execution.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Demonstrate a clear understanding of object-oriented programming principles, including inheritance, polymorphism, and encapsulation.2. Design and implement classes and objects to represent real-world entities, applying appropriate inheritance and encapsulation.3. Utilize C++ libraries and frameworks effectively to develop robust and scalable applications.4. Implement data abstraction and encapsulation techniques to ensure secure and efficient code.5. Plan and execute comprehensive testing strategies to validate the functionality and reliability of object-oriented programs.6. Identify and debug program errors using appropriate tools and techniques, enhancing program robustness.7. Evaluate and optimize program performance through code analysis and profiling, improving execution efficiency.8. Collaborate effectively with peers to develop object-oriented solutions to complex programming challenges.9. Apply exception handling techniques to handle errors and ensure program stability.10. Demonstrate proficiency in utilizing debugging tools to identify and fix program errors.11. Apply object-oriented design patterns and principles to analyze and solve programming problems.12. Evaluate the efficiency and effectiveness of object-oriented solutions through critical analysis and optimization techniques.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A: Introduction to Object-Oriented Programming (8 hours)</u></p> <ul style="list-style-type: none">- Overview of object-oriented programming principles and concepts- Classes, objects, and their relationships- Inheritance and polymorphism- Encapsulation and data abstraction

Part B: Designing Object-Oriented Solutions (12 hours)

- Problem analysis and requirements gathering
- Identifying classes and objects
- Object-oriented design principles and patterns
- Designing class hierarchies and relationships
- UML diagrams for visualizing designs

Part C: Implementing Object-Oriented Solutions in C++ (20 hours)

- C++ language essentials for object-oriented programming
- Implementing classes and objects in C++
- Inheritance and polymorphism in C++
- Handling exceptions in C++
- Utilizing C++ libraries and frameworks

Part D: Testing and Debugging Object-Oriented Programs (12 hours)

- Testing methodologies and strategies
- Unit testing and test-driven development
- Integration testing and system testing
- Debugging techniques and tools
- Error handling and exception management

Part E: Optimization and Performance Analysis (8 hours)

- Profiling and performance analysis tools
- Identifying performance bottlenecks
- Optimization techniques for object-oriented programs
- Memory management and resource optimization

Part F: Collaborative Object-Oriented Programming (8 hours)

- Collaborative development environments and version control systems
- Code reviews and best practices
- Pair programming and team collaboration
- Communication and coordination in object-oriented projects

Part G: Project Work and Application Development (20 hours)

- Applying object-oriented principles and techniques in a practical project
- Developing a complete application using C++ and object-oriented design
- Project planning, implementation, and documentation
- Integration of various modules and testing the application

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The learning and teaching strategies for the Object-Oriented Programming Course include lectures to introduce concepts, practical exercises for hands-on programming, group discussions for collaboration, case studies for real-world application, code reviews for feedback, practical projects to apply knowledge, guest lectures for industry insights, online resources for self-study, assessments to evaluate understanding, and presentations to enhance communication skills. These strategies aim to actively engage students, develop their programming abilities, and foster a deep understanding of object-oriented programming principles.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.73
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% (5)	5,10	LO #1 – 4, LO #1 – 9
	Assignments	2	10% (10)	4,11	LO #1 – 3, LO #4 – 10
	Projects / Lab.	1	10% (10)	Continuous	LO #1 – 12
	Report	1	10% (10)	11	LO # 1- 10
Summative assessment	Midterm Exam	2 hrs.	10% (10)	7	LO # 1-6
	Final Exam	4hrs.	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Object-Oriented Programming
Week 2	Classes, Objects, and Relationships
Week 3	Inheritance and Polymorphism principles
Week 4	Encapsulation and Data Abstraction
Week 5	Problem Analysis and Requirements Gathering
Week 6	Object-Oriented Design Principles and Patterns
Week 7	Mid-term Exam
Week 8	C++ Language Essentials and Advanced Topics
Week 9	Implementing Classes and Objects in C++
Week 10	Implementing Inheritance and Polymorphism in C++
Week 11	Handling Exceptions in C++
Week 12	Utilizing C++ Libraries and Frameworks
Week 13	Testing Methodologies and Strategies in C++
Week 14	Debugging Techniques and Tools in C++
Week 15	Optimization and Performance Analysis in C++
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to C++ programming environment and basic syntax.
Week 2	Implementing simple classes and objects.
Week 3	Experimenting with inheritance and polymorphism in C++.
Week 4	Implementing data abstraction and encapsulation.
Week 5	Problem-solving exercise using object-oriented design principles and patterns.
Week 6	Utilizing C++ libraries and frameworks for application development.
Week 7	Midterm Exam (No lab session).
Week 8	Implementing exception handling techniques in C++.
Week 9	Testing and debugging strategies for object-oriented programs.
Week 10	Profiling and performance analysis of C++ programs.
Week 11	Code optimization techniques for object-oriented programming.
Week 12	Collaborative programming exercise utilizing version control systems.
Week 13	Implementing advanced data structures using object-oriented techniques.
Week 14	Project work and application development using object-oriented concepts.
Week 15	review and practice exercises, Preparatory for Final Exam.
Week 16	Final Exam (No lab session).

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Object-Oriented Programming in C++" by Robert Lafore	
Recommended Texts	"Design Patterns: Elements of Reusable Object-Oriented Software" by Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides	
Websites	https://www.w3schools.com/cpp/cpp_oop.asp	

Grading Scheme

مخطط الدرجات

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer Organization and Applications		Module Delivery
Module Type	core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET2103		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Aseel Hameed Majeed	e-mail	aseel_Alnakkash@mtu.edu.iq
Module Leader's Acad. Title	Assis. Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Zahraa Saad Abdulaali	e-mail	Zahraasaadzahraa668@gmail.com
Peer Reviewer Name	Dr. Mahmoud Shuker Mahmoud	e-mail	mahmoud.shukur@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	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

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. Understand the basic components and organization of a computer system.2. Explain the function and operation of the CPU, memory, and I/O devices.3. Analyze and evaluate different computer architectures and their trade-offs.4. Design and implement basic computer systems using appropriate hardware and software components.5. Demonstrate an understanding of the relationship between computer organization and computer performance.6. Apply knowledge of computer organization principles to solve real-world computing problems.7. To develop essential skills in creating, saving, and opening documents in Microsoft Word, including formatting text and paragraphs and working with styles and themes.8. To explore advanced features in Microsoft Word, such as page layout options, working with headers, footers, and page numbers, and incorporating tables, images, and objects.9. To introduce spreadsheets and worksheets in Microsoft Excel, and develop students' skills in data entry, manipulation, and basic formulas and functions.10. To delve into advanced Microsoft Excel features, including working with ranges and cells, sorting and filtering data, and creating charts and graphs.11. To guide students in creating and editing slides in Microsoft PowerPoint, applying themes and templates, and adding text, images, and multimedia elements.12. To explore advanced PowerPoint features, such as slide transitions, animations, using SmartArt and shapes, and utilizing presenter tools and slide show options.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Understand the basic components and organization of a computer system.2. Explain the function and operation of the CPU, memory, and I/O devices.3. Analyze and evaluate different computer architectures and their trade-offs.4. Design and implement basic computer systems using appropriate hardware and software components.5. Demonstrate an understanding of the relationship between computer organization and computer performance.6. Apply knowledge of computer organization principles to solve real-world

	<p>computing problems.</p> <ol style="list-style-type: none"> 7. demonstrate the ability to evaluate and compare different computer organization techniques, such as memory management strategies and caching optimizations, to improve system performance. 8. Understand computer architectures, including their performance characteristics, and understand the impact of design choices on computer performance 9. Develop practical skills in using simulation tools, emulators, and programming languages to design, implement, and test computer organization concepts. 10. Analyze and identify performance bottlenecks in computer systems and propose appropriate optimizations to improve system efficiency. 11. Understand the principles and challenges of memory management, including memory allocation, deallocation, and garbage collection. 12. Apply knowledge of cache memory organization and mapping techniques to analyze cache behavior and optimize cache utilization. 13. Demonstrate a solid understanding of Microsoft Word, Excel, and PowerPoint, including their key features, user interfaces, and common functions. 14. Create, format, and manage documents effectively in Microsoft Word, utilizing styles, themes, page layout options, headers, footers, tables, images, and objects. 15. Utilize Microsoft Excel for data entry, manipulation, basic calculations using formulas and functions, sorting and filtering data, and creating charts and graphs. 16. Develop proficiency in creating and editing slides, applying themes, templates, and multimedia elements, and utilizing advanced features in Microsoft PowerPoint.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>Introduction to Computer Organization</p> <p>Basic computer architecture and components Von Neumann architecture</p> <p>Instruction execution cycle</p> <p>Memory Organization</p> <p>Memory hierarchy and cache memory</p> <p>Virtual memory and paging techniques</p> <p>Memory management and allocation strategies</p> <p>PU Organization and Instruction Set Architecture (ISA)</p> <p>CPU components: ALU, registers, control unit</p> <p>Instruction formats and addressing modes</p>

	<p>Input/Output (I/O) Organization</p> <p>I/O devices and interfaces</p> <p>Polling, interrupts, and DMA</p> <p>I/O communication and bus architectures</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.</p>

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
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	Quizzes	2	10% (10)	5, 10	LO #1-4 , LO #4-9

assessment	Assignments	2	10% (10)	4, 12	LO # 1-3, LO #4-11
	Projects / Lab.	1	10% (10)	Continuous	ALL
	Report	1	10% (10)	13	LO # 1-11
Summative assessment	Midterm Exam	2hr	10% (10)	9	LO # 1-8
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Computer system Organization, Main parts of computer system, Organization and architecture
Week 2	Von Neumann architecture and its components
Week 3	Instruction Set Design in Von Neuman
Week 4	Overview of instruction execution cycle
Week 5	Introduction to Memory unit, Memory Organization & classification
Week 6	Prime Memory :RAM ,ROM ,EPROM ,EEPROM& Storage memory :,Hard disk ,CD ROM
Week 7	Midterm Exam
Week 8	Concepts of Microprocessors & Microcomputer & Microcontroller .Organization of MP base system
Week 9	Machine language & Assembly language and addressing modes
Week 10	Input/Output (I/O) Organization

Week 11	Introduction to Microsoft Office Suite <ul style="list-style-type: none"> • Overview of Microsoft Word, Excel, and PowerPoint • Understanding the user interface and common features
Week 12	Microsoft Word Basics <ul style="list-style-type: none"> • Creating, saving, and opening documents • Formatting text and paragraphs • Working with styles and themes
Week 13	Advanced Microsoft Word Features <ul style="list-style-type: none"> • Page layout and formatting options • Working with headers, footers, and page numbers • Using tables, images, and other objects
Week 14	Microsoft PowerPoint Basics <ul style="list-style-type: none"> • Creating and editing slides • Applying themes and templates • Adding text, images, and multimedia elements
Week 15	Advanced Microsoft PowerPoint Features <ul style="list-style-type: none"> • Slide transitions and animations • Using SmartArt and shapes • Presenter tools and slide show options

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Computer Organization ,Familiarization with the lab environment and tools
Week 2	Lab 2: hardware components: CPU, memory, and I/O devices
Week 3	Lab 3: Computer assembly and disassembly
Week 4	Lab 4: Introduction to PC Operating Systems
Week 5	Lab 5: Installation and setup of the chosen PC operating system
Week 6	Lab 6: Assembly Language Programming
Week 7	Lab 7: Writing and executing simple assembly language programs
Week 8	Introduction to Lab Environment and Office Suite - Lab setup and software installation. Overview of Microsoft Office Suite tools and features.
Week 9	Microsoft Word Lab - Creating, editing, and formatting documents: Inserting and formatting

	images and tables.
Week 10	Microsoft Excel Lab - Creating spreadsheets and entering data. Formulas and functions for calculations.
Week 11	Microsoft PowerPoint Lab - Creating, editing, and designing slides. Adding multimedia elements and animations.
Week 12	Word Processing Techniques Lab - Mail merge and document collaboration exercises. Creating professional documents with advanced formatting.
Week 13	Data Analysis Lab with Excel - Advanced formula and function exercises. Sorting, filtering, and analyzing data.
Week 14	Presentation Design Lab with PowerPoint - Applying design principles to create visually appealing slides. Adding interactive elements and customizing slide layouts.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Computer Organization and Design" by David A. Patterson and John L. Hennessy	Yes
Recommended Texts	Structured Computer Organization" by Andrew S. Tanenbaum	No
Websites	https://www.tutorialspoint.com/computer_organization/index.asp	

Grading Scheme

مخطط الدرجات

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Electronic Fundamentals		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET2104		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Rawaa Abdulridha Kadhim	e-mail	Rawaa84ha@mtu.edu.iq
Module Leader's Acad. Title	lecturer	Module Leader's Qualification	MSc.
Module Tutor	Kadhim Fakhir Oudah	e-mail	Kazemoda75@gmail.com
Peer Reviewer Name	Dr. Osama Abbas Hussein	e-mail	osama.abbas@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CET1202	Semester	2
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To understand materials conductivity, semiconductor materials, and types2. This is the basic subject for all electronic circuits and devices.3. This course deals with first and the simplest semiconductor device, diode, diode physical construction, biasing, characteristics, application circuits and Zener4. Mathematical derivation and implementation of the load line analysis, and Q point with in diode characteristics curve to develop problem solving skills and understanding of diode circuits5. This course deals with second semiconductor device, BJT This course deals with BJT physical construction, biasing, configuration methods, input and output characteristics6. To understand the D.C biasing of BJT and circuit types , analysis and calculations of BJT parameters7. To understand and construct re model for BJT circuits8. To deal with small signal analysis of BJT
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Recognize classifications of materials according to its conductivity.2. Identify the semiconductor material characteristics and classifications3. Recognize the physical structure and properties of P and N layers4. Identify diode as a first example of semiconductor devices.5. Discuss diode physical construction, biasing, and characteristics6. Identify the variable parameters of diodes, and V threshold7. Summarize what is meant by Load line analysis , and Q point8. Identify the applications of diodes in electrical circuits using AC. And DC. Power supplies9. To understand the concept of Zener region and the differences between zener and original diodes10. To solve zener circuits and calculate its voltage current with different cases11. To understand and discuss the second semiconductor device which is Transistor (Bipolar Junction Transistor)(BJT)12. To discuss BJT physical construction, Operation, and configuration methods13. To understand and implement input and output Characteristics of each configuration method and load line and Q point implementations14. To implement and solve BJT biasing circuit types and calculations of important parameters of BJT in DC. Biasing state15. Design BJT circuit types by using Quesent point parameters16. Understand and construct re model for BJT circuits17. Derive and calculate Z_i, Z_o A_v and A_i from re model of BJT circuits18. Understand and calculate small signal analysis of BJT

<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>Semiconductor Materials Energy Levels , n- and p-Type, Semiconductor Diode Construction ,biasing, Characteristics and Zener Diodes, Load-Line Analysis [8 hrs]</p> <p>. Series Diode Configurations with DC Inputs, Parallel and Series-Parallel Configurations Sinusoidal Inputs Half-Wave Rectification, Full-Wave Rectification Clippers ,Clampers , Zener Diodes Voltage-Multiplier Circuit [10hrs]</p> <p>Transistor Construction , Transistor Operation ,Common-Base Configuration Transistor Amplifying Action ,Common-Emitter Configuration ,Common-Collector Configuration ,Limits of Operation [8hrs]</p> <p>Operating Point, Fixed-Bias Circuit , Emitter-Stabilized Bias Circuit , Voltage-Divider Bias , DC Bias with Voltage Feedback , Miscellaneous Bias Configurations, Design Operations Transistor Switching Networks, [[15 hrs]</p> <p>Revision problem classes [12 hrs]</p> <p>BJT Transistor Modeling The Important Parameters: Z_i, Z_o, A_v, A_i The r e Transistor Model The Hybrid Equivalent , small signal analysis Common-Emitter Fixed-Bias Configuration , Voltage-Divider Bias CE Emitter-Bias Configuration Emitter-Follower Configuration Common-Base Configuration[11 hr]</p>
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<p align="center">Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.</p>

Student Workload (SWL)

الحمل الدراسي للطالب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
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, 12	LO #1- 4, LO #5-12
	Assignments	2	10% (5)	4, 11	LO # 1-3, LO #4-10
	Projects / Lab.	1	10% (10)	Continuous	ALL
	Report	1	10% (10)	13	LO # 1-12
Summative assessment	Midterm Exam	2 hr	10% (10)	6	LO #1-8
	Final Exam	4 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction, Semiconductor Materials, Energy Levels , Extrinsic Materials—n- and p-Type
Week 2	Semiconductor Diode construction, biasing, characteristics, Zener region
Week 3	Load-Line Analysis, RESISTANCE LEVELS, DIODE EQUIVALENT CIRCUITS
Week 4	Series Diode Configurations with DC Inputs , Parallel and Series- Parallel Configurations
Week 5	Sinusoidal Inputs; Half-Wave Rectification, Full-Wave Rectification
Week 6	Midterm Exam
Week 7	Clipper's series and parallel ,Clampers , Zener Diodes, Introduction , Transistor Construction
Week 8	Transistor Operation, Common-Base Configuration Transistor, Amplifying Action , Common-Emitter Configuration , Limits of Operation
Week 9	Operating Point, Fixed-Bias Circuit ,Emitter-Stabilized Bias Circuit ,
Week 10	Voltage-Divider Bias , DC Bias with Voltage Feedback , Miscellaneous Bias Configurations
Week 11	Design Operations , Transistor Switching Networks
Week 12	Amplification in the AC Domain, BJT Transistor Modeling ,The Important Parameters: Z_i , Z_o , A_v , A_i The re Transistor Model
Week 13	Small signal analysis
Week 14	Common-Emitter Fixed-Bias Configuration Voltage-Divider Bias
Week 15	CE Emitter-Bias Configuration Emitter-Follower Configuration Common-Base Configuration

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction
Week 2	Lab 2: Diode characteristics
Week 3	Lab 3 Zener diode characteristics
Week 4	Lab 4 Half wave rectifier
Week 5	Lab 5: full wave rectifier
Week 6	Half and full wave rectifier with filter
Week 7	Lab 7: clippers

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electronic devices and circuit theory Poylested	Yes
Recommended Texts	.	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Communication Fundamentals		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CET2105			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	2	Semester of Delivery		3
Administering Department	CET	College	EETC	
Module Leader	Hamood Shehab Hamid		e-mail	drhamood@mtu.edu.iq
Module Leader's Acad. Title	Asst. Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Hussein Mohyi Hareez		e-mail	Maryam.khalifa@mtu.edu.iq
Peer Reviewer Name	Alhamzah taheer mohammed		e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	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

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. Understanding the communication systems and signals. 2. Viewing and knowledge block diagram communication system 3. Analyzing the advantage and disadvantage of each type of signals and systems. 4. Analyzing signals in Fourier series and Fourier transform. 5. To develop problem solving skills and understanding of filters types and design
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Recognize Basic Principles of Communication. 2. Explain the Block Diagram of a Communication System. 3 Identify essential parts that must be present in communication systems. 4. List the different types of media used in a communication system. 5. Describe the measured effect of noise on a communication system. 6. Define modulation over some carriers to make it suitable for transmission over a long distance. 7. Discuss Principles of Signals in Communication and shows examples of signals of various types. 8. Identify the difference between Analog and Digital Signals. 9. List the various types of continuous-time signals 10. Discuss the classification of signals based on their characteristics and nature of availability. 11. Define the advantages and disadvantages of each type of signal in communications. 12. Explain the two the Fourier Series in the Continuous Domain is associated with the important classes of Fourier series methods and Trigonometric Fourier series. 13. Summarize by various magnitudes or coefficients of Exponential Fourier Series on Determination for different harmonic signals. 14. Definition A major disadvantage of the Fourier series is on account of its periodicity, by means of the limitation of the Fourier series 15. Identify Fourier transform representation for the non-periodic signals 16. Describe the Inverse Fourier transform as a mathematical transformation technique that transforms signals from the continuous-frequency domain to the corresponding time domain and vice-versa 17. Definition Filters, four basic types of filters: Passive or Active depending on the Construction of filters. 18. Describe the filter depending on the design of filters: Low Pass Filter (LPF), High Pass Filter (HPF), Band Pass Filter (BPF) and Band Stop Filter (BSF). 19. Summarize the design formula for a passive filter LPF and HPF consisting

	<p>of coils, capacitors, and resistors.</p> <p>20. Identify the design formula for a passive filter Constant-K: LPF , HPF, and BPF consisting of coils, capacitors, and resistors .</p> <p>21. Definition active filters, listing the advantage of active filter over disadvantage of passive filter.</p> <p>22. Identify the design formula for active filter first order LPF, HPF and BPF used op-Amp as main component.</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>Part A -Communication System : Basic Principles of Communication System, types of media used in a communication system, effect of noise on a communication system and modulation in analogue communication (10 hr)</p> <p>Part B Signals in Communication: Principles of Signals, examples of signals of various types, difference between Analog and Digital Signals, various types of continuous-time signals, classification of signals based on their characteristics and nature of availability and the advantages and disadvantages of each type of signal in communications.(15 hr)</p> <p>Part C- I- Fourier Series in the Continuous Domain: the important classes of Fourier series methods and Trigonometric Fourier series, Exponential Fourier (5 hr)</p> <p>Part C- II: Fourier transform representation: disadvantage of the Fourier series, Fourier transform for non-periodic signals, Inverse Fourier transform as a mathematical transformation technique.(10 hr)</p> <p>Part D- Filters: basic types of filters: Passive and Active , design of filters: Low Pass Filter (LPF), High Pass Filter (HPF), Band Pass Filter (BPF) and Band Stop Filter (BSF),design formula for each type of filters for passive and active.(34 hr)</p>
<p>Learning and Teaching Strategies استراتيجيات التعلم والتعليم</p>	
<p>Strategies</p>	<p>The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.</p>

Student Workload (SWL)

الحمل الدراسي للطالب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1- 4, LO #5- 15
	Assignments	2	10% (10)	2, 12	LO # 1-7, , LO #8- 18
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 1-17
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-16
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Basic Principles of Communication: Introduction to Communication, The Block Diagram of a Communication System
Week 2	Signals: Principles of Signals & Definition, Difference between Analog and Digital Signals
Week 3	Types of continuous-time signals: (Unit-Step Function, Unit-Ramp Function, Impulse Function, Unit-Parabola Function, Signum Function, Rectangular Function, Triangular Function, Real Exponential Signal, Sinusoidal Function & Sampling Function)
Week 4	Classification of Signals, Continuous-Time Signal, Discrete-Time Signals, Even Signals, Odd Signals, Deterministic Signals, Random Signals, Sinusoidal Signals, Complex Exponential Signals
Week 5	Solved Problems: Periodic Signals, Aperiodic Signals, Solved Problems: Energy Signals, Power Signals
Week 6	Fourier series: The Fourier Series in Continuous Domain, Trigonometric Fourier series and Solved Examples, Exponential Fourier series and Solved Examples. Fourier Transform: Fourier Transform Examples
Week 7	Midterm Exam
Week 8	Inverse Fourier Transform Example: The Inverse Fourier Transform
Week 9	Filters: Types of filters: Classification Based on Construction and Design RC-LPF, RC-HPF BPF (Low Pass Filter Stage and High Pass Filter Stage) (Type 1 & Type 2) Band Stop Filter
Week 10	Passive Filters: Formula and Procedure of Design RL-LPF, RL-HPF
Week 11	LC-LPF, Constant-K-(T & π Section) LC-HPF, Constant-K-(T & π Section) LC-BPF, Constant-K-(T & π Section)
Week 12	Band Pass Filter Stage) (Type 1 & Type 2)
Week 13	Active Filters Comparison Between Passive & Active Filters
Week 14	First-Order LPF First-Order HPF
Week 15	BPF Active Filter & Band reject or Notch Filter
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Lab Instruments
Week 2	Lab 2: Function Generator and Oscilloscope.
Week 3	Lab 3: Introduction to filters types construction
Week 4	Lab 4: Fourier series and Fourier Transform examples using the Math Function
Week 5	Lab 5: Introduction to filters types design
Week 6	Lab 6: Introduction to Passive filters
Week 7	Lab 7: Introduction to active filters
Week 8	Lab 8: Constant-K-(T& π Section) construction
Week 9	Lab 9: Constant-K-(T& π Section) design
Week 10	Lab 10: Constant-K-(T& π Section) LC- LPF
Week 11	Lab 11: Constant-K-(T& π Section) LC-HPF
Week 12	Lab 12: Constant-K-(T& π Section)- BPF
Week 13	Lab 13: Constant-K-(T& π Section)- BPF – Type-1
Week 14	Lab 14: Constant-K-(T& π Section)-BPF –Type-2

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Principles of Communication Systems By J.S.Chitode, First Edition-2007 Modern Digital and Analog Communication Systems ,By B.P.Lathi OXFORD	Yes
Recommended Texts	Analog and Digital Communications, By Schaum Second Edition Data Communications and Networking, By Behrouz A. Forouzan, Fifth Edition	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	English Language II		Module Delivery
Module Type	B		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	MTU1003		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Oras Ahmed shareef	e-mail	dr.oras@mtu.edu.iq
Module Leader's Acad. Title	Asst. Professor	Module Leader's Qualification	PhD
Module Tutor	Zahraa Ihsan Abdulrazzaq	e-mail	Zahraa.Ihsan@mtu.edu.iq
Peer Reviewer Name	Dr. Osama Abbas Hussein	e-mail	Osama.abbas@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	Version Number	1.0

Relation with other Modules العلاقة مع المواد الدراسية الأخرى			
Prerequisite module		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	<ol style="list-style-type: none"> 1. Provide students with essential information in the English language in association with reading, writing and speaking skills, and knowing more English vocabulary. 2. To understand sentences, tenses, and practicing writing. 3. This module works towards enhancing students' English language competencies along with their technical or professional knowledge. 4. Enhancing students' communication skills in English can result in better job opportunities in the future
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<p>The student will have the ability to:</p> <ol style="list-style-type: none"> 1. Know the English skills of reading, and writing. 2. Recognize other English language skills such as: grammar, vocabulary. 3. Understand and appreciate the importance of grammar aspects and vocabulary to increase the ability of communicating ideas about the English language. 4. Understand sentences with multiple clauses, and comparative and superlative. 5. Understand time expression in tenses, and active and passive voice. 6. Discuss distinguish words such as do and make, like and alike, and other and another. 7. Discuss the various skills of writing such as writing essays, developing supporting ideas, and writing a paragraph. 8. Enhance students' communication skills in English.
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p>Part A: Sentences and Tenses. an overview of verb tenses, comparatives and superlatives, time expression in tenses, active and passive voice, distinguish words, Verb Patterns, Quantity, Time and Conditional Clauses, and articles. [15 hrs]</p> <p>Part B: Reading and Writing Skills Writing essays, expressing yourself, common expressions, developing supporting ideas, types of writing, and how to write a paragraph. [15 hrs]</p>

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The main strategies that will be adopted in delivering this module are:</p> <ul style="list-style-type: none"> - Allow students to actively participate in the learning process with class

	<p>discussions and exercises that support the initiative.</p> <ul style="list-style-type: none"> - Use didactic questioning through questions to determine student understanding of the material. - Writing an assignment and report that encourages students to clarify and organize their thinking and independently research and present on a topic.
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Student Workload (SWL)			
الحمل الدراسي للطلاب محسوب ل ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	33	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعيا	2.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	17	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعيا	1.13
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	50		

Module Evaluation					
تقييم المادة الدراسية					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	3 , 10	LO# 1-2, LO# 3-9
	Assignments	2	20% (10)	4, 12	LO# 1-3, LO# 3-11
	Projects / Lab.	NA			
	Report	1	10% (10)	Continuous	
Summative assessment	Midterm Exam	2hr	10% (10)	5	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	<p>Unit 1: Grammar: Tenses (Present, Past, and Future), Questions, Questions word Vocabulary: Parts of speech, adjective, preposition, word with more than one meaning Reading and writing Skill, Everyday English (Social Expression)</p>

Week 2	Unit 2: Grammar: Present Tenses (Present Simple, Present Continuous) Tens, have/have got Vocabulary: Description countries, Collection Reading and writing Skill, make conversation, Asking question
Week 3	Unit 3: Grammar: Past Tenses (Past Simple, Past Continuous) Vocabulary: Irregular verbs, making connections, nouns, verbs, and adjectives, Making negatives Reading and writing Skill, Everyday English (Time Expression)
Week 4	Unit 4: Grammar: Quantity, Articles, and some and Any Vocabulary: Buying Things Reading and writing Skill, Everyday English (Prices and shopping)
Week 5	Midterm Exam
Week 6	Unit 5: Grammar: Verb Patterns 1, Future intentions Vocabulary: Hot verbs Reading and writing skills, Everyday English (How do you feel?) Unit 6: Grammar: What's it like?, Comparative and superlative adjectives. Vocabulary: Talking about towns, Money, Synonyms and antonyms Reading and writing Skill, Everyday English (Directions)
Week 7	Unit 7: Grammar: Present Perfect and Past Simple, for and since, Tense revision Vocabulary: Past participles, Adverbs, Word pairs. Reading and writing Skill, Everyday English (short answers)
Week 8	Unit 8: Grammar: Have (got) to, Should, Must Vocabulary: Jobs, Traveling abroad, Words that go together, Compound nouns Reading and writing Skill, Everyday English (At the doctor's)
Week 9	Unit 9: Grammar: Time and Conditional Clauses, What if? Vocabulary: Hot verbs, Hotels Reading and writing Skill, Everyday English (In a hotel)
Week 10	Unit 10: Grammar: Verb Patterns 2, Infinitives, Purpose, (What, etc.+ infinitive), (something, etc.+ infinitive) Vocabulary: Shops, describe feelings and situations. Reading and writing Skill, Everyday English (Exclamations)
Week 11	Unit 11: Grammar: Active and Passive Voice Vocabulary: Verbs and past participles, verbs and nouns that go together Reading and writing Skill, Everyday English (Notices)
Week 12	Unit 12: Grammar: Second conditional, might Vocabulary: Phrasal verbs Reading and writing Skill, Everyday English (Social expression 2)
Week 13	Unit 13: Grammar: Present Perfect Continuous, Present Perfect Simple versus Continuous Vocabulary: Job and the alphabet game, Word formation, Adverb Reading and writing Skill, Everyday English (Telephoning)
Week 14	Unit 14: Grammar: Past Perfect, Reported statements Vocabulary: Word in context Reading and writing Skill, Everyday English (Saying goodbye)
Week 15	Grammar: Distinguish make and do, will and would, like, alike, unlike, and dislike, and other, another, and others Vocabulary Reading and writing Skill

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	New Headway Plus/ Pre-Intermediate, John and Liz Soars, Oxford University Press	NO
Recommended Texts	Understanding and Using English Grammar, 5 th Edition, Betty S. Azar Stacy A. Hagen.	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
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	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
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<p>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.</p>				

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية			
Module Title	The crimes of the Ba'ath regime		Module Delivery
Module Type	B		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	MTU1007		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Wahaj Mohammed Isameel	e-mail	Wahaj.mohammed@mtu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	M.Sc.
Module Tutor	Noor Al-Wud Hakeem Nasser	e-mail	
Peer Reviewer Name	Asst. Prof. Alhamzah Taher Mohammed	e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	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

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<p>يهدف هذا المقرر الدراسي إلى تعزيز فهم الطلاب للجرائم والانتهاكات التي وقعت خلال فترة نظام البعث في العراق وتأثيرها على الأفراد والمجتمع، وتشجيع التحليل والنقاش حول هذه القضايا المهمة. ومن أبرز الأهداف للمادة الدراسية هي اني يكون الطالب قادراً على أن :</p> <ol style="list-style-type: none"> 1. فهم مفهوم الجرائم وأقسامها. 2. دراسة جرائم نظام البعث والقوانين المتعلقة بها. 3. التعرف على الجرائم النفسية والاجتماعية وآثارها على الفرد والمجتمع. 4. تحليل الانتهاكات القانونية في العراق، بما في ذلك الانتهاكات لحقوق الإنسان والجرائم ذات الصلة. 5. فهم الجرائم البيئية وآثارها، بما في ذلك التلوث وتدمير المدن والقرى وتجفيف الأهوار. 6. دراسة جرائم المقابر الجماعية وفهم أحداث المقابر والتصنيف الزمني لها في العراق.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<p>مخرجات التعلم للمادة الدراسية هي:</p> <ol style="list-style-type: none"> 1. فهم مفهوم الجرائم وقدرة الطلاب على تصنيف الجرائم وفقاً لأقسامها. 2. تحليل جرائم نظام البعث وفهم القوانين المتعلقة بها، بما في ذلك الجرائم الدولية. 3. القدرة على التعرف على الجرائم النفسية لنظام البعث وفهم الآثار النفسية لجرائم نظام البعث على الأفراد والمجتمع. 4. القدرة على التعرف على الجرائم الاجتماعية لنظام البعث الآثار الاجتماعية لجرائم نظام البعث على الأفراد والمجتمع. 5. التعرف على الانتهاكات القانونية لنظام البعث في العراق وفهم أنواع الانتهاكات ومكان احتجاج الأفراد. 6. التعرف على صور انتهاكات حقوق الإنسان وجرائم السلطة التي وقعت خلال فترة نظام البعث 7. التعرف على الانتهاكات السياسية والعسكرية لنظام البعث 8. فهم الجرائم البيئية لنظام البعث والقدرة على تحليل تأثيرها على البيئة والمجتمع. 9. دراسة جرائم المقابر الجماعية لنظام البعث 10. فهم الأحداث المرتبطة بجرائم المقابر الجماعية وتصنيفها زمنياً.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>المحتويات الإرشادية في مادة اللغة تشمل مجموعة من المفاهيم والمواضيع التي يتم تغطيتها خلال عملية التعلم. ومن بين المحتويات الإرشادية المهمة:</p> <ol style="list-style-type: none"> 1. تعريف الجريمة لغة واصطلاحاً، مفهوم الجريمة، اقسام الجريمة 2. جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا عام 2005 3. الجرائم النفسية والاجتماعية وآثارها 4. عسكرة المجتمع، موقف النظام البعثي من الدين 5. انتهاكات القوانين العراقية، صور انتهاكات حقوق الإنسان وجرائم السلطة 6. بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث 7. أماكن السجون والاحتجاز لنظام البعث 8. الجرائم البيئية لنظام البعث في العراق 9. جرائم المقابر الجماعية 10. أحداث مقابر الإبادة الجماعية المرتكبة من النظام البعثي في العراق 11. التصنيف الزمني لمقابر الإبادة الجماعية في العراق للمدة 1963م - 2003م

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	استراتيجيات التعلم والتعليم المستخدمة في مادة جرائم حزب البعث تشمل مجموعة متنوعة من النهج والتقنيات التي تعزز عملية التعلم للطلاب. من بين هذه الاستراتيجيات:
	1. التفاعل النشط: يتم تشجيع الطلاب على المشاركة والمشاركة الفعالة في الدروس من خلال المناقشات الجماعية والأنشطة التفاعلية.
	2. التعلم التعاوني: يشجع التعاون والتعاون بين الطلاب من خلال العمل الجماعي والمشاريع الجماعية، حيث يتعاون الطلاب مع بعضهم البعض لتحقيق أهداف التعلم المحددة.
	3. استخدام التقنيات الحديثة: يستفيد الطلاب من استخدام التكنولوجيا في عملية التعلم، مثل استخدام الحواسيب والإنترنت للبحث والتعلم الذاتي.
	4. توفير ردود فعل فورية: يتم توفير ردود فعل فورية وتقييم مستمر للطلاب، سواء عن طريق التقييمات الشفهية أو الكتابية، مما يساعدهم على تحسين أدائهم وتطوير مهاراتهم.
5. التنوع في وسائل التواصل: يتم استخدام مجموعة متنوعة من وسائل التواصل والتعليم، مثل المحاضرات التوضيحية، والمناقشات الجماعية، والأنشطة العملية، والعروض التقديمية، لتلبية احتياجات وأساليب التعلم المختلفة للطلاب.	

Student Workload (SWL)

الحمل الدراسي للطلاب محسوب لـ ١٥ اسبوعا

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

Delivery Plan (Weekly Syllabus)

المنهاج الأسبوعي النظري

تعريف الجريمة لغة واصطلاحاً، مفهوم الجريمة، أقسام الجريمة	الأسبوع الأول
جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا عام 2005	الأسبوع الثاني
الجرائم النفسية لنظام البعث وفهم الآثار النفسية لجرائم نظام البعث على الأفراد والمجتمع.	الأسبوع الثالث
الجرائم الاجتماعية لنظام البعث وفهم الآثار الاجتماعية لجرائم نظام البعث على الأفراد والمجتمع.	الأسبوع الرابع
انتهاكات القوانين العراقية	الأسبوع الخامس
بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث	الأسبوع السادس
امتحان نصف الفصل	الأسبوع السابع
الجرائم البيئية لنظام البعث في العراق (التلوث الحربي وسياسة الأرض المحروقة)	الأسبوع الثامن
تجفيف الاهور و تجريف بساتين النخيل والأشجار والمزروعات	الأسبوع التاسع والعاشر
جرائم المقابر الجماعية واحداث مقابر الإبادة الجماعية المرتكبة من النظام البعث في العراق	الاسبوع الحادي عشر و الاسبوع الثاني عشر
التصنيف الزمني لمقابر الإبادة الجماعية في العراق للمدة من (1963-2003) م	الأسبوع الثالث عشر والرابع عشر والخامس عشر
التهيئة لامتحان النهائي	الأسبوع السادس عشر

Module Evaluation					
تقييم المادة الدراسية					
		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (5)	3, 11	LO #1, 2, LO #3- 10
	Assignments	3	20% (10)	6, 13	LO # 1-4, LO #5-10
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-10
Summative assessment	Midterm Exam	2 hours	10% (20)	7	LO # 1-5
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Learning and Teaching Resources		
مصادر التعلم والتدريس		
	Text	Available in the Library?
Required Texts	منهاج وزارة التعليم العالي والبحث العلمي العراقية - جرائم نظام البعث في العراق 2023	Yes
Recommended Texts		No
Websites	The Collage E-Library	

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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المستوى الثاني

الفصل الثاني

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Microprocessors		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CET2203			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	2	Semester of Delivery		4
Administering Department	CET	College	EETC	
Module Leader	Aseel Hameed Majeed		e-mail	Aseel_Alnakkash@mtu.edu.iq
Module Leader's Acad. Title	Ass. Professor		Module Leader's Qualification	Ph.D.
Module Tutor	Dr.Yosife Wared Saqer		e-mail	Yousifwareed@gmail.com
Peer Reviewer Name	Dr. Mahmoud Shuker Mahmoud		e-mail	mahmoud.shukur@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	Computer Organization & Architecture (CET2103)	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To understand the basic operating concept of specific microprocessor.2. To study the hardware architecture of specific microprocessor.3. To encode programs based on the specific processor language.4. To solve problems encountered in the architecture of a specific microprocessor
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Identify the basic characteristic of specific processor2. Define the processor signals and their functions3. Explain the architecture from the hardware point of view4. Identify various machine cycle.5. Explain the memory different interfacing techniques with the microprocessor.6. Explain the input output different interfacing techniques with the microprocessor.7. Explain the concept of Stack memory.8. List the addressing mode of the processor instruction.9. Encode different program based on assembly.10. Perform different arithmetic and logical operations using the processor instruction set.11. Encode different problems associative with branching instructions.12. Solve problem encountered with delay and counter.13. Identify different interrupt procedures.14. Design different interfacing systems due to the problem requirements.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Microprocessor H/W architecture</u> --MP signals, MP operations, Machine cycle, memory interfacing, input-output devices interfaces [30hrs]</p> <p><u>Part b – Microprocessor S/W architecture</u> --Instruction set, data transfer, arithmetic, logical. [25 hrs] --Stack register and stack area [15hrs] --Branching instructions and applications [20hrs] --Revision problem classes [10 hrs]</p>

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - microprocessor evolution
Week 2	Basics specific microprocessor architecture and its specifications
Week 3	Microprocessor signals and machine cycle
Week 4	Memory organization, interfacing and memory map
Week 5	Input devices interfacing, Output devices interfacing
Week 6	Midterm Exam
Week 7	Introduction to microprocessor assembly language and addressing mode
Week 8	Data transfer instruction
Week 9	Arithmetic instructions
Week 10	logical instruction
Week 11	Stack register , stack area and related instructions
Week 12	Branching instruction
Week 13	Delay and counters
Week 14	Interrupt concept and types
Week 15	Subroutine

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to microprocessor kit
Week 2	Lab 2: key function definition, read/write memory location, read/write registers
Week 3	Lab 3: Data transfer instructions
Week 4	Lab 4: Arithmetic instructions
Week 5	Lab 5: logical instruction
Week 6	Lab 6: Stack instructions
Week 7	Lab 7: Branching instruction

Learning and Teaching Resources

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
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, 10	LO #1- 6, LO #8-11
	Assignments	4	10% (10)	Continuous	
	Projects / Lab.	5	10% (10)	Continuous	
	Report	2	10% (10)	7,10	LO #1- 6, LO # 8-11
Summative assessment	Midterm Exam	2 hr	10% (10)	6	LO # 1-6
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	8085 μ p architecture and programming_Gonkar	Yes
Recommended Texts	UNDERSTANDING 8085/8086 MICROPROCESSORS and PERIPHERAL ICs	no
Websites	https://www.coursera.org/browse/physical-science-and-engineering/electrical-engineering	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Analog Communications		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET2204		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Hamood Shehab Hamid	e-mail	drhamood@mtu.edu.iq
Module Leader's Acad. Title	ASSt.Professor	Module Leader's Qualification	Ph.D.
Module Tutor	Tariq Ziad Qasim	e-mail	tariqk2011@gmail.com
Peer Reviewer Name	Alhamzah Taher Mohammed	e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	Version Number	1.0
Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CET2105	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. Understanding the modulation and de-modulation 2. Viewing and knowledge Amplitude modulation and Frequency modulation. 3. Analyzing the advantage and disadvantage of AM over FM. 4. Analyzing the generation and detection each of AM and FM. 5. To develop problem solving skills and understanding of PM equations
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Recognize Basic Principles of modulation and de-modulation 2. Explain the Need for Modulation. 3. Define a Carrier Wave, Radio Frequency Spectrum, Sound and Radio Broadcasting 4. Identify Amplitude Modulation, Percent Modulation, Upper and Lower Sidebands 5. Explain Methods of Modulation. 6. Mathematical Analysis of a Modulated Carrier Wave 7. Discuss forms of Amplitude Modulation and Methods of Amplitude Modulation. 8. Describe the Power Relation in an AM Wave. 9. Identify modulating Amplifier Circuit: AM- Transmitter & Radio Receiver Essential Parameter 10. Explain the AM generation of SSB, DSB-SC balanced modulators (Cowan & Ring). 11. Summarize various demodulation type of AM Signal: AM-Detector (Envelope & Synchronous) 12. Identify the Frequency Modulation Process: Modulation Index, Deviation Ratio, Percent Modulation and FM Sidebands. 13. Discuss the relationship between the modulation index and number of sidebands. 14. List the various types of generation of FM (the direct method and indirect method) & demodulation or detection. 15. Identify the comparison between AM and FM. 16. Discuss Principles of FM Receiver: FM Discriminator (Foster –Seeley & Ratio Detector). 17. Explain the Phase modulation (PM) Definition. 18. Discuss the PM equation and PM wave forms
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>Part A –MODULATION AND DEMODULATION: Need for Modulation,. Define a Carrier Wave, Radio Frequency Spectrum, Sound and Radio</p>

	<p>Broadcasting. (20 hr)</p> <p>Part B- Amplitude Modulation: Percent Modulation, Upper and Lower Sidebands , Methods of Modulation , Mathematical Analysis of a Modulated Carrier Wave, forms of Amplitude Modulation and Methods of Amplitude Modulation. Power Relation in an AM Wave,. Identify modulating Amplifier Circuit: AM- Transmitter & Radio Receiver Essential Parameter, The AM generation of SSB, DSB-SC balanced modulators (Cowan & Ring), demodulation type of AM Signal: AM-Detector (Envelope & Synchronous) (30hr)</p> <p>Part C Frequency Modulation Process: Modulation Index, Deviation Ratio, Percent Modulation and FM Sidebands, the relationship between the modulation index and number of sidebands, generation of FM (the direct method and indirect method) & demodulation or detection, the comparison between AM and FM, FM Receiver :FM Discriminator (Foster –Seeley & Ratio Detector), the Phase modulation (PM) Definition and the PM equation and PM wave forms.(24 hr)</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1-6 , LO #6-11
	Assignments	2	10% (10)	2, 12	LO # 1,2 , LO #3-11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 1-14
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-8
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	MODULATION AND DEMODULATION: Forms of Amplitude Modulation , Methods of Amplitude Modulation
Week 2	Carrier Wave, Radio Frequency Spectrum, Sound, Radio Broadcasting
Week 3	Need for Modulation,
Week 4	Methods of Modulation:
Week 5	Amplitude Modulation Percent Modulation, Upper and Lower Sidebands,
Week 6	Mathematical Analysis of a Modulated Carrier Wave. Power Relation in an AM Wave,
Week 7	Midterm Exam
Week 8	Modulating Amplifier Circuit: AM- Transmitter
Week 9	Radio Receiver Essential Parameter
Week 10	Generation of SSB, DSB-SC Balanced Modulators :(Cowan & Ring) Demodulation of AM Signal: AM-Detector (Envelope & Synchronous
Week 11	Frequency Modulation: Modulation Index, Deviation Ratio , Percent Modulation, FM Side bands FM Receiver :FM Discriminator (Foster –Seeley &Ratio Detector),
Week 12	Modulation Index and Number of Side bands, Demodulation or Detection, Comparison between AM and FM, The Four Fields of FM
Week 13	FM Generation (Direct& Indirect Method)
Week 14	Phase modulation (PM) Definition
Week 15	PM equation and PM wave forms

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Methods of Modulation Process and why modulation
Week 2	Lab2: Demodulation methods Process and detection.
Week 3	Lab 3:Methods of Amplitude Modulation
Week 4	Lab4: Calculating the time and a frequency of carrier wave
Week 5	Lab 5: Calculating of Index Modulation AM and Percent Modulation.
Week 6	Lab 6:Calculating of Upper and Lower Side bands frequencies of AM
Week 7	Lab 7: Modulation AM wave.
Week 8	Lab 8:Calculating power content of AM
Week 9	Lab 9: DE-modulation wave of AM
Week 10	Lab 10:Frequency modulation Process
Week 11	Lab 11:Calculating the maximum and minimum frequency
Week 12	Lab 12: Calculating carrier frequency of FM
Week 13	Lab 13: Index Modulation and Percent Modulation of FM
Week 14	Lab 14: Modulation wave of FM
Week 15	Lab 15: De-Modulation wave of FM

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Principles of Communication Systems By J.S.Chitode, First Edition-2007 Modern Digital and Analog Communication Systems ,By B.P.Lathi OXFORD	Yes
Recommended Texts	Analog and Digital Communications, By Schaum Second Edition Data Communications and Networking, By Behrouz A. Forouzan, Fifth Edition	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Advanced Engineering Mathematics		Module Delivery	
Module Type	S		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input checked="" type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CET2201			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	2	Semester of Delivery		Four
Administering Department	CET	College	EECT	
Module Leader	Hala A. Hashim		e-mail	hala.solomon@gmail.com
Module Leader's Acad. Title	Assistant Lecturer		Module Leader's Qualification	M.Sc.
Module Tutor	Saad Mohameed Abd Taima		e-mail	asaadde2018@gmail.com
Peer Reviewer Name	Asst. Prof. Alhamzah Taher Mohammed		e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	Version Number	1.0	

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CET2101	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To develop problem solving skills complex analysis.2. To understand power series.3. To the way around Fourier series.4. To get the grip on using Laplace transform.5. To develop a good understanding of ODEs.6. This course deals with Advanced Engineering Mathematics.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Describe Complex environment.2. Discuss derivative of Analytic Function.3. Describe Exponential, Trigonometric and Hyperbolic Functions.4. Explain Line Integral in the Complex Plane and Cauchy's Integral Formula.5. Using power Series and how to expand a function6. Identify elements of Fourier Series.7. Identify elements of Laplace Transform.8. Discuss different aspects of First-Order ODEs.9. Identify Bernoulli Equation and Population Dynamics.10. Discuss different aspects of Second-Order Linear ODEs.11. Using Variation of Parameters.12. Discuss different aspects of Higher Order Linear ODEs.13. Using Power Series to solve ODE.14. Explain Fourier Series solution of ODE.15. Discuss Laplace Transform solution of ODE.
<p>Indicative Contents المحتويات الإرشادية</p>	<p><u>Part A – Complex Analysis.</u></p> <p>This part includes Complex Numbers. Polar Form of Complex Numbers. Powers and Roots. Complex variables. Complex Function. Derivative. Analytic Function. Cauchy–Riemann and Laplace's Equation. Exponential, Trigonometric and Hyperbolic Functions. Euler's Formula. Logarithm. Line Integral in the Complex Plane. Cauchy's Integral Formula. Derivatives of Analytic Functions. [12 hrs] + Revision problem classes in weekly tutorials [4 hrs]</p>

	<p><u>Part B – Preliminaries to Methods of solving ODE.</u></p> <p>This part includes Power Series. Functions Given by Power Series. Fourier Series. Arbitrary Period. Even and Odd Functions. Fourier Analysis for Periodic Functions. Fourier series Formula of a function. Differentiation and Integration of Fourier Series Laplace Transform. Transforms of Derivatives and Integrals. Table of Laplace Transforms. inverse Laplace transform [9 hrs] + Revision problem classes in weekly tutorials [3 hrs]</p> <p><u>Part C – ODE.</u></p> <p>This part includes First-Order ODEs. Separable ODEs. Exact ODEs. Integrating Factors. Linear ODEs. Bernoulli Equation. Population Dynamics. Second-Order Linear ODEs. Homogeneous. Homogeneous with Constant Coefficients. Nonhomogeneous ODEs. Solution by Variation of Parameters. Higher Order Linear ODEs. Homogeneous Linear ODEs. Homogeneous Linear ODEs with Constant Coefficients. Nonhomogeneous Linear ODEs. Power Series solution of ODE. Fourier Series solution of ODE. Laplace Transform solution of ODE. [24 hrs] + Revision problem classes in weekly tutorials [8 hrs]</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	This module will primarily focus on encouraging students to participate in the activities, as well as refining and developing their critical thinking skills. This will be achieved through lectures, tutorials, discussions, and grading activities.
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Student Workload (SWL)

الحمل الدراسي للطالب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1-4, LO #5-9
	Assignments	2	20% (10)	3, 11	LO # 1,2 , LO# 3-10
	Projects / Lab.	N/A			
	Report	1	10% (10)	Continuous	LO#1-14
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Complex Numbers. Polar Form of Complex Numbers. Powers and Roots. Complex variables.
Week 2	Complex Function. Derivative. Analytic Function. Cauchy–Riemann and Laplace’s Equation.
Week 3	Exponential, Trigonometric and Hyperbolic Functions. Euler’s Formula. Logarithm.
Week 4	Line Integral in the Complex Plane. Cauchy’s Integral Formula. Derivatives of Analytic Functions
Week 5	Power Series. Functions Given by Power Series.
Week 6	Fourier Series. Arbitrary Period. Even and Odd Functions. Fourier Analysis for Periodic Functions. Fourier series Formula of a function. Differentiation and Integration of Fourier Series
Week 7	Laplace Transform. Transforms of Derivatives and Integrals. Table of Laplace Transforms. inverse Laplace transform
Week 8	Midterm Exam
Week 9	First-Order ODEs. Separable ODEs. Exact ODEs. Integrating Factors. Linear ODEs. Bernoulli Equation. Population Dynamics.
Week 10	Second-Order Linear ODEs. Homogeneous. Homogeneous with Constant Coefficients.
Week 11	Nonhomogeneous ODEs. Solution by Variation of Parameters.
Week 12	Higher Order Linear ODEs. Homogeneous Linear ODEs. Homogeneous Linear ODEs with Constant Coefficients. Nonhomogeneous Linear ODEs.
Week 13	Power Series solution of ODE.
Week 14	Fourier Series solution of ODE.
Week 15	Laplace Transform solution of ODE.

Delivery Plan (Weekly Tutorial)

المنهاج الاسبوعي الاضافي

Material Covered

Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	"Advanced Engineering Mathematics ", Erwin Kreyszig, Wiley, 10th edition (August 16, 2011), ISBN-13: 978-0470458365.	Yes
Recommended Texts	"Differential Equations for Engineers and Scientists", Yunus Cengel, William Palm, McGraw Hill, 1st edition (January 31, 2012), ISBN-13: 978-0073385907.	No
Websites	https://www.coursera.org/learn/differential-equations-engineers	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Python Programming		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input checked="" type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	MIET3206		
ECTS Credits	4		
SWL (hr/sem)	100		
Module Level	UGIII	Semester of Delivery	S-6
Administering Department	MIET	College	EETC
Module Leader	Osama Abbas Hussein	e-mail	Osama.abbas@mtu.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Mohammed Sadiq Maky	e-mail	
Peer Reviewer Name	Dr.Aws Alazawi	e-mail	aws_basil@mtu.edu.iq
Scientific Committee Approval Date	13/10/2025	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

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. Introduce students to the fundamental concepts and principles of Python programming language.2. Develop students' proficiency in writing Python code and solving programming problems.3. Familiarize students with essential programming constructs, such as variables, data types, control flow structures, and functions.4. Provide students with a solid foundation in object-oriented programming (OOP) and its application in Python.5. Enable students to work with various data structures and perform operations on them.6. Prepare students for practical application of Python in real-world scenarios, such as data manipulation, web scraping, and GUI development.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Understand the fundamentals of Python programming language, including variables, data types, and basic operators.2. Demonstrate proficiency in control flow structures, such as conditional statements and loops, to control program execution.3. Develop functions and utilize function arguments to enhance code modularity and reusability.4. Utilize exception handling techniques to effectively manage errors and ensure program robustness.5. Gain familiarity with modules and packages to leverage existing code and extend Python's functionality.6. Understand object-oriented programming (OOP) concepts and apply them to create classes, objects, and inheritance hierarchies.7. Manipulate strings, lists, dictionaries, and sets to efficiently store and retrieve data.8. Perform file handling operations, including reading from and writing to files.9. Apply Python to practical tasks, such as web scraping, data manipulation, and analysis.10. Demonstrate proficiency in working with files and directories, including navigating file systems and managing file permissions.11. Develop graphical user interfaces (GUIs) using Python libraries to create interactive applications.12. Prepare for exams by reviewing course materials, practicing exercises, and answering sample questions.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A: Introduction to Python and Basic Concepts (Estimated time: 10 hours)</u></p> <p>Overview of Python programming language</p> <p>Installation and setup</p> <p>Variables and data types</p>

	<p>Basic operators</p> <p>Input and output operations</p> <p><u>Part B: Control Flow and Functions (Estimated time: 10 hours)</u></p> <p>Conditional statements (if, else, elif)</p> <p>Loops and iterations (for loop, while loop)</p> <p>Functions and function arguments</p> <p>Recursion</p> <p><u>Part C: Data Structures and File Handling (Estimated time: 10 hours)</u></p> <p>Strings and string manipulation</p> <p>Lists and list manipulation</p> <p>Dictionaries and sets</p> <p>File handling and input/output operations</p> <p><u>Part D: Advanced Topics (Estimated time: 15 hours)</u></p> <p>Exception handling and error management</p> <p>Modules and packages</p> <p>Object-oriented programming (OOP) concepts</p> <p>Classes, objects, inheritance, and polymorphism</p> <p><u>Part E: Applications and Practical Projects (Estimated time: 15 hours)</u></p> <p>Working with files and directories</p> <p>GUI programming</p> <p>Web scraping</p> <p>Data manipulation and analysis</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>Effective learning and teaching strategies involve creating an engaging and interactive learning environment. This can be achieved through a combination of various approaches, such as incorporating active learning techniques like group discussions, problem-solving activities, and hands-on experiments. Additionally, employing visual aids, multimedia resources, and real-world examples can enhance comprehension and retention. Encouraging student participation and providing timely feedback also play vital roles in fostering student engagement and understanding. It is important to promote a growth mindset, encourage critical thinking, and create opportunities for collaboration and peer learning. By employing these strategies, educators can facilitate</p>

meaningful learning experiences and empower students to become active participants in their own learning journey.

Student Workload (SWL)

الحمل الدراسي للطالب

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	5
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	21	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	100		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Python, Variables, Data Types, and Basic Operators
Week 2	Control Flow and Conditional Statements
Week 3	Loops and Iterations
Week 4	Strings and String Manipulation
Week 5	Lists and List Manipulation
Week 6	Dictionaries and Sets
Week 7	Midterm Exam
Week 8	Functions and Function Arguments
Week 9	File Handling and Input/Output Operations
Week 10	Exception Handling and Error Management
Week 11	Modules and Packages
Week 12	Object-Oriented Programming (OOP) Concepts
Week 13	Classes and Objects
Week 14	Inheritance and Polymorphism
Week 15	Working with Files and Directories
Week 16	Preparatory Week for Final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Introduction to Python, Variables, and Basic Operators
Week 2	Control Flow and Conditional Statements
Week 3	Loops and Iterations
Week 4	Strings and String Manipulation
Week 5	Lists and List Manipulation
Week 6	Dictionaries and Sets
Week 7	Midterm Exam (No lab session).
Week 8	Functions and Function Arguments
Week 9	File Handling and Input/Output Operations
Week 10	Exception Handling and Error Management
Week 11	Modules and Packages
Week 12	Object-Oriented Programming (OOP) Concepts
Week 13	Classes and Objects
Week 14	Inheritance and Polymorphism
Week 15	Working with Files and Directories
Week 16	Final Exam (No lab session).

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Title: "Python Crash Course: A Hands-On, Project-Based Introduction to Programming" Author: Eric Matthes	
Recommended Texts	Title: "Learning Python" Author: Mark Lutz	No
Websites	URL: https://realpython.com	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Electronic Circuits		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CET2205			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	2	Semester of Delivery		4
Administering Department	CET	College	EETC	
Module Leader	Rawaa Abdulridha Kadhim		e-mail	Rawaa84ha@mtu.edu.iq
Module Leader's Acad. Title	lecturer		Module Leader's Qualification	MSc.
Module Tutor	Rouad Iqaab Salih		e-mail	rawad.o.hamdan@nust.edu.iq
Peer Reviewer Name	Dr. Osama Abbas Hussein		e-mail	osama.abbas@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025		Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CET2104	Semester	3
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. This course deals with Third semiconductor or device, FET physical construction, biasing, configuration s , output and transfer characteristics2. To understand the D.C biasing of BJT and circuit types , analysis and calculations of FET parameters3. To understand and construct re FET modeling, and circuits analysis4. To deal with small signal analysis of FET5. Deals with Depletion-Type MOSFET , and Enhancement-Type MOSFETs and Combination ,and Design6. Deals with Operational amplifiers (OP_AMP) their advantages, classifications and types and application circuits
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. To understand and discuss the third semiconductor device which is Transistor (Field Effect Transistor)(FET), Construction and Characteristics of JFETs2. To Identify and Calculate And implement Transfer Characteristics of FET3. To Identify and discuss Important Relationships 227 5.7 Depletion-Type MOSFET 228 5.8 Enhancement-Type MOSFET , MOSFET Handling , VMOS CMOS4. To implement and solve FET DC biasing and circuits analysis Fixed-Bias Configuration Self-Bias Configuration Voltage-Divider Biasing, implementations5. To understand Depletion-Type MOSFETs Enhancement-Type MOSFETs6. To identify and implement Combination Networks , Design P-Channel FETs Universal JFET Bias Curve .7. To understand FET small signal Model,8. To Identify, Calculate and analyses JFET Fixed-Bias Configuration , JFET Self-Bias Configuration , JFET Voltage-Divider Configuration ,9. To understand JFET Source-Follower (Common-Drain) Configuration , JFET Common-Gate Configuration ,10. To identify Depletion-Type MOSFETs, Enhancement-Type MOSFETs E-MOSFET Drain-Feedback Configuration,11. To Understand and implement E-MOSFET Voltage-Divider Configuration, Designing FET Amplifier Networks.12. To understand and identify Operational amplifiers (Introduction) , Differential and Common-Mode Operation13. To understand Op-Amp, Practical Op-Amp Circuits , and Op-Amp Specifications14. To identify DC Offset Parameters, Op-Amp Specifications and Frequency Parameters15. To understand and identify OP AMP applications circuits.

	<p>16. To Analyze, calculate and implement Constant-Gain Multiplier, Voltage Summing , Voltage Buffer, Controller Sources Instrumentation Circuits ,and Active Filters</p>
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>1. FET (Field Effect Transistor) (FET), Construction and Characteristics of JFETs, Transfer Characteristics of FET , Important Relationships Depletion-Type MOSFET Enhancement-Type MOSFET , MOSFET Handling , VMOS CMOS [8hrs] .</p> <p>FET D.C. biasing and circuits analysis Fixed-Bias Configuration, Self-Bias Configuration , and Voltage-Divider Biasing, implementations [8 hrs]</p> <p>Depletion-Type MOSFETs Enhancement-Type MOSFETs, Combination Networks , Design, and P-Channel FETs Universal JFET Bias Curve [10hrs].</p> <p>FET small signal Model, JFET Fixed-Bias Configuration , JFET Self-Bias Configuration , JFET Voltage-Divider Configuration [8hrs].</p> <p>JFET Source-Follower (Common-Drain) Configuration , JFET Common-Gate Configuration , Depletion-Type MOSFETs , Enhancement-Type MOSFETs E-MOSFET Drain-Feedback Configuration, Voltage-Divider Configuration ,and Designing FET Amplifier Networks . [12hrs]</p> <p>2. Operational amplifiers (OP_AMPS)</p> <p>Operational amplifiers (Introduction) , Differential and Common-Mode Operation Op-Amp introduction , Practical Op-Amp Circuits , and Op-Amp Specifications DC Offset Parameters , Op-Amp Specifications and Frequency Parameters [8 hrs]</p> <p>OP AMP applications circuits Constant-Gain Multiplier , Voltage Summing , Voltage Buffer, Controller Sources Instrumentation Circuits ,and Active Filters[6 hrs]</p>

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

Student Workload (SWL)

الحمل الدراسي للطالب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10,	LO # 1-6 , LO # 6-11
	Assignments	2	10% (10)	5, 10	LO # 1-4, LO # 5-9
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 1-12
Summative assessment	Midterm Exam	2 hr	10% (10)	9	LO #1-10
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction ,Field effect transistor FET, Introduction , CONSTRUCTION AND CHARACTERISTICS
Week 2	TRANSFER CHARACTERISTICS, Applying Shockley's Equation, and short hand method
Week 3	DEPLETION-TYPE MOSFET, Basic Construction, c Operation and Characteristics
Week 4	p-Channel Depletion-Type MOSFET, ENHANCEMENT-TYPE MOSFET, Basic construction
Week 5	Enhancement MOSEFET Basic Operation and Characteristics, MOSFET HANDLING
Week 6	FET DC. Biasing , FIXED-BIAS CONFIGURATION,
Week 7	FET SELF-BIAS CONFIGURATION, VOLTAGE-DIVIDER BIASING
Week 8	DEPLETION-TYPE MOSFETs, ENHANCEMENT-TYPE MOSFETs. DESIGN
Week 9	Midterm Exam
Week 10	FET SMALL-SIGNAL MODEL, Graphical Determination of gm, Mathematical Definition of gm
Week 11	FET AC Equivalent Circuit, JFET VOLTAGE-DIVIDER CONFIGURATION, JFET SOURCE-FOLLOWER (COMMON-DRAIN) CONFIGURATION,
Week 12	JFET COMMON-GATE CONFIGURATION, DEPLETION-TYPE MOSFETs, ENHANCEMENT-TYPE MOSFETs
Week 13	Operational amplifier, DIFFERENTIAL AND COMMONMODE OPERATIO, OP-AMP BASICS
Week 14	Operational amplifier applications
Week 15	Operational amplifier applications
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction
Week 2	Lab 2: Clampers
Week 3	Lab 3 Input characteristic of CBC BJT
Week 4	Lab 4 output characteristic of CBC BJT
Week 5	Lab 5: Input characteristic of CEC BJT
Week 6	Lab 6: output characteristic of CEC BJT
Week 7	Lab 7:review

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electronic devices and circuit theory Poylested	Yes
Recommended Texts		No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Instrumentation and Measurement		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET2206		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	2	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Omar Nameer M. Salim	e-mail	omarnmsalim@mtu.edu.iq
Module Leader's Acad. Title	Assoc. Professor.	Module Leader's Qualification	M.Sc.
Module Tutor	Kadhim Fakhir Oudah	e-mail	Kazemoda75@gmail.com
Peer Reviewer Name	Alhamzah Taher Mohammed	e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	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

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. Identify and analyze factors affecting the performance of measuring systems and errors types and cause 2. Understand voltage and current measurements from a given circuit. 3. Choose appropriate instruments for the measurement of voltage, and current in ac and dc measurements 4. Describe the operating principle of DC and AC bridges 5. Identify Oscilloscopes, signal generators, and transducers
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Explain the static characteristics of measuring systems. 2. Discuss problems related to measurement errors. 3. Explain the construction and working indicating Instruments. 4. Explain the principle of operation of the galvanometer. 5. Discuss the DC bridges- Wheatstone Bridge, Kelvin Bridge 6. Discuss the AC bridges, Capacitance Comparison Bridges, Maxwell's Bridge, Wein's bridge 7. Explain the Design of DC voltmeter and ammeter. 8. Describe Cathode Ray Tube Oscilloscope. 9. Identify High Bandwidth Digital Storage Oscilloscope. 10. Identify Spectrum Analyzer and BER Tester 11. Discuss Signal Generator. 12. Identify Arbitrary Waveform Generator 13. Explain Transducers.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Measurement and Error Analysis</u></p> <p>Basics of Measurements, Accuracy, Precision, Resolution, Gross errors and systematic errors, Absolute and relative errors, Accuracy, Precision, Resolution, and significant figures, standard of measurements [24 hrs.]</p> <p><u>Part B – Measuring Instruments</u></p> <p>Measurement of resistance, inductance, and capacitance Whetstone's Bridge, Kelvin Bridge; AC bridges, Capacitance Comparison Bridge, Maxwell's Bridge, Wein's Bridge, [9 hrs].</p> <p>Voltmeters and Ammeters Introduction, voltmeter, Multirange voltmeter, ammeter, Multirange ammeter Extending voltmeter and ammeter ranges [11hrs]</p>

	<p>Introduction Oscilloscopes, Basic principles, CRT features, Block diagram and working of each block High Bandwidth Digital Storage Oscilloscope-Spectrum Analyzer -BER Tester [8 hrs]</p> <p>Introduction Signal Generators, Fixed and variable AF oscillator, Standard signal generator Arbitrary Waveform Generator. [4 hrs]</p> <p>Introduction Transducers, Electrical transducers, Selecting a transducer, Resistive transducer [2 hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>lecture and seminars will be used to explain the theory and principles of the module. Also, laboratory reports and mini-projects will be used. Quantitative instruments such as pre-test and post-test will be used to check students' conceptual knowledge of electrical measurement after the theory lecture or laboratories work. Video will be used to explain the electrical measurement instruments. Observation form and laboratory rubric will be used to analyze the skills of the students. The observer comments from the laboratory staff on student skills will be classified according to thematic analysis to evaluate students learned skills.</p>

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
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% (5)	3, 12	LO #1, 2, LO # 3-11
	Assignments	2	10% (5)	5, 10	LO # 1-4, LO # 5-9
	Project / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 1- 12
Summative assessment	Midterm Exam	2 hr	10% (20)	9	LO # 1-7
	Final Exam	4 hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction - System of Units- Basics of Measurements
Week 2	Accuracy, Precision, Resolution
Week 3	Reliability, Repeatability, Validity
Week 4	Types of Errors
Week 5	Errors analysis
Week 6	Standard of Measurements
Week 7	Bridge Measurement .DC bridges- Wheatstone Bridge, Kelvin Bridge
Week 8	AC bridges, Capacitance Comparison Bridges, Maxwell's Bridge, Wein's bridge
Week 9	Midterm Exam
Week 10	Measuring of Basic Electrical Parameters- DC Voltmeter
Week 11	DC Ammeter- Extension of DC Voltmeter and Ammeter Range
Week 12	Cathode Ray Tube Oscilloscope
Week 13	High Bandwidth Digital Storage Oscilloscope- Spectrum Analyzer -BER Tester
Week 14	Signal Generator - Arbitrary Waveform Generator
Week 15	Transducers

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Galvanometer – sensitivity of Galvanometer
Week 2	Lab 2: measurement of DC current
Week 3	Lab 3: measurement of DC voltage
Week 4	Lab 4: measurement of AC current
Week 5	Lab 5: measurement of AC Voltage
Week 6	Lab 6: loading effect on the voltmeter
Week 7	Lab 7: Wheatstone Bridge
Week 8	Lab 8: Maxwell's Bridge
Week 9	Lab 9: Mid-term Exam
Week 10	Lab 10: DC Voltmeter Design
Week 11	Lab 11: DC Ammeter Design
Week 12	Lab 12: Oscilloscope and frequency measurement
Week 13	Lab 13: Project Discussion
Week 14	Lab 14: A preparatory week before the Final Exam
Week 15	Lab 15: Final Exam

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Electronic Instrumentation and Measurements , David A Bell, PHI / Pearson Education.	Yes
Recommended Texts	“Principles of measurement systems” , John P. Beatly, Pearson Education. Modern electronic instrumentation and measuring techniques , Cooper D & A D Helfrick, PHI	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

Module Information			
Module Title	Arabic Language	Module Delivery	
Module Type	Basic	<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	MTU1009		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	UGII	Semester of Delivery	1
Administering Department	MIET	College	EETC
Module Leader	Maysaa Mahmood	e-mail	
Module Leader's Acad. Title		Module Leader's Qualification	
Module Tutor	Hamid Hannoun is pleased	e-mail	yaserhameed37@gmail.com
Peer Reviewer Name		e-mail	
Scientific Committee Approval Date	08/11/2025	Version Number	1.0

Relation with other Modules			
Prerequisite module	None	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

<p>Module Aims</p>	<p>أهداف المادة الدراسية هي اني يكون الطالب قادراً على أن :</p> <ol style="list-style-type: none"> 1. يتعرف على أنواع الأخطاء اللغوية المشتركة وتوضيح أسبابها وكيفية تجنبها. 2. يتعلم القواعد المتعلقة بالتاء المربوطة والطويلة والتاء المفتوحة وكيفية كتابتها بشكل صحيح. 3. يتعلم قواعد كتابة الألف الممدودة والمقصورة واستخدام الحروف الشمسية والقمرية بشكل صحيح. 4. التعرف على الضاد والطاء ومعرفة كيفية التمييز بينهما في الكتابة. 5. يتعلم طرق كتابة الهمزة بشكل صحيح وفقاً للقواعد اللغوية. 6. التعرف على علامات الترقيم واستخدامها بشكل صحيح في النصوص. 7. يفهم الفروق بين الاسم والفعل والتمييز بينهما في الجمل. 8. يفهم المفاعيل وكيفية استخدامها بشكل صحيح في النصوص. 9. يتعلم الأرقام والعدد واستخدامها في التعبير عن الكميات. 10. يتجنب الأخطاء اللغوية الشائعة في سياقات عملية لتعزيز فهم القواعد وتحسين المهارات اللغوية. 11. يدرس النون والتنوين وفهم معاني حروف الجر واستخدامها بشكل صحيح في الجمل. 12. يركز على الجوانب الشكلية للخطاب الإداري وكيفية كتابته بأسلوب صحيح ومناسب. 13. التعرف على لغة الخطاب الإداري وفهم استخدامها في التواصل الإداري. 14. يفهم نماذج من المراسلات الإدارية لتطبيق المفاهيم والمهارات المكتسبة في الخطاب الإداري.
<p>Module Learning Outcomes</p>	<p>مخرجات التعلم للمادة الدراسية هي:</p> <ol style="list-style-type: none"> 1. قدرة الطلاب على تحليل وتعريف الأخطاء اللغوية المشتركة وتطبيق القواعد الصحيحة لتجنبها. 2. القدرة على استخدام القواعد اللغوية المتعلقة بالتاء المربوطة والطويلة والتاء المفتوحة بشكل صحيح. 3. قدرة الطلاب على استخدام الألف الممدودة والمقصورة بشكل صحيح واستخدام الحروف الشمسية والقمرية بطريقة صحيحة. 4. تمكن الطلاب من التمييز بين الضاد والطاء وتطبيق القواعد الصحيحة في الكتابة. 5. القدرة على كتابة الهمزة بشكل صحيح وفقاً للقواعد اللغوية. 6. استخدام علامات الترقيم بشكل صحيح في النصوص المكتوبة. 7. فهم الطلاب للفروق بين الاسم والفعل وتمكينهم من استخدامها بشكل صحيح في الجمل. 8. القدرة على استخدام المفاعيل بشكل صحيح في النصوص المكتوبة. 9. استخدام الأرقام والعدد بطريقة صحيحة للتعبير عن الكميات. 10. التمكن من تطبيق الأخطاء اللغوية الشائعة في سياقات عملية وتصحيحها بشكل مناسب. 11. فهم استخدام النون والتنوين ومعاني حروف الجر واستخدامها بشكل صحيح في الجمل. 12. القدرة على كتابة الخطاب الإداري بأسلوب صحيح ومناسب وفهم لغة الخطاب الإداري. 13. تطبيق المفاهيم والمهارات المكتسبة في كتابة المراسلات الإدارية بشكل صحيح وفعال.
<p>Indicative Contents</p>	<p>المحتويات الإرشادية في مادة اللغة تشمل مجموعة من المفاهيم والمواضيع التي يتم تغطيتها خلال عملية التعلم. ومن بين المحتويات الإرشادية المهمة:</p> <ol style="list-style-type: none"> 1. مقدمة عن الأخطاء اللغوية والتعريف بالتاء المربوطة والتاء المطولة والتاء المفتوحة. (3 ساعات) 2. قواعد كتابة الألف الممدودة والمقصورة والتعرف على الحروف الشمسية والقمرية. (3 ساعات) 3. دراسة الضاد والطاء وتعلم طرق كتابتهما بشكل صحيح. (3 ساعات) 4. تعلم كتابة الهمزة بشكل صحيح وفقاً للقواعد اللغوية. (3 ساعات) 5. دراسة علامات الترقيم وتعلم استخدامها بشكل صحيح في النصوص اللغوية. (3 ساعات) 6. التعرف على الاسم والفعل والتفريق بينهما وفهم القواعد المتعلقة بهما. (3 ساعات) 7. دراسة المفاعيل وتعلم استخدامها في الجمل اللغوية. (3 ساعات) 8. التعرف على الأعداد واستخدامها بشكل صحيح في العبارات والجمل. (3 ساعات) 9. دراسة الأخطاء اللغوية الشائعة وتطبيقاتها في النصوص اللغوية. (3 ساعات)

	<p>10. تعلم استخدام النون والتنوين وفهم معاني حروف الجر واستخدامها بشكل صحيح في الجمل. (2 ساعات)</p> <p>11. التعرف على الجوانب الشكلية للخطاب الإداري وفهم لغته وقواعده. (2 ساعات)</p> <p>12. دراسة نماذج من المراسلات الإدارية وتطبيقها في الكتابة. (2 ساعات)</p> <p>توفر هذه المحتويات الإرشادية للطلاب فهمًا شاملاً للمفاهيم اللغوية وتعلم القواعد والتطبيقات العملية التي تساعدهم في تطوير مهاراتهم اللغوية.</p>
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Learning and Teaching Strategies

Strategies	<p>استراتيجيات التعلم والتعليم المستخدمة في مادة اللغة تشمل مجموعة متنوعة من النهج والتقنيات التي تعزز عملية التعلم للطلاب. من بين هذه الاستراتيجيات:</p> <ol style="list-style-type: none"> 1. التفاعل النشط: يتم تشجيع الطلاب على المشاركة والمشاركة الفعالة في الدروس من خلال المناقشات الجماعية والأنشطة التفاعلية. 2. التعلم التعاوني: يشجع التعاون والتعاون بين الطلاب من خلال العمل الجماعي والمشاريع الجماعية، حيث يتعاون الطلاب مع بعضهم البعض لتحقيق أهداف التعلم المحددة. 3. التطبيق العملي: يتم توفير فرص للطلاب لتطبيق المفاهيم والمهارات المكتسبة في سياقات عملية وواقعية، مما يعزز التفاعل الفعال مع المادة. 4. استخدام التقنيات الحديثة: يستفيد الطلاب من استخدام التكنولوجيا في عملية التعلم، مثل استخدام الحواسيب والإنترنت للبحث والتعلم الذاتي. 5. توفير ردود فعل فورية: يتم توفير ردود فعل فورية وتقييم مستمر للطلاب، سواء عن طريق التقييمات الشفهية أو الكتابية، مما يساعدهم على تحسين أدائهم وتطوير مهاراتهم. 6. التنوع في وسائل التواصل: يتم استخدام مجموعة متنوعة من وسائل التواصل والتعليم، مثل المحاضرات التوضيحية، والمناقشات الجماعية، والأنشطة العملية، والعروض التقديمية، لتلبية احتياجات وأساليب التعلم المختلفة للطلاب. 7. باستخدام هذه الاستراتيجيات، يتم تعزيز التفاعل والتعلم الفعال للطلاب، و 8. تحفيزهم على المشاركة واكتساب المعرفة والمهارات بشكل شامل وشيق.
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Student Workload (SWL)

Structured SWL (h/sem)	33	Structured SWL (h/w)	2
Unstructured SWL (h/sem)	17	Unstructured SWL(h/w)	1
Total SWL (h/sem)	50		

Module Evaluation					
		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	3	15% (15)	5, 10,13	LO #1, 5 and 11
	Assignments	3	15% (15)	2, 11,14	LO # 3, 6 and 12
	Projects / Lab.				
	Report	1	10% (10)	14	LO # 1-13
Summative assessment	Midterm Exam	2 hours	10% (10)	7	LO # 1-7
	Final Exam	3 hours	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)		
1-8	مقدمة عن الأخطاء اللغوية – التاء المربوطة والطويلة والتاء المفتوحة	الأسبوع الأول
9-14	قواعد كتابة الالف الممدودة والمقصورة – الحروف الشمسية والقمرية	الأسبوع الثاني
15-19	الضاد والظاء	الاسبوع الثالث
20-30	كتابة الهمزة	الأسبوع الرابع
31-36	علامات الترقيم	الأسبوع الخامس
37-44	الاسم والفعل والتفريق بينهما	الأسبوع السادس
45-50	المفاعيل + العدد	الأسبوع السابع
51-61	امتحان منتصف الفصل الدراسي	الأسبوع الثامن
62-69	تطبيقات الأخطاء اللغوية الشائعة	الأسبوع التاسع والعاشر
70-75	النون والتنوين - معاني حروف الجر	الاسبوع الحادي عشر
76-80	الجوانب الشكلية للخطاب الإداري	الاسبوع الثاني عشر
81-86	لغة الخطاب الإداري + نماذج من المراسلات الإدارية	الأسبوع الثالث عشر والرابع عشر
	الاستعداد للامتحان النهائي	الأسبوع الخامس عشر

Learning and Teaching Resources		
	Text	Available in the Library?

Required Texts	- اخطاء لغوية شائعة ، تأليف: خالد بن هلال بن ناصر العنبري مكتبة: الجيل الواحد الطبعة الاولى. ٢-قواعد الاملاء وعلامات الترقيم ، تأليف : عبد السلام هارون، تحقيق: نبيل عبد السلام هارون، دار الكتب العلمية ، الطبعة الاولى ، ٢٠٠٥.	Yes
Recommended Texts	أقسام الكلام العربي من حيث الشكل والوظيفة، تأليف: الدكتور فاضل مصطفى الساق ، تقديم الاستاذ الدكتور: تمام حسان ، مكتبة الخانجي - القاهرة، طبعة ١٩٧٧م.	No
Websites	The Collage E-Library	

Grading Scheme				
Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX - Fail	راسب (قيد المعالجة)	(45-49)	More work required but credit awarded
	F - Fail	راسب	(0-44)	Considerable amount of work required
Note: Marks Decimal places above or below 0.5 will be rounded to the higher or lower full mark (for example a mark of 54.5 will be rounded to 55, whereas a mark of 54.4 will be rounded to 54. The University has a policy NOT to condone "near-pass fails" so the only adjustment to marks awarded by the original marker(s) will be the automatic rounding outlined above.				

المستوى الثالث

الفصل الأول

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Operating Systems		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET3101		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Ali nafaa gaafar	e-mail	ali_nafaa@mtu.edu.iq
Module Leader's Acad. Title	assistant lecrurer	Module Leader's Qualification	Master's
Module Tutor	Dr. Yousef Ward Sakar	e-mail	Yousifward@nust.edu.iq
Peer Reviewer Name	Dr. Mahmoud Shuker Mahmoud	e-mail	mahmoud.shukur@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	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

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. This course includes the basic concepts of operating system components. 2. To develop problem-solving skills and understand process management, deadlocks, and synchronization. 3. To understand consists of memory management techniques. 4. This course deals with File system implementation. 5. It also includes a case study on the Linux operating system. 6. To understand the I/O device management principles. 7. To perform the disk Structure, Disk Scheduling (FCFS, SSTF, SCAN, CSCAN, LOOK, CLOOK), and Disk Formatting.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Should understand: hardware components that must be managed by an operating system. 2. Describe need and role of operating system. 3. The concept of a process, the process life cycle, process states and state transitions, process control blocks (PCBs)/process descriptors. 4. How processors transition between processes via context switching. How interrupts enable hardware to communicate with software. How processes converse with one another via interprocess communication (IPC). 5. The motivation for creating threads. The similarities and differences between processes and threads. The various levels of support for threads. The life cycle of a thread. Thread signaling and cancellation. 6. The challenges of synchronizing concurrent processes and threads. Critical sections and the need for mutual exclusion. how to implement mutual exclusion primitives in software 7. How monitors synchronize access to data. How condition variables are used with monitors. Solutions for classic problems in concurrent programming such as readers and writers and circular buffer. 8. The problem of deadlock. The four necessary conditions for deadlock to exist. The problem of indefinite postponement. The notions of deadlock prevention, avoidance, detection and recovery. 9. Understand OS components such a scheduler, memory manager, file 10. System handlers and I/O device managers. 11. Analyze and criticize techniques used in OS components 12. Demonstrate and simulate algorithms used in OS components 13. Identify algorithms and techniques used in different components of Linux
<p>Indicative Contents المحتويات الإرشادية</p>	<ol style="list-style-type: none"> 1. Operating System Overview teaching hours: 10 hrs 2. Process Management teaching hours: 10 hrs 3. Process Deadlocks teaching hours: 10 hrs

- 4. Memory Management teaching hours: 14 hrs
- 5. File Management teaching hours: 10 hrs
- 6. Device Management teaching hours: 10 hrs
- 7. Linux Case Study teaching hours: 10 hrs

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies

The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to An operating system that acts as an intermediary between the user of a computer and the computer hardware. The purpose of an operating system is to provide an environment in which a user can execute programs in a convenient and efficient manner.

Student Workload (SWL)

الحمل الدراسي للطالب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Operating Systems Operating System Architectures, Definition, Two views of operating system, Evolution of operating system, Types of OS
Week 2	System Call, Handling System Calls, System Programs, Operating System Structures, The Shell, Open Source Operating Systems
Week 3	Process vs Program, Multiprogramming, Process Model, Process States, Process Control Block. Threads, Thread vs Process, User and Kernel Space Threads. Inter Process Communication, Race Condition, Critical Section
Week 4	Implementing Mutual Exclusion: Mutual Exclusion with Busy Waiting (Disabling Interrupts, Lock Variables, Strict Alteration, Peterson's Solution, Test and Set Lock), Sleep and Wakeup, Semaphore, Monitors, Message Passing, Classical IPC problems: Producer Consumer, Sleeping Barber, Dining Philosopher Problem.
Week 5	Process Scheduling: Goals, Batch System Scheduling (First-Come First-Served, Shortest Job First, Shortest Remaining Time Next), Interactive System Scheduling (Round-Robin Scheduling, Priority Scheduling, Multiple Queues), Overview of Real Time System Scheduling.
Week 6	Introduction, Deadlock Characterization, Preemptable and Non-preemptable Resources, Resource – Allocation Graph, Conditions for Deadlock.
Week 7	Midterm Exam
Week 8	Handling Deadlocks: Ostrich Algorithm, Deadlock prevention, Deadlock Avoidance, Deadlock Detection (For Single and Multiple Resource Instances), Recovery From Deadlock (Through Preemption and Rollback. Introduction, Monoprogramming vs. Multi-programming, Modelling Multiprogramming, Multiprogramming with fixed and variable partitions, Relocation and Protection. Memory management (Bitmaps & Linked-list), Memory Allocation Strategies.
Week 9	Virtual memory: Paging, Page Table, Page Table Structure, Handling Page Faults, TLB's Page Replacement Algorithms: FIFO, Second Chance, LRU, Optimal, LFU, Clock, WS- Clock,
Week 10	Concept of Segmentation: Need of Segmentation, its Drawbacks, Segmentation with Paging(MULTICS).
Week 11	File Overview: File Naming, File Structure, File Types, File Access, File Attributes, File Operations, Single Level, two Level and Hierarchical Directory Systems, File System Layout.
Week 12	Implementing Files: Contiguous allocation, Linked List Allocation, Linked List Allocation using Table in Memory, Inodes. Directory Operations, Path Names, Directory Implementation, Shared Files

Week 13	Free Space Management: Bitmaps, Linked List
Week 14	Classification of IO devices, Controllers, Memory Mapped IO, DMA Operation, Interrupts, Goals of IO Software, Handling IO (Programmed IO, Interrupt Driven IO, IO using DMA), IO Software Layers (Interrupt Handlers, Device Drivers) . Disk Structure, Disk Scheduling (FCFS, SSTF, SCAN, CSCAN, LOOK, CLOOK), Disk Formatting (Cylinder Skew, Interleaving, Error handling), RAID.
Week 15	History, Kernel Modules, Process Management, Scheduling, Inter-process Communication, Memory Management, File System Management Approaches, Device Management Approaches.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Demonstration of basic Linux Commands
Week 2	Lab 2: Process creation and termination, thread creation and termination
Week 3	Lab 3: Simulation of IPC techniques
Week 4	Lab 4: Simulation process Scheduling algorithms
Week 5	Lab 5: Simulation of page replacement algorithms
Week 6	Lab 6: Simulation of File allocation techniques
Week 7	Lab 7: Simulate free space management techniques
Week 8	Lab 8: Simulation of disk scheduling algorithms

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Operating Systems (3rd Edition) 3rd Edition by Harvey M. Deitel (Author), Paul J. Deitel (Author), David R. Choffnes (Author)	Yes
Recommended Texts	Operating System Concepts Essentials Tenth Edition Avi Silberschatz Peter Baer Galvin Greg Gagne	yes
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Control Engineering Fundamentals		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CET3102			
ECTS Credits	5			
SWL (hr/sem)	125			
Module Level	3	Semester of Delivery		5
Administering Department	CET	College	EETC	
Module Leader	Hadeel Shakir Mahmood		e-mail	Hadeel.shakir@mtu.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	MSc	
Module Tutor	Sarab Shanan Sawadi		e-mail	psg.sarab.shanan@uobasrah.edu.iq
Peer Reviewer Name	Asst. Prof. Alhamzah Taher Mohammed		e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	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

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. To define the control systems. 2. To develop mathematical models that accurately represent the behavior of the system 3. To simplify the representation of a control system. 4. To examine the system's behavior during the transient period and the steady state. 5. To design controllers that can manipulate the system or process to achieve desired objectives.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Define the control system. 2. classify the different types of control systems: 3. Describe a physical system in terms of differential equations 4. Use Laplace Transform in solving differential equations of the Control System. 5. Derive Transfer Function for describing the work of servomotors. 6. Reduce a block diagram of multiple subsystems to a single block representing the Transfer Function of the system. 7. Understand steady state and transient time response analysis. 8. Find error Coefficients and steady-state error (e_{ss}) according to system type. 9. Find the time response of the 1st order system. 10. Find the time response of the 2nd order system. 11. Understand the effect of damping ratio ξ on 2nd order system. 12. Identify Transient response specifications. 13. Define PID controllers. 14. Reduce the effect of Steady-state error (e_{ss}) and settling time (T_s) on time response using PID controller.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following:</p> <p><u>Part A – Basics of Control Systems and Transfer Function</u></p> <p>Control System definitions, Classification of Control Systems, Comparison of Open Loop and Closed Loop Control Systems, Use Laplace Transform in Control System, Mathematical Modelling of Control Systems: Electrical Systems and Mechanical Systems (Translational and Rotational), Servomotors, Rules of Block diagram reduction. [24 hrs]</p>

	<p><u>Part B – Time Response Analysis of Control Systems</u></p> <p>Definitions: time response, transient response and steady state response, standard test inputs, steady state analysis, static error coefficient method, analysis of type 0,1 and 2 systems, transient response analysis: 1st order and 2nd order systems. [30 hrs]</p> <p>PID controllers: PD controller, PI controller, PID controller and output derivative controller [20 hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The main strategy that will be adopted in delivering this module focuses on fostering active student engagement during exercises, fostering the development of critical thinking skills, and encouraging participation. This will be accomplished through a combination of classroom instruction, interactive tutorials, and the inclusion of engaging experiments that involve sampling activities that capture students' interest. The aim is to refine and enhance students' critical thinking abilities while ensuring their active involvement in the learning process.</p>

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
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)	6, 10	LO #1-5, LO #6-9
	Assignments	2	10% (10)	8, 13	LO #1-7, LO #7-10
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	14	LO #1-13
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction – Basics of Control Systems
Week 2	Use of Laplace Transform in Control System
Week 3	Mathematical Modelling of Control System: Electrical System
Week 4	Mathematical Modelling of Control System: Translational Mechanical System
Week 5	Mathematical Modelling of Control System: Rotational Mechanical System
Week 6	Servomotors
Week 7	Block Diagram Reduction
Week 8	Mid-term Exam
Week 9	Time Response Analysis of Control Systems
Week 10	Analysis of Type 0, 1, and 2 systems
Week 11	Transient Response Analysis
Week 12	Analysis of 2 nd order system
Week 13	Transient response specifications
Week 14	PID controllers
Week 15	Rate feedback controller

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to MATLAB Simulink
Week 2	Lab 2: Laplace Transform / Verifying Algebraic functions
Week 3	Lab 3: Laplace Transform / Verifying Sine functions
Week 4	Lab 4: Block Diagram Reduction
Week 5	Lab 5: Steady State Error
Week 6	Lab 6: 1 st Order System
Week 7	Lab 7: 2 nd Order System
Week 8	Lab 8: Proportional Controller/ P Controller Used in Closed-Loop DC Servo Motor Speed Control System
Week 9	Lab 9: Proportional Controller/ P Controller Used in Closed-Loop DC Servo Motor Position Control System
Week 10	Lab 10: Integral Controller/ I Controller Used in Closed-Loop DC Servo Motor Speed Control System
Week 11	Lab 11: Integral Controller/ I Controller Used in Closed-Loop DC Servo Motor Position Control System
Week 12	Lab 12: Derivative Controller/ D Controller Used in Closed-Loop DC Servo Motor Speed Control System
Week 13	Lab 13: Derivative Controller/ D Controller Used in Closed-Loop DC Servo Motor Position Control System
Week 14 & 15	Lab 14: PID Controller

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Modern Control Engineering, K. Ogata, 2010 Pearson Education	Yes
Recommended Texts	1 . Control Systems Engineering, U.A. Bakshi and S.C. Goyal, 2007 Technical Publications. 2 . Modern Control Systems, R. Dorf and R. Bishop, 2011 Pearson Education	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	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Digital Signal Processing		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET3103		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Dr. Mohammed Joudah	e-mail	mjzaiter@mtu.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualiification	Ph.D.
Module Tutor	Dr. Ahmed Ali Mahmoud	e-mail	mohanad.ahmed1@mtu.edu.iq
Peer Reviewer Name	Asst. Prof. Alhamzah Taher Mohammed	e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	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

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. Demonstrate an understanding of basic discrete-time systems, linearity, time-invariance, stability, impulse response and discrete convolution.2. Implement discrete time systems, recursive and nonrecursive realizations.3. Perform Z transform and finding the inverse Z transform including its properties.4. Demonstrate an understanding of frequency analysis of both continuous and discrete signals.5. Demonstrate an understanding of frequency response of linear time invariant systems.6. Demonstrate an understanding of discrete Fourier transform, its properties and applications.7. Design FIR and IIR digital filters.
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. State, prove and apply Shannon's sampling theorem2. Relate signal to noise ratio (SNR) to number of samples averaged in signal sampling and averaging systems3. Implement sampling of continuous time signals and reconstruct them from their samples by choosing appropriate parameters and functions.4. Change the sampling rate of discrete-time signals, avoiding folding effects.5. Describe the fundamental properties of linear time invariant systems.6. Analyze signals and systems in the discrete time domain.7. Compute the frequency response of linear and time-invariant discrete-time systems, implement decomposition into a minimum-phase system and an all-pass system, and describe generalized linear-phase systems.8. Implement discrete-time systems using various structures.9. Understand the importance of the discrete Fourier transform and algorithms for its fast computation.10. Analyze discrete-time signals in the frequency domain, using the windowing method as well as the time-dependent discrete Fourier transform, and reconstruct the signal with the overlap-sum algorithm.11. Write down, state the properties of, and apply Fourier Transforms in DSP systems12. Analyze and implement systems in the field of Z transformation.13. Design basic finite impulse response (FIR) and infinite impulse response (IIR)14. filters.
<p>Indicative Contents</p>	<p>Indicative content includes the following.</p>

المحتويات الإرشادية

Introduction to DSP

Introduction to DSP, discrete signals and their properties. In addition, the concept of frequency in continuous time and discrete time signals. [5 hrs]

Discrete systems

Discrete systems, linear time-invariant systems, convolution theorem; Digital Signal Processing (DSP) is concerned with the processing of signals that are represented as sequences of finite-precision numbers. [10 hrs]

Sampling and reconstruction of analogue signals

Review of continuous-time signal and system analysis using Fourier ; Ideal impulse sampling and reconstruction of bandlimited signals; digital to analogue conversion, and practical considerations. [10 hrs]

Discrete-time sequences

Discrete-time signals and systems, linearity, time-invariance, stability, causality; discrete-time convolution, linear constant-coefficient difference equations, magnitude and phase response. [5 hrs]

The Discrete Fourier Transform

The discrete Fourier transform (DFT); properties of the DFT; circular convolution; linear convolution via the DFT and the overlap-add method; the radix-2 decimation-in-time fast Fourier transform (FFT) algorithm. [10 hrs]

The z-transform and its properties

The z-transform, region of convergence for the z-transform, inverse z-transform, z-transform properties. [10 hrs]

FIR filter design

Generalized linear-phase causal FIR filters; FIR linear-phase filter design using the window method; frequency-sampling design of FIR filters. [10 hrs]

IIR filter design

IIR filter design using the bilinear transformation; Filter design by impulse invariance response. [10 hrs]

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	The main strategy that will be adopted in delivering this module focuses on fostering active student engagement during exercises, fostering the development of critical thinking skills, and encouraging participation. This will be accomplished through a combination of classroom instruction, interactive tutorials, and the inclusion of engaging experiments that involve sampling activities that capture students' interest. The aim is to refine and enhance students' critical thinking abilities while ensuring their active involvement in the learning process.
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Student Workload (SWL)

الحمل الدراسي للطلاب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطلاب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطلاب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطلاب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطلاب أسبوعياً	4.06
Total SWL (h/sem) الحمل الدراسي الكلي للطلاب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5, 10	LO #1-4 , LO #4-9
	Assignments	2	10% (10)	3, 12	LO # 1,2, LO #3-11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 1-11
Summative assessment	Midterm Exam	2 hr	10% (10)	6	LO # 1-5
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Signals, Systems and signal processing Basic element of digital signal processing, Advantages of digital over analog signal processing, Classification of Signals
Week 2	The Concept of frequency in Continuous and Discrete – time signals Continuous – time sinusoidal signals, Discrete – time sinusoidal signals, Harmonically

	related complex exponential.
Week 3	Analog –to-digital and digital-to-analog conversions Sampling of analog signals, The sampling theorem, Quantization and conversion, Digital-to-analog conversion, Analog-to-digital conversion.
Week 4	Analysis of digital signals and systems.
Week 5	Convolution in discrete time systems
Week 6	Mid-term Exam
Week 7	DE convolution in discrete time systems
Week 8	Discrete-time systems Input/output description of systems, Block diagram representation of discrete-time systems, Classification of discrete-time system, Correlation of discrete-time signals, Properties of correlation.
Week 9	Time domain to frequency domain conversion Discrete-Fourier transform
Week 10	Fast-Fourier transform
Week 11	The Z-transform Direct Z-transform
Week 12	Inverse Z-transform; Properties of the Z-transform.
Week 13	Analogue Filtering versus Digital filtering.
Week 14	Design methods of FIR Filters
Week 15	Design Methods of IIR Filters

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Discrete and Continuous-Time Signals.
Week 2	Lab 2: Discrete-Time Systems.
Week 3	Lab 3: Frequency Analysis.
Week 4	Lab 4: Sampling and Reconstruction.
Week 5	Lab 5: Discrete Fourier Transform.
Week 6	Lab 6: The Z-transform.
Week 7	Lab 7: Digital Filter Design.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Digital Signal Processing by John Proakis & D. G. Manolakis, 4/E. Pearson, 2006.	Yes
Recommended Texts	Sanjit K. Mitra, "Digital Signal Processing – A Computer Based Approach", Tata Mc Graw Hill, 2007.	No
Websites	https://www.youtube.com/watch?v=6dFnpz_AEyA&list=PL9567DFCA3A66F299	

Grading Scheme

مخطط الدرجات

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

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Digital Controllers		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET3104		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Asst. Prof. Siraj Qays Mahdi	e-mail	Siraj_qays@mtu.edu.iq
Module Leader's Acad. Title	Assist Lecturer	Module Leader's Qualification	MSc
Module Tutor	M.Sc. Fatima Hameed Khayoon	e-mail	Ali.alrubaie@mtu.edu.iq
Peer Reviewer Name	Dr. Mahmoud Shuker Mahmoud	e-mail	mahmoud.shukur@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	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

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. To know the types of microcontrollers and its architecture 2. To understand the difference between the microcontroller and microprocessor 3. dealing with the internal parts of microcontrollers 4. programming the PIC microcontrollers 5. connect the microcontrollers with peripherals to input and output the information 6. Implement interrupts in programs 7. Programming the PiC with the peripherals devices
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Recognize how integrated circuits and microcontrollers works. 2. Known the advantages of using Microcontrollers and Microprocessors. 3. Summarize what is meant by a Peripheral Interface Controller. 4. Describe the PIC Microcontroller. 5. Known type and function of register and SFR in Microcontroller. 6. Explain the A/D (Analog-to-Digital) Converter. 7. Discuss Capture, Compare, and Pulse width modulation modules in PIC microcontrollers. 8. Define and implement interrupts in programs. 9. Explain serial communication systems. 10. Identify how the Oscillator works in an electric circuit. 11. Programming the microcontroller, outputting data/signals, reading data/signals, and character LCD. 12. Application projects of microcontrollers.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>--Introduction to Introduction to Microcontrollers, Integrated Circuits, General Organization of PIC Microcontrollers: Pins Properties, Registers & Special Function registers, Ports (Input / Output), and Power Supply. Microcontroller Pins Features. The memory unit (ROM, Masked ROM, OTP ROM, UV EPROM, and EEPROM Memory). RAM memory and Flash memory. [15 hrs]</p> <p>--Central Processor Unit (CPU). Interrupt (example of interrupt in a microcontroller). Arithmetical Logical Unit (ALU). Instruction Decoder. Accumulator. Bus (Address Bus and Data Bus). [10 hrs]</p> <p>--Serial Communication, Baud rate, I2C Protocol, SPI (Serial Peripheral Interface), and UART (Universal Asynchronous Receiver/Transmitter) [15 hrs]</p>

	<p>--Oscillator. Timers, using interrupt in timer operating, Watchdog Timer. Counters [10 hrs]</p> <p>--Revision problem classes [5 hrs]</p> <p>--A/D (Analog-to-Digital) Converter, procedure takes place in the A/D converter module, overall plan of ADC, ADRESH, and ADRESL Registers, A/D Acquisition Requirements , ADCON0 Register & ADCON1 Register, Reference Volts. CCP Modules (Capture, Compare, and Pulse width modulation in PIC microcontrollers [19 hrs]</p>
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

Strategies	<p>The main strategy that will be adopted in delivering this module is to encourage students' participation in learning and developing their skills in microcontrollers and logic thinking, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials, and by considering the type of lab experiments involving assignments and project design activities that are interesting to the students.</p>
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Student Workload (SWL)

الحمل الدراسي للطالب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
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, 12	LO #1-4, LO #5-10
	Assignments	2	10% (10)	4, 10	LO #1-3, LO #4-9
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 1-10
Summative assessment	Midterm Exam	2 hr	10% (10)	9	LO # 1-8
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to the microcontroller, the difference between MP and Microcontroller
Week 2	The architecture of PIC Microcontroller
Week 3	General Organization of PIC, Registers & Special Function registers
Week 4	Memory Units and CPU
Week 5	I/O ports of the Microcontroller
Week 6	Serial communication, Oscillator, and Timer/Counters
Week 7	Baud rate
Week 8	Programming the Microcontroller
Week 9	Midterm Exam
Week 10	outputting data/signals, Reading data/signals , Character LCD
Week 11	A/D converter & Analog Module
Week 12	On-Chip CCP (Capture, Compare & PWM)
Week 13	Microcontroller Interrupts Programming
Week 14	EEPROM Programming
Week 15	Application projects of Microcontroller

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Micro C with a simple program
Week 2	Lab 2: Counter and Flash LED
Week 3	Lab 3: program using Micro C to count from increasing and decreasing
Week 4	Lab 4: Seven Segment
Week 5	Lab 5: LCD & Switch
Week 6	Lab 6: program using Micro C to input analog signal and read data
Week 7	Lab 7: EEPROM to read and write data.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	PIC Microcontrollers: An Introduction to Microelectronics, Martin P. Bates. Teach Yourself PIC Microcontrollers, M. Amer Iqbal Qureshi	Yes
Recommended Texts	Interfacing PIC Microcontrollers to Peripheral Devices:2011,	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 جداً	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	Digital Communications		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET3105		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Alhamzah Taher Mohammed,	e-mail	alhamza_tm@mtu.edu.iq
Module Leader's Acad. Title	Assist. Professor	Module Leader's Qualification	M.Sc.
Module Tutor	Dr.Mohammed Muhyi Huraiz	e-mail	
Peer Reviewer Name	Dr. Osama Abbas Hussein	e-mail	osama.abbas@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Analog Communications (CET2105)	Semester	5
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	<p>The aims to students in third stage to defined and understand the</p> <ul style="list-style-type: none">-Concepts and terminology used in digital communications-The advantage and disadvantage of each type of digital communication systems-Types of Digital modulation- Send multiple digital signals at the same time and how to retrieve it
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none">1- Describe of concepts and terminology used in digital communications2- Explain the advantage and disadvantage of each type of digital communications systems3- Identify types of digital modulation4- Discuss the comparison between the types of digital systems and its advantages5- work on digital systems and Describe the most suitable designs6- Explain how can send more than a signal at the same time and how to retrieve it7- analog signal into a digital signal converter (PCM)8- Explain types of digital modulation ask , psk , fsk9- Explain the modulation and demodulation of quadrature amplitude modulation
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <ul style="list-style-type: none">- Introduction to digital communication & Sampling theorem (10 hr)

	<ul style="list-style-type: none"> - Pulse Amplitude Modulation (PAM), Pulse width and Pulse Position (10 hr) - Source Coding Techniques Modulation (24 hr) - Baseband modulation (Digital Modulation), (30 hr)
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Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
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)	4,9	LO #1-4, LO #4- 7
	Assignments	2	10% (10)	3,10	LO #1-4, LO #4- 7
	Projects / Lab.	10	10% (10)	Continuous	LO #1-8
	Report	10	10% (10)	Continuous	LO #1-8
Summative assessment	Midterm Exam	2 hr	10% (20)	6	LO # 1-5
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Signal types, General block diagram of digital communication
Week 2	Advantage and disadvantage of digital modulation, digital coding
Week 3	Sampling theorem, Pulse Amplitude Modulation (PAM),
Week 4	Pulse width and Pulse Position Modulation (PWM & PPM),
Week 5	Time Division Multiplexing (TDM) , Pulse Code Modulation PCM),
Week 6	Mid exam
Week 7	Noise Consideration in PCM, Limitation and Modifications of PCM
Week 8	Differential PCM (DPCM), Delta Modulation (DM),
Week 9	Delta-Sigma Modulation
Week 10	Baseband modulation (Digital Modulation), Amplitude Shift Keying (ASK) [Modulation and demodulation].
Week 11	Frequency Shift Keying (FSK) [Modulation and demodulation],
Week 12	Phase Shift Keying (PSK) [Modulation, Coherent and Noncoherent Detection], Differential PSK.
Week 13	Quadrature Phase Shift Keying (QPSK), Offset QPSK
Week 14	Minimum Shift Keying
Week 15	Quadrature Amplitude Modulation (QAM), Multilevel Modulation Techniques M-ary PSK, M-ary QAM

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Fourier series and Fourier Transform , Spectrum analysis of signal
Week 2	Pulse Amplitude Modulation
Week 3	Pulse Position Modulation (PPM)

Week 4	Pulse Code Modulation
Week 5	Digital Time Division Multiplexing (TDM)
Week 6	Delta Modulation (DM)
Week 7	Amplitude shift key (ASK)
Week 8	Phase Shift Key (PSK)
Week 9	Frequency Shift Key (FSK)

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	- Sarkar N., Elements of Digital Communications, first edition, 2003	NO
Recommended Texts	- Haykin S., Introduction to Analog and Digital Communications, second edition, 2007.	No
Websites	https://www.coursera.org	

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	RealTime Systems		Module Delivery
Module Type	E		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET3106		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Mohammed Sadiq Maky	e-mail	Mohammed.s.maky@nust.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PhD
Module Tutor	Dr. Mohammed Sadiq Maky	e-mail	Mohammed.s.maky@nust.edu.iq
Peer Reviewer Name	Dr. Mahmoud Shuker Mahmoud	e-mail	mahmoud.shukur@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	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 Aims أهداف المادة الدراسية	<ol style="list-style-type: none">1. To teach the students about Real-time scheduling and schedulable analysis.2. To enable the students to Formally specify and verify the timing constraints3. Design methods for real-time systems4. Development and implementation of new techniques to advance the state-of-the-art real-time systems research.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ul style="list-style-type: none">• correctly and precisely reason about times, events, and action• list and reason about the sources of error and inexactitude in time interval measurement, execution time prediction, and scheduling• empirically estimate the accuracy of a real time clock• measure the execution time of a piece of code• empirically estimate the accuracy and overhead of a real-time scheduler• describe and apply commonly used abstract models and terminology for real-time scheduling and resource management• recognize, classify, and formulate the hard and soft timing requirements of a software system• select an appropriate software architecture and combination of scheduling techniques to satisfy a set of timing requirements• understand and apply the proofs of the fundamental theorems of deadline and fixed priority real-time scheduling• carry out schedulability analysis using deadline and fixed-priority approaches• implement a set of tasks with periodic and aperiodic timing requirements, using C threads and a real-time variant of the Linux operating system• evaluate the suitability of an operating system for real-time applications
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p>Part-A [20 Hrs]</p> <p>Introduction to RTS: what is system, what is RT, what is the concept of time in systems, classification, specs of each type, how and when,</p> <p>Part-B [20Hrs]</p> <p>Scheduling: the concept of scheduling, types, clock, priority, aperiodic, sporadic</p>

	<p>tasks, resource access, resource control</p> <p>Part-C [20 Hrs]</p> <p>Multi-processor scheduling: coordination, resource sharing, temporal constraints.</p> <p>Part-D [10 hrs]</p> <p>RTOS, Datastores, timers, kernels</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The main strategy that will be adopted in delivering this module focuses on fostering active student engagement during exercises, fostering the development of critical thinking skills, and encouraging participation. This will be accomplished through a combination of classroom instruction, interactive tutorials, and the inclusion of engaging experiments that involve sampling activities that capture students' interest. The aim is to refine and enhance students' critical thinking abilities while ensuring their active involvement in the learning process.</p>

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
Structured SWL (h/sem)	64	Structured SWL (h/w)	4.26
الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعياً	
Unstructured SWL (h/sem)	61	Unstructured SWL (h/w)	4.26
الحمل الدراسي غير المنتظم للطالب خلال الفصل		الحمل الدراسي غير المنتظم للطالب أسبوعياً	
Total SWL (h/sem)	125		
الحمل الدراسي الكلي للطالب خلال الفصل			

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	6, 10	LO #1-5, LO #5-9
	Assignments	2	10% (10)	8, 13	LO #1-6, LO #6- 10
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	14	LO # 1- 12
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO # 1-6
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to RTs
Week 2	Hard Versus Soft Real-Time Systems
Week 3	Signal. sensors and Transducers
Week 4	Commonly Used Approaches to Hard Real-Time Scheduling
Week 5	Clock-Driven Scheduling
Week 6	Priority-Driven Scheduling of Periodic Tasks
Week 7	Midterm Exam
Week 8	Scheduling Aperiodic and Sporadic Jobs in Priority-Driven Systems. Resources and Resource Access Control
Week 9	Clock sync, timers, Kernels
Week 10	RT in distributed Systems
Week 11	Scheduling in multi-processors
Week 12	Clock Sync.
Week 13	Hardware, timers, Kernels
Week 14	RTOS
Week 15	Real Time data stores

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Arduino UC
Week 2	Static loops
Week 3	Dynamic loops
Week 4	Watchdog
Week 5	Timers
Week 6	Arduino RTOS
Week 7	
Week 8	
Week 9	
Week 10	
Week 11	Network app (client)
Week 12	Network app (server)
Week 13	Network app (UDP)
Week 14 & 15	Proto-typing

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Real-Time Systems, Jane W. S. Liu, 2000	NO
Supporting Texts		No
Online resource	https://www.youtube.com/watch?v=yShUSwskUNA&list=PL1iLu2CSC9EU4mMByEhBp9CcYgAliDs_v https://personal.utdallas.edu/~cxl137330/courses/fall13/RTS/RTS.html http://www.cs.fsu.edu/~baker/realtime/syllabus.html#Objectives	

Grading Scheme

مخطط الدرجات

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

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

المستوى الثالث

الفصل الثاني

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Advanced Control Systems		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET3201		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Hadeel Shakir Mahmood	e-mail	Hadeel.shakir@mtu.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	MSc
Module Tutor	M.Sc.Sarab Shana'an Suwadi	e-mail	dr.oras@mtu.edu.iq
Peer Reviewer Name	Asst. Prof. Alhamzah Taher Mohammed	e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	Version Number	1.0

Relation with other Modules			
العلاقة مع المواد الدراسية الأخرى			
Prerequisite module	CET3102	Semester	
Co-requisites module	None	Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. To define the stability analysis techniques applicable to control systems.2. To develop problem-solving skills and an understanding of different stability criteria.3. To understand the principles and conditions under which a system is stable or unstable.4. To introduce students to stability margins, such as gain margin and phase margin.5. To emphasize the importance of stability in feedback control systems.6. To highlight the relationship between stability and system performance.
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Define poles and zeros of a transfer function.2. Analyze the stability of the control system from the pole-zero plot.3. Analyze the stability of the control system using Routh-Hurwitz criteria.4. Identify the special cases of Routh's criterion.5. Sketch the locus of roots in the s-plane as a parameter is varied.6. Obtain $G(s)H(s)$ from characteristic equation7. Comment on the stability of the system based on the complete Root Locus.8. Solve Root Locus problems.9. Define the frequency response of a system.10. Use the logarithmic scales.11. Identify the standard factors of $G(j\omega)H(j\omega)$.12. Plot a graph of the system's frequency response using a Bode plot.13. Comment on the stability of the system based on the Bode plot.14. Obtaining the Transfer function from the Bode plot
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Part A – Stability of Control System</u></p> <p>Poles and zeros of a transfer function, pole-zero plot, stability condition about s-plane, Hurwitz's criterion, Routh's stability criterion, special cases of Routh's criterion: special case 1 and special case 2. [10 hrs]</p> <p>Revision problem classes [6 hrs]</p> <p><u>Part B – Root Locus Method</u></p> <p>Definition of Root Locus, Rules of construction of Root Locus, General steps to solve the problem in Root Locus, obtaining $G(s)H(s)$ from the characteristic equation. [14 hrs].</p> <p>Revision problem classes [8 hrs]</p> <p><u>Part C – Bode Plot Method</u></p>

	Basics of frequency domain analysis, Magnitude plot, Phase angle plot, Logarithmic scales, frequency domain O.L.T.F., standard factors of $G(j\omega)H(j\omega)$, steps to sketch the Bode plot, stability analysis using Bode plot. [16 hrs]
	Revision problem classes [8 hrs]
	Transfer function from Bode plot [8 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module focuses on fostering active student engagement during exercises, fostering the development of critical thinking skills, and encouraging participation. This will be accomplished through a combination of classroom instruction, interactive tutorials, and the inclusion of engaging experiments that involve sampling activities that capture students' interest. The aim is to refine and enhance students' critical thinking abilities while ensuring their active involvement in the learning process.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
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)	3, 12	LO # 1, 2, LO# 3- 11
	Assignments	2	10% (10)	6, 11	LO # 1-5, LO# 6-10
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 9-13
Summative assessment	Midterm Exam	2 hr	10% (10)	8	LO # 1-7
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Stability of Control Systems
Week 2	Routh-Hurwitz Criterion
Week 3	Special Cases of Routh's Criterion
Week 4	Root Locus Method
Week 5	Rules of Root Locus
Week 6	Solve Root Locus Problems
Week 7	Stability Analysis Using Root Locus
Week 8	Mid-term Exam
Week 9	Stability Analysis Using Bode plot
Week 10	Basics of Frequency Domain Analysis
Week 11	Bode Plot Method
Week 12	Bode Plot of Standard Factors of $G(j\omega)H(j\omega)$
Week 13	Stability Analysis Using Bode plot
Week 14	Transfer Function from Bode Plot
Week 15	Design of control systems and Compensation concepts.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: introduction to MATLAB commands
Week 2 , 3 & 4	Lab 2: Responses to different input signals
Week 5 , 6 & 7	Lab 3: Pole- Zero Plot and stability analysis
Week 8 , 9, 10 & 11	Lab 4: Root locus in MATLAB
Week 12 ,13 , 14 & 15	Lab 5: Bode plot in MATLAB

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Modern Control Engineering, K. Ogata, 2010 Pearson Education	Yes
Recommended Texts	1 . Control Systems Engineering, U.A. Bakshi and S.C. Goyal, 2007 Technical Publications. 2 . Modern Control Systems, R. Dorf and R. Bishop, 2011 Pearson Education	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	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Computer Network Fundamentals		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET3202		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	3	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader		e-mail	Ammar.all@mtu.edu.iq
Module Leader's Acad. Title	Assistant Lecturer	Module Leader's Qualification	master
Module Tutor	Dr. Mohammed Sadiq Maky	e-mail	
Peer Reviewer Name	Dr. Mahmoud Shuker Mahmoud	e-mail	mahmoud.shukur@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	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

<p>Module Aims أهداف المادة الدراسية</p>	<ol style="list-style-type: none">1. Understand the Basics of Networking: The module aims to provide students with a solid foundation in the fundamental concepts, principles, and components of computer networking.2. Understand the purpose and importance of computer networks, network architectures, and network protocols.3. Explore Network Infrastructure: The module aims to familiarize students with different types of networks, such as Local Area Networks (LANs) and Wide Area Networks (WANs).4. Explore various network devices and technologies used in building and managing networks.5. Network Addressing and Subnetting Skills: The module aims to enable students to comprehend IP addressing, subnetting, and related concepts.6. Network Standards and Protocols: The module aims to introduce students to network standards and protocols established by organizations such as IEEE, IETF, and ISO
<p>Module Learning Outcomes مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none">1. Explain the data communications, networking, protocols and standards, and networking models and how to create a data flow.2. Understand the Data communications between remote parties can be achieved through a process called networking.3. Understand the fundamental concepts and principles of computer networks, including network architectures, protocols, and models (such as OSI and TCP/IP).4. Identify and describe the different network components and their functions, including routers, switches, firewalls, access points, and network cables.5. Explain the relationship between data, which are created by a device, and electromagnetic signals, which are transmitted over a medium.6. Explain the basics of network addressing, including IP addressing, subnetting, and the use of subnet masks.7. Demonstrate knowledge of commonly used network protocols, such as IP, TCP, UDP, ICMP, and DNS, and understand their roles in network communication.8. Analyze and describe different network topologies and architectures, including star, bus, ring, and mesh networks.9. Understand the fundamentals of network security, including common threats, encryption techniques, firewalls, and best practices for securing networks.10. Configure and troubleshoot basic network settings, including IP addressing, subnetting, and network connectivity.

	<ol style="list-style-type: none"> 11. Explain the importance of network standards and protocols in ensuring interoperability and compatibility in network environments. 12. Demonstrate an understanding of network performance factors and techniques for optimizing network performance, including bandwidth management and Quality of Service (QoS) implementation. 13. Apply critical thinking and problem-solving skills to analyze and troubleshoot common network issues, such as network connectivity problems and network performance degradation. 14. Work effectively as a team member in network-related activities, demonstrating communication and collaboration skills. Demonstrate practical skills in configuring and managing network devices, such as routers, switches, and wireless access points.
<p>Indicative Contents المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p>introduction to Computer Networks: 6 hrs</p> <p>Definition and purpose of computer networks : 6 hrs</p> <p>Network types and topologies : 6 hrs</p> <p>Network components and their functions : 6 hrs</p> <p>Network models: OSI and TCP/IP : : 12 hrs</p> <p>Network Devices and Infrastructure : 6 hrs</p> <p>Routers, switches, and hubs : 6 hrs</p> <p>Network interfaces and media : 6 hrs</p> <p>Network cables and connectors : 6 hrs</p> <p>Network architectures: LAN, WAN, MAN : 6 hrs</p> <p>Network Addressing and Subnetting : 6 hrs</p> <p>IPv4 and IPv6 addressing : 6 hrs</p> <p>Subnet masks and subnetting techniques : 6 hrs</p> <p>IP address allocation and management : 4 hrs</p>

Learning and Teaching Strategies

استراتيجيات التعلم والتعليم

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

الحمل الدراسي للطالب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.73
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% (5)	3, 11	LO #1, 2, LO# 3-10
	Assignments	2	10% (5)	4, 12	LO# 1-3, LO# 3-11
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	15	LO # 1-13
Summative assessment	Midterm Exam	2 hr	10% (10)	7	LO # 1-6
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Introduction to Networking, definition and purpose of computer networks
Week 2	Basic Concepts of Networking, Line configuration
Week 3	Transmission MOD
Week 4	Categories of Networks
Week 5	The OSI Model ,data protocol unit
Week 6	Main functions of the OSI Layers, TCP/IP Protocol Suite , IP address concept.
Week 7	Midterm Exam
Week 8	classes
Week 9	Subnetting
Week 10	Networking and Internetworks Devices
Week 11	Guided Transmission Media
Week 12	Unguided Transmission media
Week 13	Multiplexing technique
Week 14	FDM,TDM, and CDM
Week 15	Relationship between data, which are created by a device, and electromagnetic signals, which are transmitted over a medium.

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Network ,Familiarization with the lab environment and tools
Week 2	Lab 2: Introduction to Networking Equipment familiarization with network devices such as routers, switches, and hubs.
Week 3	Lab 3: Connecting and configuring network devices.
Week 4	Lab 4: Network Cabling and Connections
Week 5	Lab 5: Configuring and troubleshooting Ethernet connections
Week 6	Lab 6: IP Addressing and Subnetting , assigning IP addresses to network devices.
Week 7	Lab 7: Network Configuration and Troubleshooting

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	" TCP/IP Protocol Suite" Fourth Edition Behrouz A. Forouzan	NO
Recommended Texts	"Data Communications and Networking", Fourth Edition by Behrouz A. Forouzan	No
Websites		

Grading Scheme

مخطط الدرجات

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

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information			
معلومات المادة الدراسية			
Module Title	Database Systems		Module Delivery
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET3203		
ECTS Credits	6		
SWL (hr/sem)	150		
Module Level	3	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Osama Abbas Hussein	e-mail	Osama.abbas@mtu.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	PhD
Module Tutor	Dr.Yousef Ward Sakar	e-mail	Yousifward@nust.edu.iq
Peer Reviewer Name	Dr. Mahmoud Shuker Mahmoud	e-mail	mahmoud.shukur@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	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 Aims أهداف المادة الدراسية	<ol style="list-style-type: none">1. To learn the theory of the database.2. To understand The Entity Relationship Model.3. To Introduce SQL and SQL and relational database concepts.4. To understand the Constraints imposed in a database.5. Learn about Boolean Operators in SQL.6. Learn about Normalization of a database. Learn about Storage and Query Processing, transaction, and recovery.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none">1. To learn the theory of the database.2. To understand The Entity Relationship Model.3. To Introduce SQL and SQL and relational database concepts.4. To understand the Constraints imposed in a database.5. Learn about Boolean Operators in SQL.6. Learn about Normalization of a database. Learn about Storage and Query Processing, transaction, and recovery.
Indicative Contents المحتويات الإرشادية	<p>Indicative content includes the following.</p> <p>Part-A [15 Hrs]</p> <p>Introduction to the theory: What is the benefit of using a database versus a shared file system? What is Data models and the relational database system? Data independence versus data-dependent data and how a database addresses these two issues. The Three-level Architecture and why it is necessary. What are the characteristics of each of these levels and the role of the database administrator in establishing the separation of these levels? What is database management systems, its components and how they work together?</p> <p>Part-B [20Hrs]</p> <p>The Entity Relationship Model: ER diagrams, resolution of M:N relationships, and Table Instance Charts (TICs). Translations of TICs into relational tables.</p> <p>Introduction to SQL and relational database concepts: Relations and attributes. Candidate and primary keys. Foreign keys and why they are necessary. Introduction to relational operators and how they are applied. Creating and deleting tables.</p> <p>Constraints imposed in a database: Updating and deleting rows in a table using the UPDATE TABLE, DELETE TABLE, and the DROP TABLE command with and without constraints. Implementation of the Selection and Projection operators. Ordering the results of a table according to a given attribute in ascending or</p>

	<p>descending orders.</p> <p>Part-C [20 Hrs]</p> <p>Boolean Operators in SQL: pattern matching using the LIKE clause, % and underscore characters. Arithmetic Operations and use of built-in functions in SQL. Introduction to Group functions using the Group by clause and additional built in functions. Processing dates and time and basic arithmetic with dates. Formatting of dates and times.</p> <p>Normalization of a database.: First, second and third normal forms. How to detect anomalies and use of the Armstrong's axioms for determining functional dependencies. Importance of normalizing a database and the types of anomalies that may be encountered in First, Second, and Third Normal Forms. How to recognize, prevent, and how to get rid of anomalies in these forms.</p> <p>Part-D [20 hrs]</p> <p>Continuation of the normalization process: BCNF form and Dependency preservation. Algorithms to ensure dependency preservation. The Join operator and its different types. Advantages and disadvantages of higher normal forms from an operational point of view.</p> <p>Storage and Query Processing: RAID, Storage access, indexing and hashing, query processing and query optimization.</p> <p>Part-E [3] [10]</p> <p>Transaction Management and concurrency control: Transactions (concepts, state) and concurrency control (methods).</p> <p>Database Recovery: Concept and Recovery Techniques</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The main strategy that will be adopted in delivering this module focuses on fostering active student engagement during exercises, fostering the development of critical thinking skills, and encouraging participation. This will be accomplished through a combination of classroom instruction, interactive tutorials, and the inclusion of engaging experiments that involve sampling activities that capture students' interest. The aim is to refine and enhance students' critical thinking abilities while ensuring their active involvement in the learning process.</p>

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) اسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.73
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% (5)	6, 10	LO #1-3 , LO #4-6
	Assignments	2	10% (10)	8, 13	LO # 1,2, LO# 3-5
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	14	LO#1- 7
Summative assessment	Midterm Exam	2 hr	10% (10)	6	LO # 1-5
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	<p>Introduction to the theory: What is the benefit of using a database versus a shared file system? What is Data models and the relational database system? Data independence versus data-dependent data and how a database addresses these two issues. The Three-level Architecture and why it is necessary. What are the characteristics of each of these levels and the role of the database administrator in establishing the separation of these levels? What is database management systems, its components and how they work together?</p>
Week 2	
Week 3	<p>The Entity Relationship Model: ER diagrams, resolution of M:N relationships, and Table Instance Charts (TICs). Translations of TICs into relational tables.</p>
Week 4	<p>Introduction to SQL and relational database concepts: Relations and attributes. Candidate and primary keys. Foreign keys and why they are necessary. Introduction to relational operators and how they are applied. Creating and deleting tables.</p>
Week 5	
Week 6	Midterm Exam
Week 7	<p>Constraints imposed in a database: Updating and deleting rows in a table using the UPDATE TABLE, DELETE TABLE, and the DROP TABLE command with and without constraints. Implementation of the Selection and Projection operators. Ordering the results of a table according to a given attribute in ascending or descending orders.</p>
Week 8	
Week 9	<p>Boolean Operators in SQL: pattern matching using the LIKE clause, % and underscore characters. Arithmetic Operations and use of built-in functions in SQL. Introduction to Group functions using the Group by clause and additional built in functions. Processing dates and time and basic arithmetic with dates. Formatting of dates and times.</p>
Week 10	<p>Normalization of a database.: First, second and third normal forms. How to detect anomalies and use of the Armstrong's axioms for determining functional dependencies. Importance of normalizing a database and the types of anomalies that may be encountered in First, Second, and Third Normal Forms. How to recognize, prevent, and how to get rid of anomalies in these forms.</p>
Week 11	<p>Continuation of the normalization process: BCNF form and Dependency preservation. Algorithms to ensure dependency preservation. The Join operator and its different types. Advantages and disadvantages of higher normal forms from an operational point of view, join algorithm types.</p>
Week 12	<p>Storage and Query Processing: RAID, Storage access, indexing and hashing, query processing and query optimization.</p>
Week 13	<p>Transaction Management and concurrency control: Transactions (concepts, state) and concurrency control (methods).</p>
Week 14	<p>Database Recovery: Concept and Recovery Techniques</p>
Week 15	<p>Non-Relational Database systems: Document, Key-value, Column, Graph.</p>

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	An Overview of Database and SQL Query language: Introduction to PHP and MySQL, Setup steps, HTML Review Form Handling
Week 2	Basic PHP syntax, Comments, outputs
Week 3	Arithmetic and variable operation
Week 4	PHP: control statements, Loops, and Arrays
Week 5	Creating Database, tables in SQL
Week 6	Attribute Data Types and Domains in SQL
Week 7	The Entity Relationship (ER) Model: Drawing and converting entities with a relationship to relation table
Week 8	SQL Server Constraints, Select, Inserting to Data from Database
Week 9	Updating, Deleting, ordered By Data from Database
Week 10	Group Functions: AVG, MIN, MAX, SUM
Week 11	Join in SQL Server
Week 12	View data from Database
Week 13	Nested sub-queries
Week 14 & 15	Complete web application using PHP and MySQL

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	<p>Book#1: C. J. Date, "Introduction to Database Systems", 8th Ed. Publisher: Addison-Wesley, 2003</p> <p>Book#2: Ramez Elmasri, Shamkant B. Navathe, " Fundamentals of Database Systems", 7th Ed. Publisher: Pearson, 2016.</p>	NO
Supporting Texts	<p>Reference#1: A. Silberschatz, H. F.Korth, and S. Sudarshan, "Database System Concepts", 5th Ed. McGraw-Hill (2006).</p> <p>1 . Reference#2: Database Systems the Complete Book by H. Garcia-Molina and et al. Prentice Hall; 2nd Edition</p>	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	راسب	(0-44)	Considerable amount of work required

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

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information				
معلومات المادة الدراسية				
Module Title	Engineering Analysis		Module Delivery	
Module Type	Core		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar	
Module Code	CET3204			
ECTS Credits	6			
SWL (hr/sem)	150			
Module Level	3	Semester of Delivery		6
Administering Department	CET	College	EETC	
Module Leader	Oras Ahmed Shareef		e-mail	dr.oras@mtu.edu.iq
Module Leader's Acad. Title	Assist. Prof.		Module Leader's Qualification	Ph.D.
Module Tutor	M.Sc. Sarab Shanan Sawadi		e-mail	psg.sarab.shanan@uobasrah.edu.iq
Peer Reviewer Name	Asst. Prof. Alhamzah Taher Mohammed		e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025		Version Number	1.0

Relation with other Modules

العلاقة مع المواد الدراسية الأخرى

Prerequisite module	Mathematics II (CET1204)	Semester	2
Co-requisites module		Semester	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	This course aims to provide students with a fundamental understanding of basic and advanced engineering analysis techniques, including engineering components and systems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	<ol style="list-style-type: none">1. Introduce the students to the theory and application of Laplace transform.2. Give students an understanding of the time and frequency domain with different functions.3. Get better in powered circuit analysis with applications and practical examples of matrix in Matlab.4. Introduce the z-transform, which is the generalisation of the Laplace transform to discrete-time systems.5. Provide students with a fundamental understanding of basic and advanced statistical techniques.6. Provide students with a fundamental understanding of statistical measurements and graphs.7. Provide an introduction to the method, tools and ideas of numerical computation, including the bisection method, false position method, and Newton-Raphson method.8. Use numerical methods for solving algebraic and transcendental equations and solutions of linear and non-linear simultaneous equations.9. Understand the basic theory of the numerical solution of ordinary differential equations.10. Be familiar with the theorem that is related to matrices and its applications to analysis of the electronic circuits.11. Learning the method of solving complicated equations.12. Applying all of the above outcomes practically using Matlab.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <ul style="list-style-type: none">- Laplace Transform [15 hrs]- Z-transform [15 hrs]- Numerical computations [15hrs]- solution of linear simultaneous [10hrs]- Solution of nonlinear equation [5 hrs]- Numerical solution of ordinary differential equation [5 hrs]- High-level assessment Matrix [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 the type of simple experiments involving some sampling activities that are interesting to the students.
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Student Workload (SWL)

الحمل الدراسي للطالب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	86	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	5.73
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, 10	LO #1-3 , LO # 4-10
	Assignments	2	10% (10)	2, 12	LO # 1,2 , LO # 3-10
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 1-11
Summative assessment	Midterm Exam	2 hr	10% (10)	5	LO # 1-5
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	Fundamental of Laplace transform (L.T)
Week 2	properties, theorem of L.T
Week 3	Applications of L.T in electronic circuits
Week 4	Fundamental of Z-transform (Z.T), properties of Z.T
Week 5	Midterm Exam
Week 6	theorem of Z.T
Week 7	Applications of Z.T
Week 8	Numerical computations
Week 9	(bisection method, false position method,
Week 10	Newton Raphson's method, solution of algebraic and transcendental equations
Week 11	solution of linear simultaneous equations : 1)Direct methods: a)Gauss elimination B)Gauss Jordan
Week 12	2)Iterative method a)Jacobi's B)Gauss seidel iteration)
Week 13	Solution of nonlinear equation (Newton Raphson method)
Week 14	Numerical solution of ordinary differential equation (Picard's, Euler's method)
Week 15	Matrices solution of the linear system of equations, linear transformations, Cayley-Hamilton theorem

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Using Matlab in engineering analysis
Week 2	Lab 2: application of Laplace transform in electronic circuits.
Week 3	Lab 3: application of Z-transform
Week 4	Lab 4: bisection method
Week 5	Lab 5: newton-Raphson method
Week 6	Lab 6: Numerical solution of ordinary D.E
Week 7	Lab 7: Gaussian elimination and Gaussian Jordan methods

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Higher Engineering Mathematics by Dr. B.S. Grewal	Yes
Recommended Texts	An introduction to Numerical analysis by David F. Mayers	yes
Websites	www.ocw.mit.edu , www.math.uiowa.edu	

Grading Scheme

مخطط الدرجات

Group	Grade	التقدير	Marks (%)	Definition
Success Group (50 - 100)	A - Excellent	امتياز	90 - 100	Outstanding Performance
	B - Very Good	جيد جدا	80 - 89	Above average with some errors
	C - Good	جيد	70 - 79	Sound work with notable errors
	D - Satisfactory	متوسط	60 - 69	Fair but with major shortcomings
	E - Sufficient	مقبول	50 - 59	Work meets minimum criteria
Fail Group (0 - 49)	FX = Fail	راسب (قيد المعالجة)	(45-49)	More work is required but credit awarded
	F – Fail	راسب	(0-44)	A 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	Digital Image Processing		Module Delivery
Module Type	Elective		<input checked="" type="checkbox"/> Theory <input type="checkbox"/> Lecture <input checked="" type="checkbox"/> Lab <input type="checkbox"/> Tutorial <input type="checkbox"/> Practical <input type="checkbox"/> Seminar
Module Code	CET3206		
ECTS Credits	5		
SWL (hr/sem)	125		
Module Level	3	Semester of Delivery	
Administering Department	CET	College	EETC
Module Leader	Dr. Mohammed Joudah	e-mail	mjzaiter@mtu.edu.iq
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Hussein Muhi Huraiz	e-mail	Hussein.MuhiHuraiz@mtu.edu.iq
Peer Reviewer Name	Asst. Prof. Alhamzah Taher Mohammed	e-mail	alhamza_tm@mtu.edu.iq
Scientific Committee Approval Date	29/10/2025	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

<p>Module Aims</p> <p>أهداف المادة الدراسية</p>	<ol style="list-style-type: none"> 1. To become familiar with digital image fundamentals 2. To get exposed to simple image enhancement techniques in Spatial and Frequency domain. 3. To learn concepts of degradation function and restoration techniques. 4. To study the image segmentation and representation techniques. 5. To become familiar with image compression and recognition methods
<p>Module Learning Outcomes</p> <p>مخرجات التعلم للمادة الدراسية</p>	<ol style="list-style-type: none"> 1. Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms. 2. describe features of images. 3. Have a good understanding of the mathematical foundations for digital manipulation of images. 4. Operate on images using the techniques of smoothing, sharpening and enhancement. 5. image acquisition; preprocessing; segmentation; Fourier domain processing, compression and 6. analysis. 7. Be able to write programs using Matlab language for digital manipulation of images; image 8. Understand the restoration concepts and filtering techniques. 9. Be able to understand the documentation for, and make use of, the MATLAB library and MATLAB. 10. Acquisition; preprocessing; segmentation; Fourier domain processing; and compression. 11. Learn and understand the Image Enhancement in the Spatial Domain. 12. Learn and understand the Image Enhancement in the Frequency Domain. 13. Learn the basics of segmentation, features extraction, compression and recognition methods for color models.
<p>Indicative Contents</p> <p>المحتويات الإرشادية</p>	<p>Indicative content includes the following.</p> <p><u>Fundamentals</u> Need for DIP- Fundamental steps in DIP – Elements of visual perception -Image sensing and Acquisition – Image Sampling and Quantization – Imaging geometry, discrete image mathematical characterization. [15 hrs]</p> <p><u>Image Transforms</u> Two dimensional Fourier Transform- Properties – Fast Fourier Transform – Inverse</p>

	<p>FFT, Discrete cosine transform and KL transform.-Discrete Short time Fourier Transform- and its application in Compression. [10 hrs]</p> <p><u>Image Enhancement</u></p> <p>Spatial Domain: Basic relationship between pixels- Basic Gray level Transformations – Histogram Processing – Smoothing spatial filters- Sharpening spatial filters. Frequency Domain: Smoothing frequency domain filters- sharpening frequency domain filters Homomorphic filtering. [15 hrs]</p> <p><u>Image Restoration:</u></p> <p>Overview of Degradation models –Unconstrained and constrained restorations- Inverse Filtering , Wiener-Filter. [10 hrs]</p> <p><u>Feature Extraction:</u></p> <p>Detection of discontinuities – Edge linking and Boundary detection- Thresholding- - Edge based segmentation-Region based Segmentation- matching-Advanced optimal border and surface detection- Use of motion in segmentation. Image Morphology – Boundary descriptors- Regional descriptors. [10 hrs]</p> <p><u>Image Reconstruction from Projections:</u></p> <p>Need- Radon Transform – Back projection operator- Projection Theorem- Inverse Radon Transform. [10 hrs]</p>
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Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	<p>The assessment strategy for this module is designed to provide students with the opportunity to demonstrate the skills and knowledge as described in the learning outcomes. The written examination will assess the knowledge of terminology, concepts and theory of Digital Image Processing, as well as the ability to analyze problems and apply mathematical models of signal processing to solve and predict effects. The laboratory experiments will evaluate the acquired technical skills and expertise required to apply these methods to practical Digital Image Processing tasks.</p>

Student Workload (SWL)

الحمل الدراسي للطالب موزع على (15) اسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	Structured SWL (h/w) الحمل الدراسي المنتظم للطالب أسبوعياً	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	Unstructured SWL (h/w) الحمل الدراسي غير المنتظم للطالب أسبوعياً	4.06
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

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

Delivery Plan (Weekly Syllabus)

المنهاج الاسبوعي النظري

	Material Covered
Week 1	• Introduction and Digital Image Fundamentals: <ul style="list-style-type: none">• The origins of Digital Image Processing• Examples of Fields that Use Digital Image Processing• Fundamentals Steps in Image Processing
Week 2	Introduction and Digital Image Fundamentals (cont.): <ul style="list-style-type: none">• Image Sampling and Quantization,• Some basic relationships like Neighbors, Connectivity, Distance• Measures between pixels• Translation, Scaling, Rotation and Perspective Projection of image
Week 3	Introduction and Digital Image Fundamentals (cont.): <ul style="list-style-type: none">• Linear and Non Linear Operations
Week 4	Image Enhancement in the Spatial Domain: <ul style="list-style-type: none">• Some basic Gray Level Transformations• Histogram Processing
Week 5	Image Enhancement in the Spatial Domain (cont.): <ul style="list-style-type: none">• Enhancement Using Arithmetic and Logic operations
Week 6	Image Enhancement in the Spatial Domain (cont.): <ul style="list-style-type: none">• Combining Spatial Enhancement Methods• Basics of Spatial Filters
Week 7	Mid-term Exam
Week 8	Image Enhancement in the Spatial Domain (cont.): <ul style="list-style-type: none">• Smoothing and Sharpening Spatial Filters
Week 9	Image Enhancement in the Spatial Domain (cont.): <ul style="list-style-type: none">• Histogram Processing
Week 10	Image Enhancement in the Frequency Domain: <ul style="list-style-type: none">• Introduction to Fourier Transform and the frequency Domain• Computing and Visualizing
Week 11	Image Enhancement in the Frequency Domain (cont.): <ul style="list-style-type: none">• Smoothing Frequency Domain Filters
Week 12	Image Restoration: <ul style="list-style-type: none">• A model of The Image Degradation / Restoration Process
Week 13	Image Restoration (cont.): <ul style="list-style-type: none">• Inverse filtering• Wiener filtering

Week 14	Image Segmentation: <ul style="list-style-type: none"> • Detection of Discontinuities • Edge linking and boundary detection • Thresholding
Week 15	Object Recognition: <ul style="list-style-type: none"> • Patterns and Pattern Classes • Decision-Theoretic Methods

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Digital image Representation <ul style="list-style-type: none"> • Reading, Displaying, Writing Images using MATLAB • Data Classes, Image Types using MATLAB
Week 2	Lab 2: Digital image Representation (cont.) <ul style="list-style-type: none"> • Introduction to M Function Programming using MATLAB
Week 3	Lab 3: Image Enhancement in the Spatial Domain: <ul style="list-style-type: none"> • Intensity Transformation Function (MATLAB)
Week 4	Lab 4: Image Enhancement in the Spatial Domain (cont.): <ul style="list-style-type: none"> • Histogram Processing and Function Plotting (MATLAB)
Week 5	Lab 5: Image Restoration
Week 6	Lab 6: Image Segmentation.
Week 7	Lab 7: Object Recognition:

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	Fundamentals of Digital Image Processing, Anil.K.Jain – ,Pearson Education-2003.	No
Recommended Texts	Rafael C. Gonzalez, Richard E. Woods, 'Digital Image Processing', Pearson, Third Edition, 2010.	No
Websites	https://www.youtube.com/watch?v=6dFnpz_AEyA&list=PL9567DFCA3A66F299	

Grading Scheme

مخطط الدرجات

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

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