Ministry of Higher Education

Iraq University College

Computer Engineering Technology Department

(Electronics)

Academic Program & courses descriptions

For academic year

2025 - 2026

وزارة التعليم العالي والبحث العلمي

جهاز الاشراف والتقويم العلمي

دائرة ضمان الجودة والاعتماد الاكاديمي

قسم الاعتماد الدولي

وصف البرنامج الاكاديمي والمقررات الدراسية
لقسم هندسة تقنيات الحاسوب/ الالكترونيك
للعام الدراسي 2026/2025

الكلي/المعهد كلية العراق الجامعة

القسم: هندسة تقنيات الحاسوب/الالكترونيك

اسم البرنامج الاكاديمي او المهني: هندسة تقنيات الحاسوب/الالكترونيك

اسم الشهادة النهائية:بكلوريوس هندسة تقنيات الحاسوب/الالكترونيك

النظام الدراسي: فصلي

تاريخ اعداد الوصف: 2025/7/1

تاريخ ملئ الملف: 2025/9/1

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م.م. احمد حسن محمد اللامي

مسؤول ضمان الجودة وتقييم الاداء

Academic Program & courses descriptions
For academic year 2025 – 2026

Computer Technology Engineering/ Electronics
Programme Review

Programme Specification

A Computer Engineering Technology focuses on the practical programming, operation, maintenance, and application of computing, electronics, and software to design and analyze computer systems, emphasizing a blend of theoretical foundations in math and science with hands-on experience in digital circuits, microcomputers, and embedded systems. The curriculum aims to produce innovative engineers with skills in areas like programming, networking, hardware-software integration, and problem-solving for diverse industries.

Department Vision

Excellence and distinction in computer techniques, engineering specializations, teaching, research, and computer technology applications

Department mission

Seeking to graduate Computer technology engineers who are able to design, implement, setup, and operate all computer systems, computer networks, and maintaining high-skilled competition in the job market.

1. Technical Institution	Iraq University College
2. University Department/Center	Computer Engineering Technology/Electronics, CET
3. The Programme Title	Computer Engineering Technology Department
4. Title of Final Award	B.Sc. in Computer Engineering Technology/Electronics
5. Modes of the Attendance offered	
6. Accreditation	Ministry of Higher Education and Scientific Research Program Accreditation / International Accounting Education Standards
7. Other external influences	
8. Date of Production/revision of this specification	10/9/2025

9. Aims of the Programme

1. Providing students with knowledge, vocational and basic skills, practical skills for being able to diagnose faults and conduct maintenance, and repairs to computer systems
2. Enhancing students' ethical standards and personal communication skills.
3. Continue the development of the courses in accordance with the needs of the job market.
4. Encouraging faculty members and students to conduct research and studies on computing, propose pioneering ideas, and pursue learning permanently.
5. Establishing communication links with relevant parties in the fields of engineering, training and research.
6. Providing training and engineering technical consultations to relevant parties in the local community.

Specialization Outputs

The department aims at graduating students in the skills of scientifically and practically capable and uses and processing of computer technologies in order to meet the needs in the labor market and keep pace with development and modern innovations and create a critical mindset for what is available in computer technologies for the purpose of improvement.

10. Learning Outcomes, Teaching, Learning and Assessment Methods

A. Knowledge and Understanding

A1. Developing the student's knowledge through his general mastery of the principles of computer technology and its applications.

A2. Using multiple and diverse methods for the purpose of stimulating creativity and cognitive performance of students in the subjects of computer technology and its applications.

A3. The student's awareness and understanding of the work of the Computer system, represented by the mechanisms of constructing, assembling, operating, programming and maintaining successful application.

B. ***Subject-specific skills***

B1. Evaluate students through daily, monthly and final exams and encourage them to obtain a broad understanding of computer topics that enable them to practice the profession for running and maintaining computer systems.

B2. Diversity in educational means to ensure the effectiveness of the educational process, which creates awareness and passion among students about computer technologies and their important applications.

B3. Enable the student to form basic skills for designing electronic circuits and dealing with computer, network and software components, computer networks and digital communication systems and all modern technologies associated with this specialization.

- ***Teaching and Learning Methods***

C1. Methods of Delivering Lectures
C2. Discussion and Workshops
C3. Technical Reports and Studies
C4. Applied and Practical Research Projects
C5. Summer Training in State Departments
C6. Use of digital illustrations and projectors

- ***Assessment methods***

1. Exams of various types (daily, pursuit, final)
2. Student feedback (CAT)
3. The way of expression with faces and interviews
4. Learning Matrix
5. Lab Technical reports and assays
6. Professors' Evaluation of Students through Daily Discussions

C. General and rehabilitative skills (thinking/affective/value)

C1. Introducing the student to the ethics of the accounting profession and adhering to it and maintaining integrity and transparency in Computer Technologies. A2- Introducing the student to the role of the computer application in the society and committing to his responsibilities towards the society A3- Encouraging the student to continue education and follow up on new developments in the field of computer technology A4- Promoting the value of teamwork and collaborating with colleagues to achieve common goals C5- Introducing the student to take personal responsibility for actions and mistakes and commitment to improve professional performance in Computer techniques. C6- Innovating advanced methods in solving real and virtual administrative problems by students
• *Teaching and Learning Methods*
1. Mini-teaching (loop) 2. Case study and discussions 3. Online lectures 4. Practical application in the specialized laboratories of the department and the faculty
• *Assessment methods*
1- Tests of various types 2- Interviews and Observations 3- Preparation of Scientific, Engineering, and Applied Technical Reports
D. ***General and Transferable Skills (other skills relevant to employability and personal development***)
D1. Verbal and Written Communication D2. Team work, analysis and verification D3- Flexibility, initiative and motivation at work D4. Planning, Organizing and Time Management.
• *Teaching and Learning Methods*
1- Method of Giving Lectures 2- Student groups. 3- Workshops. 4- Reports and studies 5- Case studies and discussions. 6- Use of digital illustrations and projectors
• *Assessment Methods*
1- Exams of various types 2- Student feedback (CAT)

3- The way of expression with faces
4- Learning Matrix
5- Technical Reports and studies

11. The Courses Description

Since the beginning of academic year 2023/2024, two academic systems are implemented in the Computer Engineering Technology Department. According the decision by the Ministry of Higher Education and Scientific Research, **Bolognia track academic system** is started to replace the **semester system** as from academic year 2023/2024. Hence, currently the first three levels follow Bolognia track system while the fourth level is still follow the previous semester system.

The rest of this report list the detailed description of the four level in the Computer Engineering Technology Department.

11-1 The curriculum for the first three levels:

جمهورية العراق - وزارة التعليم العالي والبحث العلمي | كلية العراق الجامعة | بكالوريوس في هندسة تقنيات الحاسوب/ الالكترونكس (الدورة الأولى)| المنهاج الدراسي للعام 2025-2026

Republic of Iraq - Ministry of Higher Education and Scientific Research
Iraq University College
Bachelor's degree in Computer Technology Engineering (First cycle)
Four years (Eight semesters) - 240 ECTS credits - 1 ECTS = 25 hr
Program Curriculum (2024 - 2025)

جمهورية العراق - وزارة التعليم العالي والبحث العلمي
كلية العراق الجامعة
بكالوريوس في هندسة تقنيات الحاسوب/ الالكترونكس (الدورة الأولى)
(أربع سنوات (ثمانية فصول دراسية) - ٢٤٠ وحدة دراسية - كل وحدة دراسية = ٢٥ ساعة
المنهاج الدراسي للعام 2024-2025

Level	Semester	No.	Module Code	Module Name in English	اسم المادة بالعربية	Languag	SSWL (hrs/w) CL	Lect	Lab	Pr	Tut	Seminar	Exam /wks	SSWL /wks	USSWL /wks	SWL /wks	ECTS	Module Type	Prerequisite Module(s) Code
UGI	One	1	CET1101	Digital Fundamentals	مبادىء الرقمية	English	2		2				4	64	86	150	6	C	
		2	CET1102	Electrical Engineering Fundamentals	مبادىء الهندسة الكهربائية	English	2		2				4	64	86	150	6	C	
		3	CET1103	Mathematics I	الرياضيات 1	English	2				1		3	48	77	125	5	S	
		4	CET1104	Engineering Drawing	الرسم الهندسي	English			3				3	48	77	125	5	S	
		5	CET1105	Engineering workshops	الورش الهندسية	English			4				4	64	86	150	6	S	
		6	CET1106	English Language I	اللغة الانكليزية 1	English	1	1					3	33	17	50	2	B	
						Total	7	1	11	0	1	0	21	321	429	750	30.00		
UGI	Two	1	CET1201	Digital Systems	الانظمة الرقمية	English	2		2				4	64	86	150	6	C	CET1101
		2	CET1202	Electrical Circuits	الدوائر الكهربائية	English	2		2				4	64	86	150	6	C	CET1102
		3	CET1203	Programming Essentials	اساسيات البرمجة	English	2		2				4	64	86	150	6	C	
		4	CET1204	Mathematics II	الرياضيات II	English	2				1		3	48	77	125	5	S	CET1103
		5	CET1205	Democracy and Human Rights	الديمقراطية و حقوق الانسان	Arabic	2						3	33	17	50	2	B	
		6	CET1206	Arabic Language	اللغة العربية	Arabic	2						3	33	17	50	2	B	
		7	CET1207	Computer Fundamentals	اساسيات الحاسوب	English	1		1				4	34	41	75	3	S	
						Total	13	0	7	0	1	0	25	340	410	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة بالعربية	Languag	SSWL (hrs/w) L	Lect	Lab	Pr	Tut	Seminar	Exam /wks	SSWL /wks	USSWL /wks	SWL /wks	ECTS	Module Type	Prerequisite Module(s) Code
UGII	Three	1	CET2101	Engineering Mathematics	الرياضيات الهندسية	English	2				1		3	48	77	125	5.00	S	CET1204
		2	CET2102	Object Oriented Programming, OOP	البرمجة الكيانية	English	2		2		1		4	79	71	150	6.00	S	
		3	CET2103	Computer Organization and Architecture	تركيب ومعمارية الحاسوب	English	2		2				4	64	61	125	5.00	C	
		4	CET2104	Electronics Fundamentals	مبادىء الالكترونيك	English	2		2				4	64	61	125	5.00	C	CET1202
		5	CET2105	Communication Fundamentals	اسس الاتصالات	English	2		2				4	64	61	125	5.00	C	
		6	CET2106	English Language II	اللغة الانكليزية 2	English	1	1					3	33	17	50	2.00	B	
		7	CET2107	The Crimes of Baath Regime	جرائم حزب البعث	Arabic	2						3	33	17	50	2.00	B	
						Total	13	1	8	0	2	0	25	385	365	750	30.00		
UGII	Four	1	CET2201	Advanced Engineering Mathematics	الرياضيات الهندسية المتقدمة	English	2				1		3	48	77	125	5.00	S	CET2101
		2	CET2202	Python Programming	البرمجة بلغة بايثون	English	2		2				4	64	36	100	4.00	S	
		3	CET2203	Microprocessors	المعالجات الدقيقة	English	2		2				4	64	61	125	5.00	C	
		4	CET2204	Analog Communications	الاتصالات المعطية	English	2		2				4	64	61	125	5.00	C	CET2105
		5	CET2205	Electronics Circuits	الدوائر الالكترونية	English	2		2				4	64	61	125	5.00	C	CET2104
		6	CET2206	Instrumentation and Measurement	الاجهزة والقياس	English	2		2				4	64	36	100	4.00	C	
		7	CET2207	Arabic Language 2	اللغة العربية 2	Arabic	2						3	33	17	50	2.00	B	
						Total	14	0	10	0	1	0	26	401	349	750	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) L (hr/sect)	Tut	Lab	Pr	Sem	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
	Five	1	CET3101	Operating System	انظمة التشغيل	English	2		2			4	64	61	125	5.00	C	
		2	CET3102	Control Engineering Fundamentals	اسس هندسة السيطرة	English	2		2			4	64	61	125	5.00	C	
		3	CET3103	Digital Signal Processing	معالجة الاشارة الرقمية	English	2		2			4	64	61	125	5.00	C	
		4	CET3104	Digital Controllers	السيطرة الرقمية	English	2		2			4	64	61	125	5.00	C	
		5	CET3105	Digital Communications	الاتصالات الرقمية	English	2		2			4	64	61	125	5.00	C	
		6	CET31XX	Elective	مادة اختيارية	English	2		2			4	64	61	125	5.00	E	
						Total	12	0	12	0	0	0	24	384	366	750	30.00		
UGII	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) L (hr/sect)	Tut	Lab	Pr	Sem	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
	Six	1	CET3201	Advanced Control Systems	انظمة السيطرة المتقدمة	English	2		2			4	64	61	125	5.00	C	CET3102
		2	CET3202	Computer Networks Fundamentals	اساسيات شبكات الحاسوب	English	2		2			4	64	61	125	5.00	C	
		3	CET3203	Data Base Systems	انظمة قواعد البيانات	English	2		2			4	64	61	125	5.00	C	
		4	CET3204	Engineering Analysis	التحليلات الهندسية	English	2		2			4	64	61	125	5.00	C	
		5	CET3205	Data Communications	اتصالات البيانات	English	2		2			4	64	61	125	5.00	B	
		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	30.00		

Level	Semester	No.	Module Code	Module Name in English	اسم المادة الدراسية	Language	SSWL (hr/w) CL	Lect	Lab	Pr	Tut	Semi	Exam hr/sem	SSWL hr/sem	USSWL hr/sem	SWL hr/sem	ECTS	Module Type	Prerequisite Module(s) Code
	five		CET3106	Real Time System	انظمة الزمن الحقيقي	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	
UGIII																			
	six		CET3206	Digital Image Processing	معالجة الصور الرقمية	English	2		2				4	64	61	125	5.00	E	
			CET3207	IoT Fundamentals	اساسيات انترنت الاشياء	English	2		2				4	64	61	125	5.00	E	
	Seven		CET4101	Artificial Intelligence	الذكاء الاصطناعي	English	2		2				4	64	61	125	5.00	E	
			CET4102	Distributed Computing and Systems	انظمة الحوسبة الموزعة	English	2		2				4	64	61	125	5.00	E	
			CET4103	Neural Networks	الشبكات العصبية	English	2		2				4	64	61	125	5.00	E	
UGIV																			
			CET4201	Reconfigurable Computing Systems	نظم الحوسبة القابلة لإعادة الـ	English	2		2				4	64	61	125	5.00	E	
			CET4202	Wireless Sensors Networks	شبكات المستشعرات اللاسلكية	English	2		2				4	64	61	125	5.00	E	
	Eight		CET4203	Optimization Algorithms	خوارزميات التحسين	English	2		2				4	64	61	125	5.00	E	

Structured SWL (hr/w) type			Module type				
	CL	Class Lecture		B	Basic learning act	SWL:	Student Workload
	Lab	Laboratory		C	Core learning acti	SSWL:	Structured SWL
	Pr	Practical Training		S	Sport or related	USSWL:	Unstructured SWL
	Tut	Tutorial		E	Elective learning a		
	Lect	Online lecture					
	Semi	Seminar					

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

11-2 The curriculum for the fourth stage:

Forth stage- sirst semester

No.	Subjects	Units	Theoretical (h)	Practical (h)
1.	Computer networks I	3	2	2
2.	Computer architecture I	3	2	2
3.	Smart Modeling System	3	2	2
4.	Database	3	2	2
5.	Network security	3	2	2
6.	Graduation Project I	3	2	2
المجموع		18	12	12

Fourth Stage – second semester:

No.	Subjects	Units	Theoretical (h)	Practical (h)
1.	Computer networks II	3	2	2
2.	Computer architecture II	3	2	2
3.	Project management	3	2	2
4.	Optical communications	3	2	2
5.	Artificial intelligent	3	2	2
6.	Graduation Project II	3	2	2
المجموع		18	12	12

Courses Descriptions

Iraq University College

Computer Engineering Technology Department

First Level – Semester One

2025/2026

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Digital fundamentals (CET1101) الاساسيات الرقمية

الفصل الأول 1st Semester

Module Information معلومات المادة الدراسية					
Module Title	**Digital Fundamental**			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CET1101				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	First		**Semester of Delivery**	1	
Administering Department	CET		**College**	IUC	
Module Leader	Alaa Sahel Gaafer		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Alaa Sahel Gaafer		**e-mail**		
Peer Reviewer Name	Prof. Hamza Abbass Al-Sewadi		**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	10/07/2023		**Version Number**	**1.0**	

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

Module Descriptions وصف المادة
This course describes why digital logic circuits have become ubiquitous and introduces approaches to the methodical design of such circuits. Decimal, Hexadecimal, and Binary number systems are described, and techniques are introduced for converting from one system to another. Binary codes for representing numerical and alphanumerical information are discussed. Basic definitions and common elements of binary logic systems are developed. Common representations of digital logic functions and circuits are introduced, including truth tables, waveform representations, schematics, distinctive symbols, and Boolean expressions

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	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, in-coder, multiplexer, demultiplexer, and comparator circuits.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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 the design of logic circuit by using logic gates. 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 the 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
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Number systems; decimal, binary, octal, and hexadecimal number system, conversion, operation. [8 hrs] - Codes- excess-3, gray code, conversions, operations, complements [8 hrs] - Logic gates-NOT, AND, OR, NOR, NAND, XOR, XNOR. [5 hrs] - Logic simplification- Boolean theorem and DeMorgan's law. [10 hrs] - Karnaugh map-SOP, POS, and don't care. [10 hrs] - Arithmetic operations Part A- adder, parallel binary adder, subtractor, adder-subtractor. [10 hrs] - Arithmetic operations Part B- multiplexer, demultiplexer, decoder, encoder, comparator, and code conversion. [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, practical laboratory experiments, interactive tutorials and by considering types of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**64**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**4.26**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**86**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**5.73**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
Assessment		**Time/ Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5 and 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**	2hr	10% (10)	10	LO # 1-10
	Final Exam	3hr	50% (50)	16	All
Total assessment			**100% (100 Marks)**		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Weeks	**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	
Weeks	**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	sum-of-products , SOP

Week 8	Product of Sums 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	No
Recommended Texts	Fundamentals of Digital Logic with Verilog Design McGraw-Hill Education. 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 is 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

Electrical Engineering Fundamentals (IUC00102) اساسيات الكهربائية

1st Semester الفصل الاول

Module Information معلومات المادة الدراسية					
Module Title	**Electrical Engineering Fundamentals**			**Module Delivery**	
Module Type	**C**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET1102**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	**1**	
Administering Department	**CET**		**College**	**IUC**	
Module Leader	Dakhil Ismail Salih		**e-mail**		
Module Leader's Acad. Title	**Assis. Lecturer**		**Module Leader's Qualification**	**M.Sc.**	
Module Tutor	Dakhil Ismail Salih		**e-mail**		
Peer Reviewer Name	**Prof. Hamza Al-Sewadi**		**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	**10/07/2023**		**Version Number**	**1**	

Module Descriptions وصف المادة
Explore the basics of electricity and learn its laws, theorems and how the DC circuit works in this free online course. The history of electricity is fascinating and you find it in nature and the latest technology. This course explains how early scientists came up with laws and theorems such as Ohm's law, Norton's theorem and more. We examine the basic concepts of the DC circuit and how to apply them in modern life. You'll learn about electrical components such as resistors, capacitors, etc., and how to calculate voltage and current across DC circuits.

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To develop problem-solving skills and understanding of circuit theory 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 Law problems. 6. To perform Thevenin's Norton's Theorem.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of 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
Indicative Contents المحتويات الإرشادية	1- Definition: Symbols and Abbreviations, Units, Electric Circuit & Its Element. The Direct Current Network. , Ohms low, Charge, Force, Work, Power. (20 hr) 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 laws. Anatomy of a circuit, Network reduction (20 hr) 3- 3-Revision problem classes : 4- 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)

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**64**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**4.26**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**86**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**5.73**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation

تقييم المادة الدراسي ة

Assessment		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
	Lab.	8	20% (20)	Continuous	All
	Report	1	5% (5)	12	LO # 6-11
Summative assessment	Midterm Exam	2hr	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

Week	Material Covered
Week 1	Symbols and abbreviations
Week 2	The direct current networks, Ohm law
Week 3 & 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 Theory

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	**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 voltage
Week 5	Superposition Method
Week 6	Norton's Theorem. Lab
Week 7	Thevenin'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	1. DC Electrical Circuit Analysis: A Practical Approach Copyright Year: 2020, dissidents. 2. Circuits, C.K. Alexander and M.N.O Sadiku, McGraw-Hill Education	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

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Mathematics 1 (CET1103) 1

الرياضيات

1st Semester **الفصل الاول**

Module Information **معلومات المادة الدراسية**					
Module Title	Mathematics 1			**Module Delivery**	
Module Type	S			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CET1103				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	1	**Semester of Delivery**	1		
Administering Department	CET	**College**	IUC		
Module Leader	Prof. Kadhim Karim	**e-mail**			
Module Leader's Acad. Title	Lecturer	**Module Leader's Qualification**	Ph.D.		
Module Tutor	Prof. Kadhim Karim	**e-mail**			
Peer Reviewer Name	Dr. Hamid Alzuwaini	**e-mail**	hamid.alzuwaini@iuc.edu.iq		
Scientific Committee Approval Date	**10/7/2023**	**Version Number**	1		

Module Description وصف المادة
Concentrates on preparing students with the concepts and skills that apply to the study of Calculus. Topics include polynomial, exponential, logarithmic, and trigonometric functions along with their equations and graphs. Concepts of analytic geometry are also developed. It assumes some knowledge of trigonometric functions and equations for lines and conic sections

Relation with other Modules العلاقة مع المقررات الدراسية الأخرى

Prerequisite module	**----**	**Semester**	**---**
Co-requisites module	**----**	**Semester**	**---**

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	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
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize Line and Circle equations 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 Derivatives. 5. Identify when to use different Differentiation Methods. 6. Discuss the Curve Sketching process and the L'Hospital's Rule. 7. Analyze the 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 and 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 e the Definite Integral Applications Arc Length and Average Value of a Function. 15. Discuss the Definite Integral Applications Areas Between Two Curves
Indicative Contents المحتويات الإرشادية	**Part A - Preliminaries to differential calculus**. This part includes the Line and Circle Equation and related evaluating formulas and parameters. Furthermore, the main mathematical Function characteristics are 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, and then the Continuity Conditions. [9 hrs] + Revision problem classes in weekly tutorials [3 hrs] **Part B – Differential calculus.**

	This part will take in detail the first key subject of the semester, the Differentiation process from the perspective of Definition as limit, Differentiation Rules, and Function Derivative Table. This 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, the Hospital's Rule, and Taylor and Maclaurin Series. [12 hrs] + Revision problem classes in weekly tutorials [5 hrs] **Part C – Integral calculus.** 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, the Average Value of a Function, and Areas Between two Curves. [22 hrs] + Revision problem classes in weekly tutorials [8 hrs

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	47	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية

Assessment		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	Quizzes	2	10% (10)	5,10	LO #1 – 9
	Assignments	2	20% (20)	5,10	LO # 1 - 4, LO # 6-9
	Projects / Lab.	N/A	--	--	
	Report	1	10% (10)	--	LO # 1 – 14
Summative assessment	Midterm Exam	2hr	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	
Week	**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
Note: 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 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
	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

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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

الرسم الهندسي Engineering Drawing CET1104

الفصل الاول 1st Semester

Module Information معلومات المادة الدراسية					
Module Title	Engineering Drawing			**Module Delivery**	
Module Type	Support or related learning activity			☐ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CET1104				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	1		**Semester of Delivery**		1
Administering Department	CET		**College**		IUC
Module Leader	Mr. Raed Hasan Sayhood		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**		M.Sc
Module Tutor	Mr. Raed Hasan Sayhood		**e-mail**		
Peer Reviewer Name	Prof. Hamza Al-Sewadi		**e-mail**	Hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	**11/7/2023**		**Version Number**	1	

Module Descriptions وصف المادة

Relation with other Modules العلاقة مع المقررات الدراسية الأخرى			
Prerequisite module	**NoneNone**	**Semester**	
Co-requisites module		**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the basics of AutoCAD 2. Explain Drawing settings 3. How to draw: Point, Line, Multiline, P line, Spline, X line, Rectangle. 4. How to draw: 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.
Indicative Contents المحتويات الإرشادية	5- Indicative content includes the following. 6- --AutoCAD Software, drawing settings, Drawing Tools, Line, Circle, Arc, Ellipse, Donut, 7- Polygon, Rectangle, Point, Multiline, P line, Spline, X line. [20 hrs.] 8- --Modify Tools 9- Erase, Undo, Redo, Explode, Move, Copy, Rotate, Mirror, Array, Align, Scale, Stretch, 10- Lengthen, Trim, Extend, Break, Join, Chamfer, Fillet. [4 hrs.]

	11- --Display Control Zoom, Pan, Redraw, Clean Screen. [4 hrs.] 12- --Dimension - Linear, Aligned, Radius, Diameter, Center Mark, Angle, Arc length, 13- Continuous, Baseline, Tolerance, Dimension Space, Dimension Break, Jogged radius, 14- Ordinate dimensions. [4 hrs.] 15- --Hatching Objects [4hrs] 16- --Text, Style, M text, Scale text, Spell, [4 hrs.] 17- --3D MODELLING, Convert 2D to 3D, Solid Editing [20 hrs.]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**48**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**3.2**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**77**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**5.13**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**125**		

Module Evaluation تقييم المادة الدراسي ة					
Assessment		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
	Lab.	10	20% (20)	Continuous	
	Report				
Summative assessment	Midterm Exam	3hr	10% (10)	7	LO #1 -7
	Final Exam	3hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Week	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	3. An Introduction to Autodesk Inventor 2010 and AutoCAD 2010 Unbnd Edition 4. 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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Engineering Workshops (CET1105) الورش الهندسية

الفصل الأول 1st Semester

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Workshops**			**Module Delivery**	
Module Type	Support or related learning activity			☐**Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CET1105				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	First		**Semester of Delivery**	1	
Administering Department	CET		**College**	IUC	
Module Leader	Dakhil Ismael		**e-mail**	Dakhil@iuc.edu.iq	
Module Leader's Acad. Title	Assist Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Dakhil Ismael		**e-mail**		
Peer Reviewer Name	Prof. Hamza Al-Sewadi		**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	10/07/2023		**Version Number**	**1.0**	

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

Module Descriptions وصف المادة

The most important characteristics of the course are a study of all electrical devices and electronic measuring devices, methods of using types of soldering and irons, methods of making effective electrical circuits, soldering resistors, capacitors, diodes, transistors, and coils, and creating new devices through these electronic circuits.

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	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. 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 and safely maintain different devices. In general, studying this subject aims to prepare students to become skilled technicians in the fields 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
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	The learning outcomes of studying Electrical, Electronic, and Mechanical workshops include: 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 can 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 promote 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 workshop operations. b. Identify and explain the safety measures and regulations applicable to electrical and mechanical workshops. 7. Describe the different tools, machines, and materials used in electrical and mechanical workshops. 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. 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. 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. 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. 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 clearly and concisely. 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 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.

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Electronic workshop 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.] We will also talk about conductors and semiconductors [10 hrs.] Part B – Electrical workshop 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.]

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 the type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**64**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**4.26**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**86**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**5.73**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية

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

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Weeks	**Material Covered**
Week 1&2	❖ 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	❖ 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	❖ Electronic components (resistor, inductors, capacitors) ❖ 1- ONE LAMP CONTROLLED BY ONE SWITCH 2- 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	❖ Electronic components (Battery, jumper, fuse, push button, switch, rotary switch) ❖ 1-Introduction to Workshop Safety 2- Turning Process and Instrumentation Measures
Week 13&14	❖ Electronic components (Diode, Transistor, Transformer)

	❖ 1- Cutting Tools 2-Practical Exercise - Horizontal Turning
Week 15	❖ using breadboard and Vero board, building a Circuit on Breadboard, Building a Circuit on Vero board ❖ 1- Turning Different Shapes 2- Introduction to the 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 is 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

English Language 1 (CET1106) 1 اللغة الانكليزية

1st Semester الفصل الاول

Module Information معلومات المادة الدراسية					
Module Title	English Language 1			**Module Delivery**	
Module Type	Basic learning activities			☒ **Theory** ☒**Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CET1106				
ECTS Credits	2				
SWL (hr/sem)	50				
Module Level	1		**Semester of Delivery**		1
Administering Department	CET		**College**		IUC
Module Leader	Dr. Kais Khaleel		**e-mail**	Kays.khlil@iuv.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**		PhD
Module Tutor	Dr. Kais Khaleel		**e-mail**	Kays.khlil@iuv.edu.iq	
Peer Reviewer Name	Prof. Hamza Al-Sewadi		**e-mail**	Hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	**10/7/2023**		**Version Number**		1

Module Description وصف المادة

This module aims to enhance the communication skills of students whose level is just passing high school and starting university study. There will be a particular focus on the development of the four language skills (speaking, listening, reading, and writing) and on broadening students' vocabulary and syntactical range so that they can communicate easily on a wide range of topics, as well as specialized in engineering college.

Relation with other Modules العلاقة مع المقررات الدراسية الأخرى			
Prerequisite module	**----**	**Semester**	**---**
Co-requisites module	**----**	**Semester**	**---**

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	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), adjectives, adverbs, 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	The student will have the ability to: 1. Know the English skills of reading and writing. 2. Recognize other English language skills such as grammar, and vocabulary. 3. Understand and appreciate the importance of grammar aspects and vocabulary to increase the ability to communicate ideas about the English language. 4. Understand pronouns, questions, and short answers. 5. Understand the 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	Indicative content includes the following. **Part A: Parts of Sentence.** Pronoun, question, and short answer, adjective, adverb, prepositions of place. [14 hrs] **Part B: Tenses** Past Tense, Present Tense, and Future Tense. [8 hrs] Part C: Reading and Writing Punctuation marks, and practicing writing [8 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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. - Writing an assignment and report that encourages students to clarify and organize their thinking and independently research and present on a topic.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	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					
Assessment		**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.	N/A	--	--	
	Report	1	10% (10)	14	1-8

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

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	**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, Adjectives and Nouns Reading and Writing Skill
Week 3	Unit 3: Grammar: Negatives, Questions, and short Answers Vocabulary: Jobs, Personal Information Reading and Writing Skill
Week 4	Unit 4: Grammar: Possessive adjectives, Possessive, 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, Words 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, requests 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, 5TH Edition, Betty S. Azar Stacy A. Hagen.	No
Websites	https://www.khanacademy.org/math/differential-calculus	

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 is 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.

Iraq University College

Computer Engineering Technology Department

First Level – Semester Two

2025/2026

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية
Digital Systems (CET1201)النظم الرقمية
2nd Semesterألفصل الثاني

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**	IUC	
Module Leader	Mrs. Israa Kadhim		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Msc.	
Module Tutor	Mrs. Israa Kadhim		**e-mail**		
Peer Reviewer Name	Prof. Hamza Abbass Al-Sewadi		**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	10/ 7/ /2023		**Version Number**	1.0	

Relation with other Modules العالقة مع المقررات الدراسية ألخرى			
Prerequisite module	CET1101	**Semester**	1
Co-requisites module	None	**Semester**	

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

Module Aims أهداف المادة الدراسية	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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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.
Indicative Contents المحتويات االرشادية	Indicative content includes the following. --Flip-Flops – SR latch, T latch, D latch. **[10 hrs]** --Flip-Flops- JK FF, edge triggered, and conversion from one type to another. [**10 hrs]** --Counters- Asynchronous, synchronous counters, Decade, up-down counters, and counter decoding. **[15 hrs]** --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]** --Multivibrators- definition, astable, bistable, mono-stable, and 555 timer **[5 hrs]** --A/D convertors modeling -flash ADC, tacking ADC, slope ADC ,successive approximation ADC, digital ramp ADC, delta sigma ADC. **[5 hrs]** --D/A convertors modeling -R/2R DAC, R/2nR DAC. **[5 hrs]**
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.

Student Workload (SWL) الحمل الدراسي للطالب موزعة على 15 أسبوع			
Structured SWL (h/sem) الحمل الدرا يالمنتظم للطالب خالل الفصل	64	**Structured SWL (h/w)** الحمل الدرا يالمنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدرا يرغ ريالمنتظم للطالب خالل الفصل	86	**Unstructured SWL (h/w)** الحمل الدرا يرغ ريالمنتظم للطالب أسبوعيا	5.73
Total SWL (h/sem) الحمل الدرا يراك يلطالب خالل 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 الأسبوعي النظري	
	Material Covered
Week 1	Flip-flops and laches(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, tacking ADC, slope ADC ,successive approximation ADC, digital ramp ADC, delta sigma ADC)
Week 15	D/A convertors (R/2R DAC, R/2^nR DAC)
Week 16	**Preparatory week before the final Exam**

Delivery Plan (Weekly Lab. Syllabus) المنهاج الأسبوعي 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
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MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

الدوائر الكهربائية(Electrical Circuits (CET1202

الفصل الثاني 2nd Semester

Module Information معلومات المادة الدراسية					
Module Title	Electrical Circuits			**Module Delivery**	
Module Type	Core			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CET1202				
ECTS Credits	6				
SWL (hr/sem)	150				
Module Level	First		**Semester of Delivery**	2	
Administering Department	CET		**College**	IUC	
Module Leader	Dakhil Ismaeel Salih		**e-mail**		
Module Leader's Acad. Title	Assist Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Dakhil Ismaeel Salih		**e-mail**		
Peer Reviewer Name	Prof. Hamza Abbas Al-Sewadi		**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	10/07/2023		**Version Number**	**1.0**	

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

Module Descriptions وصف المادة

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

Module Objectives أهداف المادة الدراسية	1. To develop problem solving skills and understanding of circuit theory 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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize how electricity works in electrical circuits. 2. List the various terms associated with electrical circuits. 3. Summarize what is meant by a basic electric circuit. 4. Discuss the reaction and involvement of atoms in electric circuits. 5. Describe electrical power, charge, and current. 6. Define Ohm's law. 7. Identify the basic circuit elements and their applications. 8. Discuss the operations of 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.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Definition: - The Alternating Current Network Types of Alternating Waveforms, Generation of Alternating Current, and Definitions related to Alternating Waveforms The Alternating Current Network. Ohms low, The Mean Values, The Effective Vales, The Vector Diagram (40 hr) Circuit Theory in (A.C) 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) 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)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	This Course Specification prepares the student to be able to realize basicىparameters 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 محسوب لـ ١٥ اسبوعا

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**64**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**4.26**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**86**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**5.73**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

Module Evaluation تقييم المادة الدراسية					
Assessment		**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.	1	20% (20)	Continuous	LO # 1-12
	Report	1	10% (10)	12	LO # 1-12
Summative assessment	**Midterm Exam**	2hr	10% (10)	8	LO # 1-9
	Final Exam	3hr	50% (50)	16	All
Total assessment			**100% (100 Marks)**		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Weeks	**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
Week 16	Preparatory week before the final Exam

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
Weeks	**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	No
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 is 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

Programming Essentials (CET1203) **اساسيات البرمجة**

1st Semester **الفصل الاول**

Module Information **معلومات المادة الدراسية**					
Module Title	**Programming Essentials**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET1203**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	**CET**		**College**	**IUC**	
Module Leader	**Mr.Aqeel Adil**		**e-mail**		
Module Leader's Acad. Title	**Professor**		**Module Leader's Qualification**	m.s	
Module Tutor	**Mr.Aqeel Adil**		**e-mail**		
Peer Reviewer Name	**Prof. Hamza Al-Sewadi**		**e-mail**	**hamza.ali@iuc.edu.iq**	
Scientific Committee Approval Date	**10/07/2023**		**Version Number**	**1**	

Module Descriptions **وصف المادة**

Relation with other Modules العلاقة مع المقررات الدراسية الأخرى			
Prerequisite module	**NoneNone**	**Semester**	
Co-requisites module		**Semester**	

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

Module Objectives أهداف المادة الدراسية	1. To develop problem-solving skills and understanding of programming principles. 2. To understand the logic behind programming. 3. This course includes using C++ as a programming language. 4. This course includes algorithm design. 5. To understand how a programmer should prepare his work and think logically. 6. To perform programming projects using control statements, and functions, and to deal with the data stored in an array or file.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Use of algorithms (Flowchart specifically). 2. Explain how the program is written using C++ Programming language. 3. Define and use variables (Data types, Declaration of variables). 4. Use of operators and their 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 drawing of Flowchart of if-else statement. 6. Use of Loops (for, while, do-while), 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++.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - -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. Introduction to C++ with a simple program implementation. Types of programming errors, Program development life cycle, Algorithms - Flowchart - . Header files, Standard Input/output instructions, Comments in C++. [15 hrs] -- Variables, Data Types, Declaration of variables, Constants, Statements. Operators (Assignment, Arithmetic operators, Relational and Logical operators, Bitwise Operators, Increment and decrement, Cast operator, and Conditional operator), Precedence of operators. [5 hrs] -- 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. [10 hrs]

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	**64**	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	**4.26**
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	**86**	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	**5.73**
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**150**		

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 learning and developing their skills in programming and logical 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.
	- -Arrays (One dimensional and Two Dimensional) [5 hrs] -- 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. [15 hrs] -- Character sequences and string handling, ASCII table. [5 hrs] - -Handling and processing text files in C++ [5 hrs]

Module Evaluation تقييم المادة الدراسي ة					
Assessment		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
	Lab.	1	10% (10)	Continuous	LO #1- 11
	Report	1	5% (5)	12	LO #1- 11
Summative assessment	Midterm Exam	2hr	10% (10)	7	LO #1- 7
	Final Exam	4hr	50% (50)	15	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	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 files, and executable files. 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), a flowchart of if-else statements.
Week 6	Making Decisions (switch statement), using a break statement with a switch statement, and the flowchart of the switch statement.
Week 7	Mid-term Exam
Week 8	Loops (while, do-while), using break and continue statements with loops, the 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 الاسبوعي للمختبر	
Week	**Material Covered**
Week 1	Lab 1: Introduction to C++ with a simple program implementation. Header files, Standard Input/output instructions, and 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	5. Starting with Programming Logic and Design (What's 6. 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 is required but credit is 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

Mathematics II (CET1204) 2 الرياضيات

2nd Semester الفصل الثاني

Module Information معلومات المادة الدراسية					
Module Title	Mathematics II			**Module Delivery**	
Module Type	Support or related learning activity			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CET1204				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	1		**Semester of Delivery**		2
Administering Department	CET			**College**	IUC
Module Leader	Prof. Kadhim Karim		**e-mail**		
Module Leader's Acad. Title	Professor		**Module Leader's Qualification**		Ph.D.
Module Tutor	Prof. Kadhim Karim		**e-mail**		
Peer Reviewer Name	Dr. Hamid Alzuwaini		**e-mail**	Hamza.ali@iuv.edu.iq	
Scientific Committee Approval Date	**10/7/2023**		**Version Number**	1	

Module Description وصف المادة
Concentrates on preparing students with the concepts and skills that apply to the study of Calculus. Topics include polynomial, exponential, logarithmic, and trigonometric functions along with their equations and graphs. Concepts of analytic geometry are also developed. It assumes some knowledge of trigonometric functions and equations for lines and conic sections

Relation with other Modules العلاقة مع المقررات 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

Module Objectives أهداف المادة الدراسية	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
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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.
Indicative Contents المحتويات الإرشادية	**<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]** **<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]** **<u>Part C – System of Linear Equations.</u>** **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] **<u>Part D – Vector Spaces and Diagonalization.</u>** **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]**

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 محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.13
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
Assessment		**Time/ Number**	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	20%	5,10	LO # 1 - 14, LO # 6-9
	Assignments	2	15%	5,10	LO # 1 - 14, LO # 6-9
	Projects / Lab.	N/A	--	--	
	Report	1	5%	--	LO # 1 - 15
Summative assessment	**Midterm Exam**	2hr	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	
Week	**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
Note: Each week, a question sheet related to the material presented in the theoretical lecture will be solved and debated.	

Delivery Plan (Weekly Tutorial) المنهاج الاسبوعي الإضافي
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
Democracy and Human Rights (CET1205) الديمقراطية وحقوق الانسان

Module Information معلومات المادة الدراسية					
Module Title	**Democracy and Human Rights**			**Module Delivery**	
Module Type	**Basic learning activities**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET1205**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	CET		**College**	IUC	
Module Leader	Mr. Mohammad Al-Mosawi		**e-mail**		
Module Leader's Acad. Title	Asst Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Mr. Mohammad Al-Mosawi		**e-mail**		
Peer Reviewer Name	Prof. Hamza Abbass Al-Sewadi		**e-mail**	Hamza.ali@iuv.edu.iq	
Scientific Committee Approval Date	10/7/2023		**Version Number**	1.0	

Relation with other Modules العالقة مع المقررات الدراسية ألخرى			
Prerequisite module	None	**Semester**	
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. التطور التاريخي لحقوق الإنسان: دراسة التطور التاريخي لفهم حقوق الإنسان من الحضارات القديمة إلى العصور الحديثة. 2. حقوق الإنسان في الشرائع السماوية: التركيز على حقوق الإنسان في الإسلام وكيف تم تضمينها في الشريعة الإسلامية. 3. اعتراف إقليمي بحقوق الإنسان: فحص اعتراف الأقاليم الأوروبية، الأمريكية، الإفريقية، الإسلامي، والعربي بحقوق الإنسان. 4. دور المنظمات غير الحكومية: دراسة دور المنظمات مثل اللجنة الدولية للصليب الأحمر ومنظمة العفو الدولية في حماية حقوق الإنسان. 5. الإطار القانوني الدولي والإقليمي: التركيز على المواثيق الدولية والإقليمية، مثل اللعان العالمي لحقوق الإنسان. 6. تحليل حقوق الإنسان في التشريعات الوطنية: دراسة كيفية ترجمة حقوق الإنسان في التشريعات الوطنية، مع التركيز على الدستور العراقي. 7. تصنيف حقوق الإنسان وضماناتها: فهم مختلف أشكال حقوق الإنسان والضمانات الدستورية والقضائية والسياسية لحمايتها.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. القدرة على وصف وتحليل التطور التاريخي لحقوق الإنسان منذ الحضارات القديمة حتى العصور الحديثة. 2. القدرة على فحص حقوق الإنسان في حضارة وادي الرافدين وغيرها لفهم التأثير الثقافي على تطورها. 3. تفسير حقوق الإنسان في الإسلام وفهم كيف تم تضمينها في الشريعة الإسلامية. 4. القدرة على تحليل تطور حقوق الإنسان خال العصور الوسطى والحديثة. 5. الفهم الشامل الاعتراف الأقاليم الأوروبية، الأمريكية، الإفريقية، الإسلامي، والعرب بحقوق الإنسان. 6. القدرة على تقييم دور منظمات مثل اللجنة الدولية للصليب الأحمر ومنظمة العفو الدولية في حماية حقوق الإنسان. 7. القدرة على دراسة وتحليل المواثيق الدولية والإقليمية، بما في ذلك اللعان العالمي لحقوق الإنسان. 8. القدرة على فحص كيف تم ترجمة حقوق الإنسان في التشريعات الوطنية، مع التركيز على مثال الدستور العراقي 9. . القدرة على تصنيف حقوق الإنسان إلى أشكال فردية وجماعية، وأجيال مثل الحقوق المدنية والسياسية والاقتصادية والاجتماعية 10. . القدرة على تحليل الضمانات الدستورية والقضائية والسياسية لحقوق الإنسان على الصعيدين الوطني والدولي والإقليمي.
Indicative Contents المحتويات الإرشادية	فهم التاريخ التطوري لحقوق الإنسان (س 3) تحليل حقوق الإنسان في الحضارات القديمة (س 3) فهم حقوق الإنسان في الشرائع السماوية (س 3) تحليل حقوق الإنسان في العصور الوسطى والحديثة (س 3) فهم الاعتراف الإقليمي بحقوق الإنسان (س 3) تقدير دور المنظمات غير الحكومية (س 3) فهم الإطار القانوني لحقوق الإنسان (س 3) تحليل حقوق الإنسان في التشريعات الوطنية (س 3) فهم أشكال وأجيال حقوق الإنسان (س 3) تحليل ضمانات حقوق الإنسان (س 3)

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	تشجيع الطالب على المشاركة في مناقشات تفاعلية حول تطور حقوق الإنسان عبر التاريخ. مشروعات بحثية: توجيه الطالب في إعداد مشروعات بحثية تستكشف تطور حقوق الإنسان في فترات تاريخية محددة. استخدام التكنولوجيا: تضمين وسائل تكنولوجية لتعزيز تفاعل الطالب 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 الطالب وفهمهم لتطور حقوق الإنسان على مر العصور.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ 15 أسبوعا			
Structured SWL (h/seem) الحمل الدراس المنتظم للطالب خال الفصل	33	**Structured SWL (h/w)** الحمل الذراع يالمنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/seem) الحمل الدراس غ ريالمنتظم للطالب خال الفصل	17	**Unstructured SWL (h/w)** الحمل الذراع يرغ ريالمنتظم للطالب أسبوعيا	1.13
Total SWL (h/seem) الحمل الدراس الكل للطالب خال الفصل	50		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	5, 10	LO #1-4, 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 الأسبوعي النظري	
الأسبوع الأول	التطور التاريخي لحقوق النسان حقوق النسان في الحضارات القديمة (حضارة وادي الرافدين، والحضارات القديمة الأخرى)
الأسبوع الثـــاني	حقوق النسان في الشرائع السماوية مع التركيز على حقوق النسان في السالم. حقوق النسان في العصور الوسطى والحديثة.
السبوع الثـــالث	الاعتراف الإقليمي بحقوق النسان على الصعيد الأوربي الأمريكية، الأفريقي، الإسلامي، العربي
الأسبوع الـــرابـع	المنظمات غير الحكومية ودورها في حقوق النسان اللجنة الدولية للصليب الحمر، منظمة العفو الدولية، منظمة مراقبة حقوق النسان المنظمة العربية لحقوق النسان)
الأسبوع الخـــامس	حقوق النسان في المواثيق الدولية والإقليمية والتشريعات الوطنية. حقوق النسان في المواثيق الدولية)اللعان العالمي لحقوق النسان العهدين الدوليين الخاصين بحقوق النسان
الأسبوع الســادس	حقوق النسان في المواثيق الإقليمية)الاتفاقية الأوربية لحقوق النسان الاتفاقية الأمريكية لحقوق النسان الميثاق الأفريقي لحقوق النسان الميثاق العربي لحقوق النسان
الأسبوع الســابع	امتحان منتصف الفصل الدراسي
الأسبوع الثـــامن	حقوق النسان في التشريعات الوطنية (الدستور العراقي)
الأسبوع التاسع	اشكال :اشكال واجبال حقوق النسان حقوق النسان الحقوق الفردية، الحقوق الجماعية اجيال حقوق النسان الجيل الوال الحقوق المدنية حقوق النسان الحديثة،:الجيل الثالث)، (الجيل الثاني الحقوق الاقتصادية والاجتماعية)، (والسياسية الوعي المائي والبيتي
الأسبوع العاشر	ت حقوق النسان وحمايتها على الصعيد الوطني الضمانات الدستورية والقضائية والسياسية
السبوع الحادي عشر	دور اللمم المتحدة، دور المنظمات)ضمانات حقوق الإنسان وحمايتها على الصعيدين الإقليمي والدولي الإقليمية جريمة الإبادة الجماعية
السبوع الثاني عشر	تصنيف الحريات العامة الحريات الأساسية والفردية حرية المن والشعور بالاطمئنان حرية الذهاب والجاب، الحرية الشخصية
الأسبوع الثالث عشر	الحريات الفكرية والثقافية حرية الرأي حرية المعتقد حرية التعليم
الأسبوع الرابـــع 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	علي حجازي وجمال:، تأليف" القضايا والتحدياتحقوق الإنسان في العالم العربي" 1. الطبعة الثانية، العام: الطبعة.شعت : 2017. أحمد المجالي وغسان حمدان:، تأليف" المفاهيم والقضايا الحديثة:مبادئ حقوق الإنسان" 2. الطبعة الأول، العام: الطبعة. : 2019.	Yes
Recommended Texts	الطبعة الأول،: مصطفى كامل محمود. الطبعة:، تأليف"حقوق الأنسان والديمقراطية" 1. العام: 2015. : الطبعة. نبيل رزق:، تأليف" تاريخ حقوق الانسان في العصور القديمة والوسطى 2. الطبعة الثالثة، العام: 2012. : الطبعة. سعد الله عباس:، تأليف" الواقع والتحديات:حقوق الإنسان في العراق" 3. الطبعة الأول، العام: 2014. : الطبعة عبد الكريم السامرائي:، تأليف" المفهوم والتطور:حقوق الانسان في العراق" 4. الطبعة الأول، العام: 2018. 5. حقوق الانسان في العراق بين التحديات والافاق تأليف محمد السامرائي ولقاء الحربي الطبعة الاولى لعام 2020	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
Arabic Language (CET1206) اللغة العربية
الفصل الثاني 2nd Semester

Module Information معلومات المادة الدراسية					
Module Title	**Arabic Language**			**Module Delivery**	
Module Type	**Basic learning activities**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET1206**				
ECTS Credits	**2**				
SWL (hr./seem)	**50**				
Module Level	1		**Semester of Delivery**	2	
Administering Department	CET		**College**	IUC	
Module Leader	Dr. Wijdan Sadiq		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Wijdan Sadiq		**e-mail**		
Peer Reviewer Name	Prof. Hamza Al-Sewali		**e-mail**	Hamza.ali@iuv.edu.iq	
Scientific Committee Approval Date	13/06/2023		**Version Number**	1.0	

Relation with other Modules العالقة مع المقررات 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	أهداف المادة الدراسية هي ان يكون الطالب قادرا على ان: 1. يتعرف عليل 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 والظاء ومعرفة كيفية التمييز بينهما في الكتابة. 5. يتعلم طرق كتابة الهمزة بشكل صحيح وفقا للقواعد اللغوية. 6. التعرف على عالمات الترقيم واستخدامها بشكل صحيح في النصوص. 7. يفهم الفروق بين الاسم والفعل والتمييز بينهما في الجمل. 8. يفهم المفاعلى 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 الادخاري وكيفية كتابته بأسلوب صحيح ومناسب. 13. التعرف على لغة الخطاب الاداري وفهم استخدامها في التواصل الاداري. 14. يفهم نماذج من المراسلات الإدارية لتطبيق المفاهيم والمهارات المكتسبة في الخطاب الاداري.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	مخرجات التعلم للمادة الدراسية :ه 1. قدرة الطالب على تحليل وتعريف الأخطاء اللغوية وتطبيق القواعد الصحيحة لتجنبها. 2. القدرة على استخدام القواعد اللغوية المتعلقة بالتاء المربوطة والطويلة والتاء المفتوحة بشكل صحيح 3. قدرة الطالب على استخدام الألف الممدودة والمقصورة بشكل صحيح واستخدام الحروف الشمسية والقمرية بطريقة صحيحة. 4. تمكين الطالب من التمييز بين ا لـ ضـ ا د والظاء وتطبيق القواعد الصحيحة في الكتابة. 5. القدرة على كتابة الهمزة بشكل صحيح وفقا للقواعد اللغوية. 6. استخدام علامات الترقيم بشكل صحيح في النصوص المكتوبة. 7. فهم الطالب للفروق بين الاسم والفعل وتمكينهم من استخدامهما بشكل صحيح في الجمل. 8. القدرة على استخدام الفاعل 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.
Indicative Contents المحتويات الإرشادية	المحتويات الإرشادية في مادة اللغه تشمل مجموعة من المفاهيم والمواضيع الترقيم تغطيتها خال عملية التعلم. ومن بين المحتويات الإرشادية المهمة: 1. مقدمة عن الأخطاء اللغوية والتعريف بالتاء المربوطة والتاء المطلة والتاء المفتوحة .ساعات. 2. قواعد كتابة الألف الممدودة والمقصورة والتعرف على الحروف الشمسية والقمرية .ساعات. 3. دراسة الضاد والظاء وتعلم طرق كتابتهما بشكل صحيح .ساعات. 4. تعلم كتابة الهمزة بشكل صحيح وف قاء للقواعد اللغوية .ساعات . 5. دراسة عالمات ال ترقيم وتعلم استخدامها بشكل صحيح في النصوص اللغوية .ساعات . 1. التعرف على الاسم والفعل والتفريق بينهما وفهم القواعد المتعلقة بهما .ساعات . 7. دراسة الفاعل وتعلم استخدامها في الجمل اللغوية .ساعات. 8. التعرف على الأعداد واستخدامها بشكل صحيح في العبارات والجمل .ساعات. 9. دراسة الأخطاء اللغوية الشائعة وتطبيقاتها في النصوص اللغوية .ساعات . 10. تعلم استخدام النون والتنوين وفهم معاني حروف الجر واستخدامها بشكل صحيح في الجمل ساعات 11. التعرف على الجوانب الشكلية للخطاب الإداري وفهم لغته وقواعده 3 ساعات 12. دراسة نماذج من المراسلات الإدارية وتطبيقها في الكتابة 3 ساعات توفر هذه المحتويات الارشادية للطالب فهما شاملا للمفاهيم اللغوية وتعلم القواعد والتطبيقات العملية التي تتساعدهم في تطور مهاراتهم اللغوية.

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 للطالب. من بين هذه الاستراتيجيات 1. : التفاعل النشط: يتم تشجيع الطالب على المشاركة والمشاركة الفعالة في الدروس من خلال المناقشات الجماعية والأنشطة التفاعلية. 2. التعلم التعاوني: يشجع التعاون والتعاون بين الطلاب من خال العمل الجماعي و المشاريع الجماعية، حيث يتعاون الطالب مع بعضهم البعض لتحقيق أهداف التعلم المحددة 3. . التطبيق العم يل: يتم توف ت فرص للطالب لتطبيق المفاهيم والمهارات المكتسبة. ف سياقات عملية وواقعية، مما يعزز التفاعل الفعل مع المادة. 4. استخدام التقنيات الحديثة: يستفيد الطالب من استخدام التكنولوجيا. ف عملية التعلم، مثل استخدام الحواسيب والإن رنت للبحث والتعلم الذات ر ن5. . توف ت ردود فعل فورية: يتم توف ت ردود فعل فورية وتقييم مستمر للطالب، سواء عن طريق التقييمات الشفهية أو الكتابية، مما يساعدهم على تحس. ي أدائهم وتطوير مهاراتهم. 1. التنوير و وسائل التواصل: يتم استخدام مجموعة متنوعة من وسائل التواصل والتعليم، مثل المحاضرات لتوضيحية، والمناقشات الجماعية، والأنشطة العملية، والعروض التقديمية، لتلبية احتياجات وأساليب التعلم المختلفة للطالب.

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

Structured SWL (h/seem) الحمل الدراس المنتظم للطالب خال الفصل	33	**Structured SWL (h/w)** الحمل الذراع سالمنتظم للطالب أسبوعيا	2.2
Unstructured SWL (h/seem) الحمل الدراس غ ت المنتظم للطالب خال الفصل	17	**Unstructured SWL (h/w)** الحمل الذراع سغ ت المنتظم للطالب أسبوعيا	1.13
Total SWL (h/seem) الحمل الدراس الكيل للطالب خال الفصل	50		

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 #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 الأسبوعي النظري

الأسبوع الأول	مقدمة عن الأخطاء اللغوية –التاء المربوطة والطويلة والتاء المفتوحة	١-8
الأسبوع الثـــاني	قواعد كتابة اللف الممدودة والمقصورة – الحروف الشمسية والقمرية	9-١4
السبوع الثـــالث	الضاد والظاء	١٥-١9
الأسبوع الـــرابـع	كتابة الهمزة	20-30
الأسبوع الخـــامس	عالمات الترقيم	٣١-36
الأسبوع الســـادس	الاسم والفعل والتفريق بينهما – الفاعل	٣٧-٥0
الأسبوع الســـابع	الامتحان النصفي	
الأسبوع الثـــامن	العـــدد	١-6٥١
الأسبوع التاسع والعاشر	تطبيقات الأخطاء اللغوية الشائعة	62-69
السبوع الحادي عشر	النون والتنوين ـ معاني حروف الجر	٧٠-70
السبوع الثاني عشر	الجوانب الشكلية للخطاب الإداري	76-80
الأسبوع الثالث عشر والرابـع عشر	لغة الخطاب الإداري	٨١-86
الأسبوع الخامس عشر	نماذج من المراسلات الإدارية	
الأسبوع السادس عشر	الاستعداد لامتحان النهائي	

Learning and Teaching Resources
مصادر التعلم والتدريس

	Text	Available in the Library?
Required Texts	• ملزمة اللغة العربية)المعممة من وزارة التعليم العال والبحث العلم(	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
	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

Computer fundamentals (CET1207) اساسيات الحاسوب

2nd Semester الفصل الاول

Module Information معلومات المادة الدراسية					
Module Title	**Computer fundamentals**			**Module Delivery**	
Module Type	**Support or related learning activity**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET1207**				
ECTS Credits	**3**				
SWL (hr/sem)	**75**				
Module Level	1		**Semester of Delivery**	**2**	
Administering Department	**CET**		**College**	**IUC**	
Module Leader	**Mrs. Ithar Habeeb**		**e-mail**		
Module Leader's Acad. Title	**Professor**		**Module Leader's Qualification**	m.s	
Module Tutor	**Mrs. Ithar Habeeb**		**e-mail**		
Peer Reviewer Name	**Prof. Hamza Al-Sewadi**		**e-mail**	Hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	**10/07/2023**		**Version Number**	**1**	

Module Descriptions وصف المادة
Remedial Computer Skills course introduces students to information technology and communication. It includes an introduction to information technology, the structure of digital computer systems, computer software (system SW and application SW), the Internet, and networks. The course also aims to enhance students' practical skills in effectively using the following software packages: Microsoft Windows 10, MS Word, and Internet browsers such as Internet Explorer and Google Chrome. Classes of Remedial computer skills courses are held in labs to allow students to practice and exercise.

Relation with other Modules العلاقة مع المقررات الدراسية الأخرى			
Prerequisite module	**NoneNone**	**Semester**	
Co-requisites module		**Semester**	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Objectives أهداف المادة الدراسية	1. To learn and understand how computer systems work. 2. To learn computer organization and architecture for computers. 3. To understand input and output devices. 4. To learn and understand storage devices. 5. To learn hardware and software computer systems. 6. To understand computer networks and web technologies.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Study how the computer works and its components. 2. Understand memory function and storage. 3. Understand how the operating system works and its structure. 4. Learn the fundamentals of computer networks. 5. To have basic knowledge about computer security and protection. 6. Learn how the WWW web works and its technologies. 7. Study how to use Microsoft applications (Word, Excel, PowerPoint, Notepad).
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part One : Introduction to computer: characteristics, components, computer System Hardware, Organization and Architecture. [16 hrs.] Part Two : Input, Output, Storage devices, and computer software. [8 hrs.] Part Three : Computer number systems and data representation. [8 hrs.] Part Four : Computer networks, web technologies, and computer viruses. [8 hrs.] Part Five : Applications program (MS Word, Excel, PowerPoint, Notepad). [16 hrs.]

Module Evaluation تقييم المادة الدراسي ة					
Assessment		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
	Lab.	1	10% (10)	Continuous	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)		

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 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.

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
Week	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, Solid 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	Mid-term Exam
Week 8	The Web Technologies and Internet: Concept of the Internet, How the Web Works, 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 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	
Week	**Material Covered**
Week 1	Computer Hardware Components: Case components, Motherboard, Power Supply, CPU, Memory, Hard Disk
Week 2	Input Devices: Keyboard, Mouse, Joystick, Light Pen, Track Ball, Scanner, Microphone, Bar- Code Reader
Week 3	Output Devices: Monitor, Printer, Plotter, Projector, Audio Output Devices
Week 4	Storage Devices: HHD, 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	Yes
Recommended Texts	P. Deitel & H. Deitel, C++ How to Program, 10th Ed., Pearson, 2017 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 is required but credit is awarded
	F – Fail	راسب	(0-44)	Considerable amount of work required

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كلية العراق الجامعة

Iraq University College

Computer Engineering Technology Department

Second Level – Semester Three

2025/2026

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

Module Information معلومات المادة الدراسية					
Module Title	**Engineering Mathematics**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET2101**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	CET		**College**	IUC	
Module Leader	Dr. Hamid Hashim Al-Zwaini		**e-mail**		
Module Leader's Acad. Title	Assistant Lecturer		**Module Leader's Qualification**	Ph.D	
Module Tutor	Dr. Hamid Hashim Al-Zwaini		**e-mail**		
Peer Reviewer Name	Prof. Hamza A. Al-Sewadi		**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	10/7/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المقررات 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	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	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	Part A - Probabilty 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]**

	Part B – Statistics 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

	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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	5.13
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 Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	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
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MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية
البرمجة الكيانية
Object Oriented Programming

Module Information معلومات المادة الدراسية					
Module Title	**Object Oriented Programming**			**Module Delivery**	
Module Type	**S**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET2102**				
ECTS Credits	**6**				
SWL (hr/sem)	**150**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	CET		**College**	IUC	
Module Leader	Mr. Akeel Adil		**e-mail**		
Module Leader's Acad. Title	Assist. Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Mr. Akeel Adil		**e-mail**		
Peer Reviewer Name	Prof. Hamza A. AL-Sewadi		**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	10/7/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المقررات 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

Module Aims أهداف المادة الدراسية	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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A: Introduction to Object-Oriented Programming (8 hours) - 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 محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	79	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	5.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	71	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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
	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
ترتيب ومعمارية الحاسوب
Computer Organization & Architecture

Module Information معلومات المادة الدراسية					
Module Title	Computer Organization & Architecture			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CET2103				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		**Semester of Delivery**	3	
Administering Department	CET		**College**	IUC	
Module Leader	Miss Woroud Fadhil		**e-mail**		
Module Leader's Acad. Title	Assist. Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Miss Woroud Fadhil		**e-mail**		
Peer Reviewer Name	Prof. Hamza A. Al-Sewadi		**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	10/7/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات إلارشادية	
Module Aims أهداف المادة الدراسية	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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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. 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.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Introduction to Computer Organization Basic computer architecture and components Von Neumann architecture Instruction execution cycle Memory Organization Memory hierarchy and cache memory Virtual memory and paging techniques Memory management and allocation strategies PU Organization and Instruction Set Architecture (ISA) CPU components: ALU, registers, control unit Instruction formats and addressing modes Input/Output (I/O) Organization I/O devices and interfaces Polling, interrupts, and DMA I/O communication and bus architectures

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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 #4-9
	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
Week 2	Main parts of computer system, Organization and architecture
Week 3	Von Neumann architecture and its components
Week 4	Instruction Set Design in Von Neuman
Week 5	Overview of instruction execution cycle
Week 6	Introduction to Memory unit
Week 7	Memory Organization & classification
Week 8	Prime Memory :RAM ,ROM ,EPROM ,EEPROM& Storage memory :,Hard disk ,CD ROM
Week 9	**Midterm Exam**
Week 10	Concepts of Microprocessors &Microcomputer & Microcontroller .Organization of MP base System
Week 11	Instruction formats and addressing modes
Week 12	Machine language & Assembly language
Week 13	Input/Output (I/O) Organization
Week 14	Polling, interrupts, and DMA
Week 15	Pipelining and Instruction-Level Parallelism
Week 16	**Preparatory week before the final Exam**

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

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

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
مباديء الالكترونيك
Electronic Fundamentals

Module Information
معلومات المادة الدراسية

Module Title	**Electronic Fundamentals**	**Module Delivery**	
Module Type	**Core**	☒ **Theory**	
Module Code	**CET2104**	☐ **Lecture** ☒ **Lab**	
ECTS Credits	**5**	☐ **Tutorial**	
SWL (hr/sem)	**125**	☐ **Practical** ☐ **Seminar**	

Module Level	2	**Semester of Delivery**	3
Administering Department	CET	**College**	IUC
Module Leader	Mr. Alaa Ibrahim	**e-mail**	dakhil.ismail@iuc.edu.iq
Module Leader's Acad. Title		**Module Leader's Qualification**	MSc.
Module Tutor	Mr. Alaa Ibrahim	**e-mail**	dakhil.ismail@iuc.edu.iq
Peer Reviewer Name	Prof. Hamza Al-Sewadi	**e-mail**	Hamza.ali@iuc.eduiq
Scientific Committee Approval Date	10/7//2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المقررات 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

Module Aims أهداف المادة الدراسية	1. To understand materials conductivity, semiconductor materials, and types 2. 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 Zener 4. 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 circuits 5. This course deals with second semiconductor device, BJT This course deals with BJT physical construction, biasing, configuration methods, input and output characteristics 6. To understand the D.C biasing of BJT and circuit types , analysis and calculations of BJT parameters 7. To understand and construct re model for BJT circuits 8. To deal with small signal analysis of BJT
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize classifications of materials according to its conductivity. 2. Identify the semiconductor material characteristics and classifications 3. Recognize the physical structure and properties of P and N layers 4. Identify diode as a first example of semiconductor devices. 5. Discuss diode physical construction, biasing, and characteristics 6. Identify the variable parameters of diodes, and V threshold 7. Summarize what is meant by Load line analysis , and Q point 8. Identify the applications of diodes in electrical circuits using AC. And DC. Power supplies 9. To understand the concept of Zener region and the differences between zener and original diodes 10. To solve zener circuits and calculate its voltage current with different cases 11. To understand and discuss the second semiconductor device which is Transistor (Bipolar Junction Transistor)(BJT) 12. To discuss BJT physical construction, Operation, and configuration methods 13. To understand and implement input and output Characteristics of each configuration method and load line and Q point implementations 14. To implement and solve BJT biasing circuit types and calculations of important parameters of BJT in DC. Biasing state 15. Design BJT circuit types by using Quesent point parameters 16. Understand and construct re model for BJT circuits 17. Derive and calculate Zi, Zo Av and AI from re model of BJT circuits 18. Understand and calculate small signal analysis of BJT .

Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Semiconductor Materials Energy Levels , n- and p-Type, Semiconductor Diode Construction ,biasing, Characteristics and Zener Diodes, Load-Line Analysis [8 hrs] . 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] Transistor Construction , Transistor Operation ,Common-Base Configuration Transistor Amplifying Action ,Common-Emitter Configuration ,Common-Collector Configuration ,Limits of Operation [8hrs] 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] Revision problem classes [12 hrs] BJT Transistor Modeling The Important Parameters: Zi, Zo, 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]

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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: Zi, Zo, A v, A 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 anf full wave rectifire 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
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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

اسس الاتصالات

Communication Fundamentals

Module Information معلومات المادة الدراسية					
Module Title	Communication Fundamentals			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET2105**				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level	2		**Semester of Delivery**	**3**	
Administering Department	CET		**College**	IUC	
Module Leader	Dr. Abdul-Wahab Isa		**e-mail**		
Module Leader's Acad. Title	Assist. Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Dr. Abdul-Wahab Isa		**e-mail**		
Peer Reviewer Name	Prof. Hamza Al-Sewadi		**e-mail**	Hsmza.ali@iuc.edu.iq	
Scientific Committee Approval Date	10/7/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية

Module Aims أهداف المادة الدراسية	1. 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
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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

	of coils, capacitors, and resistors. 20. Identify the design formula for a passive filter Constant-K: LPF , HPF, and BPF consisting of coils, capacitors, and resistors . 21. Definition active filters, listing the advantage of active filter over disadvantage of passive filter. 22. Identify the design formula for active filter first order LPF, HPF and BPF used op-Amp as main component.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **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) **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) **Part C- I**- Fourier Series in the Continuous Domain: the important classes of Fourier series methods and Trigonometric Fourier series, Exponential Fourier (5 hr) **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) **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)
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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

اللغة الانكليزية 2

English Language II

Module Information معلومات المادة الدراسية					
Module Title	**English Language II**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☒ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET2106**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	CET		**College**	IUC	
Module Leader	Dr. Kais Khaleel		**e-mail**	Kays.khlil@iuv.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	PhD	
Module Tutor	Dr. Kais Khaleel		**e-mail**	Kays.khlil@iuv.edu.iq	
Peer Reviewer Name	Prof. Hamza A. Al_Sewadi		**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	10/7/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المقررات 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	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	The student will have the ability to: 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 االرشادية	Indicative content includes the following. **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] **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]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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. - Writing an assignment and report that encourages students to clarify and organize their thinking and independently research and present on a topic.

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	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	**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)

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, 5th 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 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
جرائم حزب البعث
The crimes of the Ba'ath regime

Module Information معلومات المادة الدراسية					
Module Title	**The crimes of the Ba'ath regime**			**Module Delivery**	
Module Type	**B**			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET2107**				
ECTS Credits	**2**				
SWL (hr/sem)	**50**				
Module Level	2		**Semester of Delivery**	3	
Administering Department	CET		**College**	IUC	
Module Leader	Miss Wid Fathi		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc..	
Module Tutor	Miss Wid Fathi		**e-mail**		
Peer Reviewer Name	Prof. Hamza Al-Sewadi		**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	10/7/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المقررات 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	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 ابرز الأهداف للمادة الدراسية هي اني يكون الطالب قادراً على أن : 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
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	مخرجات التعلم للمادة الدراسية هي: 1- فهم مفهوم الجرائم وقدرة الطلاب على تصنيف الجرائم وفقا 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 احتجاز 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 زمنيا.
Indicative Contents المحتويات الإرشادية	المحتويات الإرشادية في مادة اللغة تشمل مجموعة من المفاهيم والمواضيع التي يتم تغطيتها خلال عملية التعلم. ومن بين المحتويات الإرشادية المهمة ١. تعريف الجريمة لغة واصطلاحًا، مفهوم الجريمة، اقسام الجريمة جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠٥ الجرائم النفسية والاجتماعية وآثارها عسكرة المجتمع، موقف النظام البعثي من الدين ه انتهاكات القوانين العراقية، صور انتهاكات حقوق الإنسان وجرائم السلطة بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث ٦. أماكن السجون والاحتجاز لنظام البعث الجرائم البيئية لنظام البعث في العراق جرائم المقابر الجماعية أحداث مقابر الإبادة الجماعية المرتكبة من النظام البعثي في العراق ١٠. التصنيف الزمني لمقابر الإبادة الجماعية في العراق للمدة ١٩٦٣ م - ٢٠٠٣م ١١.

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	استراتيجيات التعلم والتعليم المستخدمة في مادة جرائم حزب البعث البائد 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 التعلم التعاوني: يشجع التعاون والتعاون بين الطلاب من خلال العمل الجماعي والمشاريع الجماعية، حيث يتعاون الطلاب مع بعضهم البعض لتحقيق أهداف التعلم المحددة. استخدام التقنيات الحديثة يستفيد الطلاب من استخدام التكنولوجيا في عملية التعلم، مثل .استخدام الحواسيب والإنترنت للبحث والتعلم الذاتي 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 ه التنويع 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 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		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري		
الأسبوع الأول	تعريف الجريمة لغة واصطلاحًا، مفهوم الجريمة، اقسام الجريمة	
الأسبوع الثاني	جرائم نظام البعث وفق توثيق قانون المحكمة الجنائية العراقية العليا عام ٢٠٠٥	
الاسبوع الثالث	الجرائم النفسية لنظام البعث وفهم الآثار النفسية لجرائم نظام البعث على الأفراد والمجتمع.	
الأسبوع الرابع	الجرائم الاجتماعية لنظام البعث وفهم الآثار الاجتماعية لجرائم نظام البعث على الأفراد	
الأسبوع الخامس	انتهاكات القوانين العراقية	
الأسبوع السادس	بعض قرارات الانتهاكات السياسية والعسكرية لنظام البعث	
الأسبوع السابع	امتحان نصف الفصل	
الأسبوع الثامن	الجرائم البيئية لنظام البعث في العراق التلوث الحربي وسياسة الأرض المحروقة	
الأسبوع التاسع والعاشر	تجفيف الاهوار و تجريف بساتين النخيل والأشجار والمزروعات	
الأسبوع الحادي عشر و الثاني عشر	جرائم المقابر الجماعة واحداث مقابر الإبادة الجماعية المرتكبة من النظام البعث في العراق	
الأسبوع الثالث عشر و الرابع عشر و الخامس عشر	التصنيف الزمني لمقابر الإبادة الجماعية في العراق للمدة من (١٩٦٣-٢٠٠٣) م	
الأسبوع السادس عشر	التهيئة للامتحان النهائي	

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
	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.

Iraq University College

Computer Engineering Technology Department

Second Level – Semester Four

2025/2026

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية
الرياضيات الهندسية المتقدمة
Advanced Engineering Mathematics

Module Information معلومات المادة الدراسية					
Module Title	**Advanced Engineering Mathematics**			**Module Delivery**	
Module Type	S			☒ **Theory** ☐ **Lecture** ☐ **Lab** ☒ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET2201**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	2		**Semester of Delivery**	Four	
Administering Department	CET		**College**	IUC	
Module Leader	Prof. Hamid Hashim Al-Zwaini		**e-mail**		
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	Ph.D.	
Module Tutor	Prof. Hamid Hashim Al-Zwaini		**e-mail**		
Peer Reviewer Name	Prof. Hamza Al-Sewadi		**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	10/7/2023		**Version Number**	1.0	

Relation with other Modules العلاقة مع المقررات 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	
Module Aims أهداف المادة الدراسية	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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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 function 6. 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.
Indicative Contents المحتويات الإرشادية	<u>Part A – Complex Analysis.</u> 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]**

	Part B – Preliminaries to Methods of solving ODE. 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]** Part C – ODE. 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]**

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 محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	48	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	3.2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	77	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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)

منهاج الاسبوعي الإضافي

	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
البرمجة بلغة بايثون
Python Programming

Module Information
معلومات المادة الدراسية

Module Title	**Python Programming**	**Module Delivery**	
Module Type	**S**	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET2202**		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		

Module Level	2	**Semester of Delivery**	4
Administering Department	CET	**College**	IUC
Module Leader	Mr. Alaa Sehel Jafar	**e-mail**	
Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Mr. Alaa Sehel Jafar	**e-mail**	
Peer Reviewer Name	Prof. Hamza Al-Sewadi	**e-mail**	hamza.ali@iuc.edu.iq
Scientific Committee Approval Date	10/7/2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المقررات 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

Module Aims أهداف المادة الدراسية	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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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.
Indicative Contents المحتويات االرشادية	Indicative content includes the following. Part A: Introduction to Python and Basic Concepts (Estimated time: 10 hours) Overview of Python programming language Installation and setup Variables and data types Basic operators Input and output operations

	Part B: Control Flow and Functions (Estimated time: 16 hours) Conditional statements (if, else, elif) Loops and iterations (for loop, while loop) Functions and function arguments Recursion Part C: Data Structures and File Handling (Estimated time: 16 hours) Strings and string manipulation Lists and list manipulation Dictionaries and sets File handling and input/output operations Part D: Advanced Topics (Estimated time: 16 hours) Exception handling and error management Modules and packages Object-oriented programming (OOP) concepts Classes, objects, inheritance, and polymorphism Part E: Applications and Practical Projects (Estimated time: 16 hours) Working with files and directories GUI programming Web scraping Data manipulation and analysis

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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 meaningful learning experiences and empower students to become active participants in their own learning journey.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
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 #1-5, LO #5-8
	Assignments	1	10% (10)	9	LO# 1-8
	Projects / Lab.	1	10% (10)	Continuous	
	Report	1	10% (10)	13	LO # 1-12
Summative assessment	Midterm Exam	2 hrs.	10% (10)	7	LO # 1-7
	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

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
المعالجات الدقيقة
Microprocessors

Module Information
معلومات المادة الدراسية

Module Title	**Microprocessors**		**Module Delivery**	
Module Type	**Core**		☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET2203**			
ECTS Credits	**5**			
SWL (hr/sem)	**125**			
Module Level	2	**Semester of Delivery**	4	
Administering Department	CET	**College**	IUC	
Module Leader	Worood Fadhil Abbass	**e-mail**		
Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**	M.Sc.	
Module Tutor	Worood Fadhil Abbass	**e-mail**		
Peer Reviewer Name	Prof. Hamza Al-Sewadi	**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	10/7/2023	**Version Number**	1.0	

Relation with other Modules
العلاقة مع المقررات 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

Module Aims أهداف المادة الدراسية	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
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Identify the basic characteristic of specific processor 2. Define the processor signals and their functions 3. Explain the architecture from the hardware point of view 4. 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.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Microprocessor H/W architecture --MP signals, MP operations, Machine cycle, memory interfacing, input-output devices interfaces [30hrs] Part b – Microprocessor S/W architecture --Instruction set, data transfer, arithmetic, logical. [25 hrs] --Stack register and stack area [15hrs] --Branching instructions and applications [20hrs] --Revision problem classes [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	14	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	11	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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)		

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 صادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	8085 µp 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
الاتصالات التماثلية
Analogue Communications

Module Information
معلومات المادة الدراسية

Module Title	**Analogue Communications**	**Module Delivery**	
Module Type	**Core**	☒ **Theory**	
Module Code	**CET2204**	☐ **Lecture**	
ECTS Credits	5	☒ **Lab**	
SWL (hr/sem)	125	☐ **Tutorial**	
		☐ **Practical**	
		☐ **Seminar**	

Module Level	2	**Semester of Delivery**	**4**
Administering Department	CET	**College**	IUC
Module Leader	Mr, Alaa Ibrahim	**e-mail**	
Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Mr. Alaa Ibrahim	**e-mail**	
Peer Reviewer Name	Prof. Hamza Al-Sewadi	**e-mail**	hamza.ali@iuc.edu.iq
Scientific Committee Approval Date	10/7/2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المقررات 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	
Module Aims أهداف المادة الدراسية	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
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Recognize Basic Principles of modulation and de-modulation 2. Explain the Need for Modulation. . Define a Carrier Wave, Radio Frequency Spectrum, Sound and Radio Broadcasting . Identify Amplitude Modulation, Percent Modulation, Upper and Lower Sidebands 5. Explain Methods of Modulation. 6. Mathematical Analysis of a Modulated Carrier Wave . Discuss forms of Amplitude Modulation and Methods of Amplitude Modulation. 8. Describe the Power Relation in an AM Wave. . Identify modulating Amplifier Circuit: AM- Transmitter & Radio Receiver Essential Parameter 0. Explain the AM generation of SSB, DSB-SC balanced modulators (Cowan &Ring). 1. Summarize various demodulation type of AM Signal: AM-Detector (Envelope & Synchronous) 2. Identify the Frequency Modulation Process: Modulation Index, Deviation Ratio, Percent Modulation and FM Sidebands. 3. Discuss the relationship between the modulation index and number of sidebands. 4. 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. 6. Discuss Principles of FM Receiver: FM Discriminator (Foster –Seeley &Ratio Detector). 17. Explain the Phase modulation (PM) Definition. 18. Discus the PM equation and PM wave forms
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. **Part A** –MODULATION AND DEMODULATION: Need for Modulation,. Define a Carrier Wave, Radio Frequency Spectrum, Sound and Radio

	Broadcasting. (20 hr) **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) **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)

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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
الدوائر الالكترونية
Electronic Circuits

Module Information
معلومات المادة الدراسية

Module Title	**Electronic Circuits**	**Module Delivery**	
Module Type	**Core**	☒ **Theory**	
Module Code	**CET2205**	☐ **Lecture** ☒ **Lab**	
ECTS Credits	**5**	☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
SWL (hr/sem)	**125**		

Module Level	2	**Semester of Delivery**	4
Administering Department	CET	**College**	IUC
Module Leader	Mr. Dakhim Ismail Salih	**e-mail**	dakhil.ismail@iuc.edu.iq
Module Leader's Acad. Title		**Module Leader's Qualification**	MSc.
Module Tutor	Mr. Dakhim Ismail Salih	**e-mail**	dakhil.ismail@iuc.edu.iq
Peer Reviewer Name	Prof. Hamza Al-Sewadi	**e-mail**	hamza.ali@iuc.edu.iq
Scientific Committee Approval Date	10/7/2023	**Version Number**	1.0

Relation with other Modules
العلاقة مع المقررات 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	
Module Aims أهداف المادة الدراسية	1. This course deals with Third semiconductor or device, FET physical construction, biasing, configuration s , output and transfer characteristics 2. To understand the D.C biasing of BJT and circuit types , analysis and calculations of FET parameters 3. To understand and construct re FET modeling, and circuits analysis 4. To deal with small signal analysis of FET 5. Deals with Depletion-Type MOSFET , and Enhancement-Type MOSFETs and Combination ,and Design 6. Deals with Operational amplifiers (OP_AMP) their advantages, classifications and types and application circuits
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. To understand and discuss the third semiconductor device which is Transistor (Field Effect Transistor)(FET), Construction and Characteristics of JFETs 2. To Identify and Calculate And implement Transfer Characteristics of FET 3. To Identify and discuss Important Relationships 227 5.7 Depletion-Type MOSFET 228 5.8 Enhancement-Type MOSFET , MOSFET Handling , VMOS CMOS 4. To implement and solve FET DC biasing and circuits analysis Fixed-Bias Configuration Self-Bias Configuration Voltage-Divider Biasing, implementations 5. To understand Depletion-Type MOSFETs Enhancement-Type MOSFETs 6. 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 Operation 13. To understand Op-Amp, Practical Op-Amp Circuits , and Op-Amp Specifications 14. To identify DC Offset Parameters, Op-Amp Specifications and Frequency Parameters 15. To understand and identify OP AMP applications circuits.

	16. To Analyze, calculate and implement Constant-Gain Multiplier, Voltage Summing , Voltage Buffer, Controller Sources Instrumentation Circuits ,and Active Filters
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 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] . FET D.C. biasing and circuits analysis Fixed-Bias Configuration, Self-Bias Configuration , and Voltage-Divider Biasing, implementations [8 hrs] Depletion-Type MOSFETs Enhancement-Type MOSFETs, Combination Networks , Design, and P-Channel FETs Universal JFET Bias Curve [10hrs]. FET small signal Model, JFET Fixed-Bias Configuration , JFET Self-Bias Configuration , JFET Voltage-Divider Configuration [8hrs]. 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] 2. Operational amplifiers (OP_AMPS) 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] OP AMP applications circuits Constant-Gain Multiplier , Voltage Summing , Voltage Buffer, Controller Sources Instrumentation Circuits ,and Active Filters[6 hrs]

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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
الاجهزة والقياس
Instrumentation and Measurement

Module Information
معلومات المادة الدراسية

Module Title	Instrumentation and Measurement	**Module Delivery**	
Module Type	**Core**	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CET2206		
ECTS Credits	**4**		
SWL (hr/sem)	**100**		

Module Level	2	**Semester of Delivery**	4
Administering Department	CET	**College**	IUC
Module Leader	Mr. Dakhil Ismaeel Salih	**e-mail**	dakhil.ismail@iuc.edu.iq
Module Leader's Acad. Title	Assist. Lecturer	**Module Leader's Qualification**	M.Sc.
Module Tutor	Mr. Dakhil Ismaeel Salih	**e-mail**	dakhil.ismail@iuc.edu.iq
Peer Reviewer Name	Prof. Hamza Al-Sewadi	**e-mail**	hamza.ali@iuc.edu.iq
Scientific Committee Approval Date	15/10/2024	**Version Number**	1.0

Relation with other Modules
العلاقة مع المقررات الدراسية الأخرى

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

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

Module Aims أهداف المادة الدراسية	1. 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
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A – Measurement and Error Analysis 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.] Part B – Measuring Instruments Measurement of resistance, inductance, and capacitance Whetstone's Bridge, Kelvin Bridge; AC bridges, Capacitance Comparison Bridge, Maxwell's Bridge, Wein's Bridge, [9 hrs]. **Voltmeters and Ammeters Introduction**, voltmeter, Multirange voltmeter, ammeter, Multirange ammeter Extending voltmeter and ammeter ranges [11hrs]

	Introduction Oscilloscopes, Basic principles, CRT features, Block diagram and working of each block High Bandwidth Digital Storage Oscilloscope- Spectrum Analyzer -BER Tester [8 hrs] Introduction Signal Generators, Fixed and variable AF oscillator, Standard signal generator Arbitrary Waveform Generator. [4 hrs] Introduction Transducers, Electrical transducers, Selecting a transducer, Resistive transducer [2 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	36	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	2.4
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% (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. Beately, 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.

نموذج وصف المادة الدراسية

اللغة العربية 2

Arabic Language (2)

Module Information	معلومات المادة الدراسية		
Module Title	Arabic Language (2)	Module Delivery	
Module Type	Basic	☒ Theory ☒ Lecture ☐ Lab ☐ Tutorial ☐ Practical ☐ Seminar	
Module Code	CET2207		
ECTS Credits	2		
SWL (hr/sem)	50		
Module Level	2	Semester of Delivery	2
Administering Department	CET	College	IUC
Module Leader	Dr. Wijdan Sadiq	e-mail	
Module Leader's Acad. Title	Lecturer	Module Leader's Qualification	Ph.D.
Module Tutor	Dr. Wijdan Sadiq	e-mail	
Peer Reviewer Name	Hamza Abbass Al-Sewadi	e-mail	Hamza.ali@iuc.edu.iq
Scientific Committee Approval Date	15/10/2024	Version Number	1.0

Relation with other Modules	العلاقة مع المقررات 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	أهداف المادة الدراسية هي اني يكون الطالب قادراً على أن : 1. يتعرف على ماهية التعبير القرآني. 2. يتعلم القواعد النحوية المستعملة في التعبير القرآني، والأثر البلاغي والفني الذي يترتب على كيفية التعبير القرآني، وأن يفهم الطالب كيفية التحليل للنصوص القرآنية. 3. يتعرف على شخصية من أهم شخصيات الأدب والشعر العربي والعراقي، بدر شاكر السياب ، ومعرفة شعره. 4. يتعرف على علامات الإعراب الأصلية والفرعية ،ويتعلم استعملها في اللغة العربية ، ويفهم الفرق بين علامات الإعراب الفرعية والاصلية. 5. يتعلم الفرق بين الجمل الأسمية والفعلية ، ويتعرف على أنواع المبتدأ، وأنواع الخبر، ويفهم الفرق بينهما . 6. يتعرف عل إن واخواتها ، ويتعلم القواعد الخاصة بها. 7. يفهم الفرق بين إنَّ و أنَّ، وأنْو أنْ ، ويطبق ذلك عند استعمال كل منها في النصوص. 8. .يتعرف عل كان وأخواتها ، ويتعلم عمل كل منها في اللغة ، ويتمكن من استعمالها الصحيح في اللغة . 9. يتعرف على عمل الأفعال الخمسة ،وعلامات إعرابها ،ويستطيع استعمالها بشكل صحيح في الخطاب ، أو النص. 10. يتعرف على الأخطاء اللغوية ، ويتعلم تجنبها أثناء الكتابة. 11. يدرس معلومات لغوية : الأضداد والمرادفات ،والفرق اللغوية ، والمعاملات النحوية ، ويفهم الفرق بينها ، ويتمكن من تحليلها . 12. يتعلم إعراب المثنى . 13. يتعرف على أنواع الجموع، ويتعلم التفريق بينها ، ويفهم كيفية إعرابها. 14. يتعلم كيفية كتابة قواعد اللغة العربية في لوحة بيانية ، ويتمكن من تصويب الأخطاء اللغوية .
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	**مخرجات التعلم للمادة الدراسية هي:** 1. قدرة الطالب على فهم التعبير القرآني ، وتحليل النصوص. 2. القدرة على استخدام القواعد النحوية ،وفهم الأساليب البلاغية والقدرة على استعمالها. 3. معرفة الطالب لشخصية الشاعر والأديب بدر شاكر السياب ، وأهم أشعاره وآثاره. 4. القدرة على التمييز بين علامات الإعراب الأصلية والفرعية ، والقدرة على استعمالها في الخطاب ، أو النص. 5. قدرة الطالب على التمييز بين الجمل الأسمية والفعلية ، وقدرته على التمييز بين أنواع المبتدأ، والخبر ، وكيفية استعمال الجمل وإعرابها. 6. فهم الطالب لعمل إنَّ وأخواتها ، وقدرته على استعمالها بشكل صحيح في الجمل. 7. القدرة على التفريق بين أنَّ وإنَّ، وإنْ وأنْ، واستعمالها في مواضعها الصحيحة في النصوص. 8. القدرة على فهم عمل كان وأخواتها ، واستعمالها بشكل صحيح. 9. التمكن من معرفة و أعراب الأفعال الخمسة ، وكيفية استعمالها في الجمل. 10. القدرة على معرفة وتجنب الأخطاء اللغوية عند الكتابة. 11. معرفة إعراب المثنى .

	12. القدرة على التمييز بين الجموع ، وكيفية إعرابها ، واستعمالها في الجمل. 13. معرفة الطالب لمعلومات لغوية : المرادفات. والأضداد ، والفرق اللغوية ، والمعادلات النحوية ، والقدرة على استخراجها ، أو استعمالها في الجمل.
Indicative Contents المحتويات الإرشادية	**المحتويات الإرشادية في مادة اللغة تشمل مجموعة من المفاهيم والمواضيع التي يتم تغطيتها خلال عملية التعلم. ومن بين المحتويات الإرشادية المهمة:** 1. مقدمة عن التعبير القرآني، وتعريف بالإعجاز اللغوي في آيات القرآن الكريم وجمالية اللغة العربية وبلاغتها. (4 ساعات) 2. التعريف بشخصية الشاعر الكبير بدر شاكر السياب ، وأهمية شعره في الأدب العربي والعراقي. (4 ساعات) 3. دراسة علامات الإعراب ، بنوعيها ، وكيفية الأعراب . (4 ساعات) 4. دراسة الجمل الأسمية والفعلية ، وتعلم التفريق بين الأنواع المبتدأ ، وأنواع الخبر. (4 ساعات) 5. دراسة إن وأخواتها ، وكيفية عملها وأعرابها . (4 ساعات) 6. دراسة الفرق بين إنَّ وأنَّ، وإنْ وأنْ، وكيفية عملها وأعرابها. (4 ساعات) 7. دراسة كان وأخواتها ، وكيفية عملها وإعرابها. (4 ساعات) 8. التعريف بالأفعال الخمسة ، وعملها وإعرابها.. (4 ساعات) 9. دراسة الأخطاء اللغوية الشائعة وتطبيقاتها في النصوص. (4 ساعات) 10. تعلم المعلومات اللغوية : الأضداد والمترادفات، والفروق اللغوية ، والمعادلات النحوية. (3 ساعات) 11. دراسة المثنى وأعرابه .(٣ساعات) 12. دراسة الجموع ، وأنواعها وإعرابها. (٣ ساعات) 13. دراسة القواعد النحوية وكتابتها في رسم بياني ، وتصويب الأخطاء اللغوية. (3 ساعات)
استراتيجيات التعلم والتعليمLearning and Teaching Strategies	
Strategies	استراتيجيات التعلم والتعليم المستخدمة في مادة اللغة 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. 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. التنويع 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.

الحمل الدراسي للطالب محسوب لـ ١٥ اسبوعا **Student Workload (SWL)**			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	33	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	2
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	17	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	1
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	**50**		

Module Evaluation
تقييم المادة الدراسية

		Time/ Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative Assessment	**Quizzes**	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)		

المنهاج الاسبوعي النظري **Delivery Plan (Weekly Syllabus)**	
الأسبوع الأول ، والثاني	التعبير القرآني، نحويا من حيث تركيب الجملة والنص. بلاغيا من حيث التأثير الفني، والرجوع إلى المصدر (كتاب التعبير القرآني) للدكتور فاضل السامرائي .
الاسبوع الثالث	الشاعر بدر شاكر السياب.
الأسبوع الرابع	علامات الإعراب الأصلية:(الفتحة والضمة، والكسرة)، وعلامات الإعراب الفرعية :(الألف ، والواو، والياء).
الأسبوع الخامس	الجمل الأسمية – المبتدأ والخبر ، وانواع المبتدأ ، وأنواع الخبر.
الأسبوع السادس	أنَّ وأخواتها
الأسبوع السابع	الفرق بين إنَّ وأنَّ ، وأنْ وإنْ.
الأسبوع الثامن	كان وأخواتها.
الأسبوع التاسع والعاشر	الأفعال الخمسة .
الاسبوع الحادي عشر	الأخطاء اللغوية الجزء (2)
الاسبوع الثاني عشر	معلومات لغوية : المرادفات والاضداد، وفروق لغوية. ومعادلات نحوية.

الأسبوع الثالث عشر والرابع عشر	المثنى وإعرابه.
الأسبوع الخامس عشر	أنواع الجموع : جمع المذكر السالم- جمع المؤنث السالم- جمع التكسير .
الأسبوع السادس عشر	هندسة النحو: قواعد اللغة العربية في لوحة تعليمية ، وتصويبات لغوية

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	• التعبير القرآني للدكتور فاضل السامرائي.	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.

Iraq University College

Computer Engineering Technology Department

Third Level – Semester Five

2025/2026

MODULE DESCRIPTION FORM
نموذج وصف المادة الدراسية
أنظمة التشغيل
Operating Systems

Module Information معلومات المادة الدراسية					
Module Title	**Operating Systems**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET3101**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	3		**Semester of Delivery**	5	
Administering Department	CET		**College**	IUC	
Module Leader	Alaa Sahel Gaafar		**e-mail**	lec.alaa.sahl@uobasrah.edu.iq	
Module Leader's Acad. Title	Lecturer		**Module Leader's Qualification**	M.Sc.	
Module Tutor	Alaa Sahel Gaafar		**e-mail**	lec.alaa.sahl@uobasrah.edu.iq	
Peer Reviewer Name	Prof. Hamza Abbass Al-Sewadi		**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	29/10/2023		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. 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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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
Indicative Contents	**1. Operating System Overview teaching hours: 10 hrs** **2. Process Management teaching hours: 10 hrs**

المحتويات الإرشادية	**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) أسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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

اسس هندسة السيطرة

Control Engineering Fundamentals

Control Engineering Fundamentals					
Module Information معلومات المادة الدراسية					
Module Title	**Control Engineering Fundamentals**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET3102**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level		UGx11 3	**Semester of Delivery**		5
Administering Department		CET	**College**	**IUC**	
Module Leader	Mrs. Sundus Falih Hasan		**e-mail**	falihsundus@gmail.com	
Module Leader's Acad. Title		Lecturer	**Module Leader's Qualification**		M.Sc.
Module Tutor	Mrs. Sundus Falih Hasan		**e-mail**	falihsundus@gmail.com	
Peer Reviewer Name		Prof. Hamza Abbass Al-Sewadi	**e-mail**		Hamza.ali@iuc.edu.iq
Scientific Committee Approval Date		29/10/2023	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To 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.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	14. Define the control system. 15. classify the different types of control systems. 16. Describe a physical system in terms of differential equations 17. Use Laplace Transform in solving differential equations of the Control System. 18. Derive Transfer Function for describing the work of servomotors. 19. Reduce a block diagram of multiple subsystems to a single block representing the Transfer Function of the system. 20. Understand steady state and transient time response analysis. 21. Find error Coefficients and steady-state error (e_{ss}) according to system type. 22. Find the time response of the 1^{st} order system. 23. Find the time response of the 2^{nd} order system. 24. Understand the effect of damping ratio ξ on 2^{nd} order system. 25. Identify Transient response specifications. 26. Define PID controllers. 27. Reduce the effect of Steady-state error (e_{ss}) and settling time (T_s) on time response using PID controller.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following: <u>Part A – Basics of Control Systems and Transfer Function</u> 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]

	Part B – Time Response Analysis of Control Systems 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] PID controllers: PD controller, PI controller, PID controller and output derivative controller [20 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) أسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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 2nd 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: 1st Order System
Week 7	Lab 7: 2nd 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

معالجة الاشارة الرقمية

Digital Signal Processing

Module Information معلومات المادة الدراسية					
Module Title	**Digital Signal Processing**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET3103**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level		**3**	**Semester of Delivery**		5
Administering Department		**CET**	**College**		IUC
Module Leader	**Mr. Hussaen Ali Jasim**		**e-mail**		
Module Leader's Acad. Title		**Lecturer**	**Module Leader's Qualification**		M.Sc.
Module Tutor	**Mr. Hussaen Ali Jasim**		**e-mail**		
Peer Reviewer Name		**Prof. Hamza Abbass Al-Sewadi**	**e-mail**		Hamza.ali@iuc.edu.iq
Scientific Committee Approval Date		**29/10/2023**	**Version Number**		1.0

Relation with other Modules العلاقة مع المقررات 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	6. Demonstrate an understanding of basic discrete-time systems, linearity, time-invariance, stability, impulse response and discrete convolution. 7. Implement discrete time systems, recursive and nonrecursive realizations. 8. Perform Z transform and finding the inverse Z transform including its properties. 9. Demonstrate an understanding of frequency analysis of both continuous and discrete signals. 10. Demonstrate an understanding of frequency response of linear time invariant systems. 11. Demonstrate an understanding of discrete Fourier transform, its properties and applications. 12. Design FIR and IIR digital filters.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. State, prove and apply Shannon's sampling theorem 2. Relate signal to noise ratio (SNR) to number of samples averaged in signal sampling and averaging systems 3. 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 systems 12. Analyze and implement systems in the field of Z transformation. 13. Design basic finite impulse response (FIR) and infinite impulse response (IIR)

	filters.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 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 decimationin-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.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) أسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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 #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
	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
السيطرة الدقيقة
Digital Controllers

Module Information معلومات المادة الدراسية					
Module Title	**Digital Controllers**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET3104**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**UGx11 3**		**Semester of Delivery**	5	
Administering Department	**CET**		**College**	**IUC**	
Module Leader	**Prof. Kays Shareef Majdi**		**e-mail**	kays.majdi@iuc.edu.iq	
Module Leader's Acad. Title	**Professor**		**Module Leader's Qualification**	Ph.D.	
Module Tutor	**Prof. Kays Shareef Majdi**		**e-mail**	kays.majdi@iuc.edu.iq	
Peer Reviewer Name	**Prof. Hamza A. Al-Sewadi**		**e-mail**	hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	**29/10/2023**		**Version Number**	1.0	

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To 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
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	14. Recognize how integrated circuits and microcontrollers works. 15. Known the advantages of using Microcontrollers and Microprocessors. 16. Summarize what is meant by a Peripheral Interface Controller. 17. Describe the PIC Microcontroller. 18. Known type and function of register and SFR in Microcontroller. 19. Explain the A/D (Analog-to-Digital) Converter. 20. Discuss Capture, Compare, and Pulse width modulation modules in PIC microcontrollers. 21. Define and implement interrupts in programs. 22. Explain serial communication systems. 23. Identify how the Oscillator works in an electric circuit. 24. Programming the microcontroller, outputting data/signals, reading data/signals, and character LCD. 25. Application projects of microcontrollers.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. --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] --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] --Serial Communication, Baud rate, I2C Protocol, SPI (Serial Peripheral Interface), and UART (Universal Asynchronous Receiver/Transmitter) [15 hrs]

	--Oscillator. Timers, using interrupt in timer operating, Watchdog Timer. Counters [10 hrs] --Revision problem classes [5 hrs] --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]

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 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.

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 أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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 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
الاتصالات الرقمية
Digital Communications

Module Information معلومات المادة الدراسية					
Module Title	**Digital Communications**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET3105**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**3**		**Semester of Delivery**	5	
Administering Department	**CET**		**College**	**IUC**	
Module Leader	**Miss. Dhuha Karim**		**e-mail**		
Module Leader's Acad. Title	**Assist. Professor**		**Module Leader's Qualification**	M.Sc.	
Module Tutor	**Miss. Dhuha Karim**		**e-mail**		
Peer Reviewer Name	**Prof. Hamza Abbass Alsewadi**		**e-mail**	Hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	**29/10/2023**		**Version Number**	1.0	

Relation with other Modules العلاقة مع المقررات الدراسية الأخرى			
Prerequisite module		**Semester**	5
Co-requisites module	None	**Semester**	

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims	The aims to students in third stage to defined and understand the

أهداف المادة الدراسية	-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	1- Describe of concepts and terminology used in digital communications 2 -Explain the advantage and disadvantage of each type of digital communications systems 3- Identify types of digital modulation 4- Discuss the comparison between the types of digital systems and its advantages 5- work on digital systems and Describe the most suitable designs 6- Explain how can send more than a signal at the same time and how to retrieve it 7- analog signal into a digital signal converter (PCM) 8- Explain types of digital modulation ask , psk , fsk 9- Explain the modulation and demodulation of quadrature amplitude modulation
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Introduction to digital communication **&** Sampling theorem **(10 hr)** - Pulse Amplitude Modulation (PAM), Pulse width and Pulse Position **(10 hr)** - Source Coding Techniques Modulation **(24 hr)** - Baseband modulation (Digital Modulation), **(30 hr)**
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL)

الحمل الدراسي للطالب موزع على (15) أسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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 4,5	Pulse width and Pulse Position Modulation (PWM & PPM),
Week 6	Time Division Multiplexing (TDM) , Pulse Code Modulation PCM),
Week 7	Mid exam
Week 8	Noise Consideration in PCM, Limitation and Modifications of PCM

Week 9	Differential PCM (DPCM), Delta Modulation (DM),
Week 10	Delta-Sigma Modulation
Week 11	Baseband modulation (Digital Modulation)
Week 12	Amplitude Shift Keying (ASK) [Modulation and demodulation].
Week 13	Frequency Shift Keying (FSK) [Modulation and demodulation],
Week 14	Phase Shift Keying (PSK) [Modulation, Coherent and Noncoherent Detection], Differential PSK.
Week 15	Quadrature Phase Shift Keying (QPSK)

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

أنظمة المعالجة في الوقت الحقيقي

Real Time Systems

Module Information معلومات المادة الدراسية					
Module Title	**Real Time Systems**			**Module Delivery**	
Module Type	**E**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET3106**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level	**3**	**Semester of Delivery**	5		
Administering Department	**CET**	**College**	IUC		
Module Leader	**Dr. Wadhah Abbass Hasan**	**e-mail**			
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	Ph.D.		
Module Tutor	**Dr. Wadhah Abbass Hasan**	**e-mail**			
Peer Reviewer Name	**Prof. Hamza Abbass Al-Sewadi**	**e-mail**	Hamza.ali@iuc.edu.iq		
Scientific Committee Approval Date	**29/10/2023**	**Version Number**	1.0		

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

Module Aims, Learning Outcomes and Indicative Contents أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To teach the students about Real-time scheduling and schedulable analysis. 2. To enable the students to Formally specify and verify the timing constraints 3. Design methods for real-time systems 4. Development and implementation of new techniques to advance the state-of-the-art real-time systems research.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	• 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	Indicative content includes the following.

	Part-A [20 Hrs] 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, Part-B [20Hrs] Scheduling: the concept of scheduling, types, clock, priority, aperiodic, sporadic tasks, resource access, resource control Part-C [20 Hrs] Multi-processor scheduling: coordination, resource sharing, temporal constraints. Part-D [10 hrs] RTOS, Datastores, timers, kernels

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) أسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26

Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4.26
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 #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**	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 RTs
Week 2	Hard Versus Soft Real-Time Systems
Week 3	A Reference Model of Real-Time Systems
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 - Week 10	Arduino RTOS
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	1. https://www.youtube.com/watch?v=yShUSwskUNA&list=PL1iLu2CSC9EU4mMByEhBp9CcYgAIiDs_v 2. https://personal.utdallas.edu/~cxl137330/courses/fall13/RTS/RTS.html 3. 4. 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

المعالجات المتوازية

Parallel Computing

Module Information

معلومات المادة الدراسية

Module Title	**Parallel Computing**	**Module Delivery**	
Module Type	**Elective**	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET3107**		
ECTS Credits	**5**		
SWL (hr/sem)	**125**		
Module Level	**3**	**Semester of Delivery**	5
Administering Department	**CET**	**College**	**IUC**
Module Leader	**NA**	**e-mail**	
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	
Module Tutor	**NA**	**e-mail**	
Peer Reviewer Name	**NA**	**e-mail**	
Scientific Committee Approval Date	**29/10/2023**	**Version Number**	1.0

Relation with other Modules

العلاقة مع المقررات الدراسية الأخرى

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To understand the basic principles of parallel computing. 2. To demonstrate different types of parallel algorithms 3. To deal with the basic concept of parallel programming. 4. To evaluate the performance of the parallel programs. 5. To apply parallel programming for solving different problems.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1. Understand the fundamental concepts of parallel computing and its importance in modern computing systems. 2. Demonstrate knowledge of different parallel computing architectures and their characteristics. 3. Develop an understanding of parallel algorithms for specific computational tasks, such as sorting or graph algorithms. 4. Demonstrate proficiency in using parallel computing libraries and tools, such as OpenMP or MPI. 5. Analyze and evaluate the performance of parallel algorithms and programs. 6. Design and implement parallel algorithms using parallel programming models and frameworks. 7. Identify and overcome common challenges in parallel computing, such as load balancing and synchronization. 8. Utilize parallel computing techniques to solve computationally intensive problems efficiently. 9. Apply parallelization strategies to different types of applications, such as numerical simulations or data processing tasks. 10. Optimize parallel programs through techniques like data partitioning and task scheduling. 11. Understand the impact of parallel computing on energy consumption and efficiency. 12. Explore advanced topics in parallel computing, such as parallel I/O or GPU programming.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. 1. Introduction to Parallel Computing [4] Motivation and importance of parallel computing, Taxonomy of parallel computing systems, Parallelism levels: task, data, and instruction-level parallelism 2. Parallel Architectures [6] Flynn's taxonomy: SISD, SIMD, MISD, MIMD; Shared-memory architectures: multiprocessors and multicores; Distributed-memory architectures: clusters and supercomputers; GPU architectures and programming models

	3. Parallel Programming Models [12] Shared-memory programming: OpenMP, Pthreads; Message Passing Interface (MPI); GPU programming: CUDA, OpenCL; Programming shared-address space systems (OpenMP, Pthreads); Programming scalable systems (message passing: MPI, global address space languages) 4. Parallel Algorithms and Techniques [10] Parallelization techniques: task parallelism, data parallelism; decomposition techniques, mapping & scheduling computation, templates 5. Performance Analysis and Optimization [8] Metrics for performance evaluation: speedup, efficiency, scalability; Bottleneck identification and optimization strategies; Load balancing techniques; Memory hierarchy optimization: caching and data locality 6. Parallelization of Applications [12] Non-numerical algorithms (sorting, graphs); Numerical algorithms (dense matrix algorithms, sparse matrix algorithms) 8. Emerging Trends and Technologies [12] Cluster, Grid, and Cloud computing and parallelism; Parallel computing in edge and IoT devices; Quantum computing and its potential impact on parallelism

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

Student Workload (SWL) الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem)	64	**Structured SWL (h/w)**	4.26

الحمل الدراسي المنتظم للطالب خلال الفصل		الحمل الدراسي المنتظم للطالب أسبوعيا	
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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, 13	LO #1-4 and 5-10
	Assignments	2	10% (10)	6, 12	LO # 3-5 and 6-10
	Projects / Lab.	2	20% (20)	Continuous	All
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	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 of parallel computing
Week 2	Parallel Architectures
Week 3	Parallel Algorithms and Techniques
Week 4	Programming shared-address space systems
Week 5	Programming scalable systems
Week 6	Performance Analysis and Optimization
Week 7	Mid Term Exam

Week 8	Analytical modeling of program performance
Week 9	Collective communication
Week 10	Synchronization
Week 11	Non-numerical algorithms (sorting, graphs)
Week 12	Numerical algorithms (dense matrix algorithms, sparse matrix algorithms)
Week 13	Performance measurement and analysis of parallel programs
Week 14	GPU Programming
Week 15	Emerging Trends and Technologies

Delivery Plan (Weekly Lab. Syllabus)

المنهاج الاسبوعي للمختبر

	Material Covered
Week 1	Lab 1: Introduction to Parallel Programming
Week 2	Lab 2: Implement Parallel Reduction using Min, Max, Sum, and Average operations.
Week 3	Lab 3: parallel algorithms for Vector Operations.
Week 4	Lab 4: parallel algorithms for Matrix Operations.
Week 5	Lab 5: Parallel Sorting Algorithms.
Week 6	Lab 6: Parallel Search Algorithm.
Week 7	Lab 7: Parallel Search Algorithm.

Learning and Teaching Resources

مصادر التعلم والتدريس

	Text	**Available in the Library?**
Required Texts	• An Introduction to Parallel Computing, Design and Analysis of Algorithms, 2/e. Ananth Grama, Vipin Kumar, Anshul Gupta, and George Karypis. Addison-Wesley, 2003. • Parallel Programming in C with MPI and OpenMP. Michael J. Quinn. McGraw Hill, 2004	Yes
Recommended Texts	• Using OpenMP: Portable Shared Memory Parallel Programming - Barbara Chapman, Gabriele Jost, Ruud van der Pas (2008)	No

	• Using MPI: Portable Parallel Programming with the Message-Passing Interface, 3rd Ed - William Gropp, Ewing Lusk, Anthony Skjellum (2014) • Programming Massively Parallel Processors: A Hands-on Approach, 3rd Ed. - David B. Kirk, Wen-mei W. Hwu (2016)	
Websites	https://www.mcs.anl.gov/~itf/dbpp/	

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.

Iraq University College

Computer Engineering Technology Department

Third Level – Semester Six

2025/2026

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

أنظمة السيطرة المتقدمة

Advanced Control Systems

Module Information معلومات المادة الدراسية					
Module Title	**Advanced Control Systems**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET3201**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level	**3**		**Semester of Delivery**	6	
Administering Department	**CET**		**College**	**IUC**	
Module Leader	**Mrs. Sundus Falih Mohsin**		**e-mail**		
Module Leader's Acad. Title	**Lecturer**		**Module Leader's Qualification**	MSc	
Module Tutor	**Mrs. Sundus Falih Mohsin**		**e-mail**		
Peer Reviewer Name	**Prof. Hamza Abbass Al-Sewadi**			Hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	**29/10/2023**		**Version Number**	1.0	

Relation with other Modules العلاقة مع المقررات 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	
Module Aims أهداف المادة الدراسية	13. To define the stability analysis techniques applicable to control systems. 14. To develop problem-solving skills and an understanding of different stability criteria. 15. To understand the principles and conditions under which a system is stable or unstable. 16. To introduce students to stability margins, such as gain margin and phase margin. 17. To emphasize the importance of stability in feedback control systems. 18. To highlight the relationship between stability and system performance.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	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 equation 7. 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(JW)H(JW). 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
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <u>Part A – Stability of Control System</u> 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] Revision problem classes [6 hrs] <u>Part B – Root Locus Method</u>

	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]. Revision problem classes [8 hrs] Part C – Bode Plot Method Basics of frequency domain analysis, Magnitude plot, Phase angle plot, Logarithmic scales, frequency domain O.L.T.F., standard factors of G(JW)H(JW), 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) أسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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(jw)H(jw)
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	3. Control Systems Engineering, U.A. Bakshi and S.C. Goyal, 2007 Technical Publications. 4. 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

اساسيات شبكات الحاسوب

Computer Network Fundamentals

Module Information معلومات المادة الدراسية					
Module Title	Computer Network Fundamentals			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	CET3202				
ECTS Credits	5				
SWL (hr/sem)	125				
Module Level		**3**	**Semester of Delivery**		6
Administering Department		**CET**	**College**	**IUC**	
Module Leader	**Mr. Saif Aldeen Mustafa**		**e-mail**		
Module Leader's Acad. Title		**Assistant Lecturer**	**Module Leader's Qualification**		M. Sc.
Module Tutor	**Mr. Saif Aldeen Mustafa**		**e-mail**		
Peer Reviewer Name	**Prof. Hamza Abbass Al-Sewadi**		**e-mail**	Hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date		**29/10/2023**	**Version Number**	1.0	

Relation with other Modules العلاقة مع المقررات 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	19. 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. 20. Understand the purpose and importance of computer networks, network architectures, and network protocols. 21. 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). 22. Explore various network devices and technologies used in building and managing networks. 23. Network Addressing and Subnetting Skills: The module aims to enable students to comprehend IP addressing, subnetting, and related concepts. 24. Network Standards and Protocols: The module aims to introduce students to network standards and protocols established by organizations such as IEEE, IETF, and ISO
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	26. Explain the data communications, networking, protocols and standards, and networking models and how to create a data flow. 27. Understand the Data communications between remote parties can be achieved through a process called networking. 28. Understand the fundamental concepts and principles of computer networks, including network architectures, protocols, and models (such as OSI and TCP/IP). 29. Identify and describe the different network components and their functions, including routers, switches, firewalls, access points, and network cables. 30. Explain the relationship between data, which are created by a device, and electromagnetic signals, which are transmitted over a medium. 31. Explain the basics of network addressing, including IP addressing, subnetting, and the use of subnet masks. 32. Demonstrate knowledge of commonly used network protocols, such as IP, TCP, UDP, ICMP, and DNS, and understand their roles in network communication. 33. Analyze and describe different network topologies and architectures, including star, bus, ring, and mesh networks. 34. Understand the fundamentals of network security, including common threats, encryption techniques, firewalls, and best practices for securing

	networks. 35. Configure and troubleshoot basic network settings, including IP addressing, subnetting, and network connectivity. 36. Explain the importance of network standards and protocols in ensuring interoperability and compatibility in network environments. 37. Demonstrate an understanding of network performance factors and techniques for optimizing network performance, including bandwidth management and Quality of Service (QoS) implementation. 38. Apply critical thinking and problem-solving skills to analyze and troubleshoot common network issues, such as network connectivity problems and network performance degradation. 39. 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.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. introduction to Computer Networks**: 6 hrs** Definition and purpose of computer networks **: 6 hrs** Network types and topologies **: 6 hrs** Network components and their functions **: 6 hrs** Network models: OSI and TCP/IP : **: 12 hrs** Network Devices and Infrastructure **: 6 hrs** Routers, switches, and hubs **: 6 hrs** Network interfaces and media **: 6 hrs** Network cables and connectors **: 6 hrs** Network architectures: LAN, WAN, MAN **: 6 hrs** Network Addressing and Subnetting : **6 hrs** IPv4 and IPv6 addressing **: 6 hrs** Subnet masks and subnetting techniques **: 6 hrs** IP address allocation and management **: 4 hrs**

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

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) أسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (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

أنظمة قواعد البيانات

Database Systems

Module Information معلومات المادة الدراسية					
Module Title	**Database Systems**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET3203**				
ECTS Credits	5				
SWL (hr/sem)	**125**				
Module Level		**3**	**Semester of Delivery**		6
Administering Department		**CET**	**College**	**IUC**	
Module Leader	**Dr. Walaa Hussaen Ali**		**e-mail**		
Module Leader's Acad. Title		**Lecturer**	**Module Leader's Qualification**		Ph.D.
Module Tutor	**Dr. Walaa Hussaen Ali**		**e-mail**		
Peer Reviewer Name	**Prof. Hamza Abbass Al-Sewadi**		**e-mail**		Hamza.ali@iuc.edu.iq
Scientific Committee Approval Date		**29/10/2023**	**Version Number**		1.0

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

Module Aims, Learning Outcomes and Indicative Contents

أهداف المادة الدراسية ونتائج التعلم والمحتويات الإرشادية	
Module Aims أهداف المادة الدراسية	1. To 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	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	Indicative content includes the following. Part-A [15 Hrs] 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? Part-B [20Hrs] The Entity Relationship Model: ER diagrams, resolution of M:N relationships, and Table Instance Charts (TICs). Translations of TICs into relational tables. 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. 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. Part-C [20 Hrs] 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. 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. Part-D [20 hrs] 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. Storage and Query Processing: RAID, Storage access, indexing and hashing, query processing and query optimization. Part-E [3] [10] Transaction Management and concurrency control: Transactions (concepts, state) and concurrency control (methods). Database Recovery: Concept and Recovery Techniques

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) أسبوع

Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation

تقييم المادة الدراسية

		Time/Number	Weight (Marks)	Week Due	Relevant Learning Outcome
Formative assessment	**Quizzes**	2	10% (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	**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?
Week 2	
Week 3	**The Entity Relationship Model:** ER diagrams, resolution of M:N relationships, and Table Instance Charts (TICs). Translations of TICs into relational tables.
Week 4	**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.
Week 5	
Week 6	**Midterm Exam**
Week 7	**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.
Week 8	**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.
Week 9	
Week 10	**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**.**

Week 11	**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.
Week 12	**Storage and Query Processing:** RAID, Storage access, indexing and hashing, query processing and query optimization.
Week 13	**Transaction Management and concurrency control:** Transactions (concepts, state) and concurrency control (methods).
Week 14	**Database Recovery:** Concept and Recovery Techniques
Week 15	**Non-Relational Database systems:** Document, Key-value, Column, Graph.

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	Book#1: C. J. Date, “Introduction to Database Systems”, 8th Ed. Publisher: Addison-Wesley, 2003 Book#2: Ramez Elmasri, Shamkant B. Navathe, " Fundamentals of Database Systems",7th Ed. Publisher: Pearson, 2016.	NO
Supporting Texts	Reference#1: A. Silberschatz, H. F.Korth, and S. Sudarshan, “Database System Concepts", 5th Ed. McGraw-Hill (2006). 5. Reference#2: Database Systems the Complete Book by H. Garcia-Molina and et al. Prentice Hall; 2nd Edition	No

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

التحليلات الهندسية

Engineering Analysis

Module Information

معلومات المادة الدراسية

Module Title	**Engineering Analysis**	**Module Delivery**	
Module Type	**Core**	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET3204**		
ECTS Credits	**5**		
SWL (hr/sem)	**125**		
Module Level	**3**	**Semester of Delivery**	6
Administering Department	**CET**	**College**	**IUC**
Module Leader	**Dr. Hamid Hashim Al-Zweni**	**e-mail**	
Module Leader's Acad. Title	**Assist. Prof.**	**Module Leader's Qualification**	Ph.D.
Module Tutor	**Dr. Hamid Hashim Al-Zweni**	**e-mail**	
Peer Reviewer Name	**Prof. Hamza Abbass Al-Sewadi**	**e-mail**	Hamza.ali@iuc.edu.iq
Scientific Committee Approval Date	**29/10/2023**	**Version Number**	1.0

Relation with other Modules

العلاقة مع المقررات 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	This course aims to provide students with a fundamental understanding of basic and advanced engineering analysis techniques, including engineering components and systems.

أهداف المادة الدراسية	
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	40. Introduce the students to the theory and application of Laplace transform. 41. Give students an understanding of the time and frequency domain with different functions. 42. Get better in powered circuit analysis with applications and practical examples of matrix in Matlab. 43. Introduce the z-transform, which is the generalisation of the Laplace transform to discrete-time systems. 44. Provide students with a fundamental understanding of basic and advanced statistical techniques. 45. Provide students with a fundamental understanding of statistical measurements and graphs. 46. Provide an introduction to the method, tools and ideas of numerical computation, including the bisection method, false position method, and Newton-Raphson method. 47. Use numerical methods for solving algebraic and transcendental equations and solutions of linear and non-linear simultaneous equations. 48. Understand the basic theory of the numerical solution of ordinary differential equations. 49. Be familiar with the theorem that is related to matrices and its applications to analysis of the electronic circuits. 50. Learning the method of solving complicated equations. 51. Applying all of the above outcomes practically using Matlab.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Laplace Transform [15 hrs] - Z-transform [15 hrs] - Numerical computations [15hrs] - solution of linear sim ultaneous [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.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) أسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	4
Total SWL (h/sem) الحمل الدراسي الكلي للطالب خلال الفصل	125		

Module Evaluation تقييم المادة الدراسية					
		Time/Number	**Weight (Marks)**	**Week Due**	**Relevant Learning Outcome**
Formative assessment	**Quizzes**	2	10% (10)	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
اتصالات البيانات
Data Communications

Module Information معلومات المادة الدراسية					
Module Title	**Data Communications**			**Module Delivery**	
Module Type	**Core**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET3105**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**3**		**Semester of Delivery**	5	
Administering Department	**CET**		**College**	**IUC**	
Module Leader	**Dr. Abdul Wahab Isa**		**e-mail**		
Module Leader's Acad. Title	**Assist. Professor**		**Module Leader's Qualification**	Ph.D.	
Module Tutor	**Dr. Abdul Wahab Isa**		**e-mail**		
Peer Reviewer Name	**Prof. Hamza Abbass Al-Sewadi**		**e-mail**	Hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	**29/10/2023**		**Version Number**	1.0	

Relation with other Modules العلاقة مع المقررات الدراسية الأخرى			
Prerequisite module		**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	The aims to students in third stage to defined and understand the Digital Modulation Synchronization Line Codes Spread Spectrum Systems Satellite Communication
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	1- Describe digital communications modulation and Explain the modulation and demodulation of quadrature amplitude modulation 2 -Explain the advantage and disadvantage of each type of digital communications systems 4- Discuss the comparison between the types of digital systems and its advantages 5- Explain Synchronization 6- Describe Spread Spectrum Systems 7- Explain types Satellite Communication 8-Describe the Advantages and Applications of Microwaves
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. - Digital Modulation (10 hr) - Synchronization (10 hr) - Line Codes (10 hr) - Spread Spectrum Systems (15 hr) - Satellite Communication (15hr) - Microwaves(10hr)
Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	The main strategy that will be adopted in delivering this module is to encourage students' participation in the exercises, while at the same time refining and expanding their critical thinking skills. This will be achieved through classes, interactive tutorials and by considering type of simple experiments involving some sampling activities that are interesting to the students.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) أسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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- 8
	Assignments	2	10% (10)	3,10	LO #1-4, LO #4- 8
	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 # 1-8
	Final Exam	4hr	50% (50)	16	All
Total assessment			100% (100 Marks)		

Delivery Plan (Weekly Syllabus) المنهاج الاسبوعي النظري	
	Material Covered
Week 1	Digital Modulation: Quadrature Phase Shift Keying (QPSK), Offset QPSK
Week 2	Minimum Shift Keying, Gaussian Minimum Shift Keying (GMSK).
Week 3	Quadrature Amplitude Modulation (QAM), Multilevel Modulation Techniques M-ary PSK, M-ary QAM
Week 4	Synchronization: Phase Locked Loop (PLL) Recovery; Carrier Recovery: square law device,.
Week 5	Costas loop, DF PLL; Clock Recovery: spectrum line method, minimum mean square error, early-late gate method
Week 6	Line Codes: Binary Line Codes; Multilevel Signaling
Week 7	Mid exam

Week 8	Spread Spectrum Systems: Introduction; Advantages and Disadvantages; Pseudo Noise Sequence (PN Sequence) Generation and Properties
Week 9,10	Spread Spectrum Systems: Direct Sequence Spread Spectrum; Frequency Hopping Spread Spectrum (SFH, FFH).
Week 11	Satellite Communication: introduction; Types Of Satellites; Frequency Bands;
Week 12	Satellite Construction; Satellite Link Design;
Week 13	Modulation and Multiplexing Techniques: FDM/FM, TDM; Multiple Access: FDMA, TDMA, CDMA.
Week 14	Typical Frequencies; Band Designation;
Week 15	Introduction to antennas & Microwaves , Advantages of Microwaves; Applications of Microwaves.

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Quadrature Phase Shift Keying (QPSK)
Week 2	Minimum Shift Keying
Week 3	Quadrature Amplitude Modulation (QAM), Multilevel Modulation Techniques M-ary PSK, M-ary QAM
Week 4	Phase Locked Loop (PLL) Recovery
Week 5,6	Direct Sequence Spread Spectrum; Frequency Hopping Spread Spectrum (SFH, FFH).
Week 7	Satellite Link Design; Modulation and Multiplexing Techniques: FDM/FM, TDM
Week 8,9	Design Multiple Access: FDMA, TDMA, CDMA

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	- **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

معالجة الصور الرقمية

Digital Image Processing

Module Information معلومات المادة الدراسية					
Module Title	**Digital Image Processing**			**Module Delivery**	
Module Type	**Elective**			☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET3206**				
ECTS Credits	**5**				
SWL (hr/sem)	**125**				
Module Level	**3**		**Semester of Delivery**	6	
Administering Department	**CET**		**College**	**IUC**	
Module Leader	**Dr. Wadhah Abbass Hasan**		**e-mail**		
Module Leader's Acad. Title	**Lecturer**		**Module Leader's Qualification**	Ph.D.	
Module Tutor	**Dr. Wadhah Abbass Hasan**		**e-mail**		
Peer Reviewer Name	**Prof. Hamza Abbass Al-Sewadi**		**e-mail**	Hamza.ali@iuc.edu.iq	
Scientific Committee Approval Date	**29/10/2023**		**Version Number**	1.0	

Relation with other Modules العلاقة مع المقررات 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	25. To become familiar with digital image fundamentals 26. To get exposed to simple image enhancement techniques in Spatial and Frequency domain. 27. To learn concepts of degradation function and restoration techniques. 28. To study the image segmentation and representation techniques. 29. To become familiar with image compression and recognition methods
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	52. Know and understand the basics and fundamentals of digital image processing, such as digitization, sampling, quantization, and 2D-transforms. 53. describe features of images. 54. Have a good understanding of the mathematical foundations for digital manipulation of images. 55. Operate on images using the techniques of smoothing, sharpening and enhancement. 56. image acquisition; preprocessing; segmentation; Fourier domain processing, compression and 57. analysis. 58. Be able to write programs using Matlab language for digital manipulation of images; image 59. Understand the restoration concepts and filtering techniques. 60. Be able to understand the documentation for, and make use of, the MATLAB library and MATLAB. 61. Acquisition; preprocessing; segmentation; Fourier domain processing; and compression. 62. Learn and understand the Image Enhancement in the Spatial Domain. 63. Learn and understand the Image Enhancement in the Frequency Domain. 64. Learn the basics of segmentation, features extraction, compression and recognition methods for color models.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. <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] <u>Image Transforms</u> Two dimensional Fourier Transform- Properties – Fast Fourier Transform – Inverse FFT, Discrete cosine transform and KL transform.-Discrete Short time Fourier Transform- and its application in Compression. [10 hrs]

	Image Enhancement 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] Image Restoration: Overview of Degradation models –Unconstrained and constrained restorations- Inverse Filtering , Wiener-Filter. [10 hrs] Feature Extraction: 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] Image Reconstruction from Projections: Need- Radon Transform – Back projection operator- Projection Theorem- Inverse Radon Transform. [10 hrs]

Learning and Teaching Strategies استراتيجيات التعلم والتعليم	
Strategies	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.

Student Workload (SWL) الحمل الدراسي للطالب موزع على (15) أسبوع			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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:** • 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.):** • 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.):** • Linear and Non Linear Operations
Week 4	**Image Enhancement in the Spatial Domain:** • Some basic Gray Level Transformations • Histogram Processing
Week 5	**Image Enhancement in the Spatial Domain (cont.):** • Enhancement Using Arithmetic and Logic operations
Week 6	**Image Enhancement in the Spatial Domain (cont.):** • Combining Spatial Enhancement Methods • Basics of Spatial Filters
Week 7	Mid-term Exam
Week 8	**Image Enhancement in the Spatial Domain (cont.):** • Smoothening and Sharpening Spatial Filters
Week 9	**Image Enhancement in the Spatial Domain (cont.):** • Histogram Processing
Week 10	**Image Enhancement in the Frequency Domain:** • Introduction to Fourier Transform and the frequency Domain • Computing and Visualizing
Week 11	**Image Enhancement in the Frequency Domain (cont.):** • Smoothing Frequency Domain Filters
Week 12	**Image Restoration:** • A model of The Image Degradation / Restoration Process
Week 13	**Image Restoration (cont.):** • Inverse filtering • Wiener filtering
Week 14	**Image Segmentation:** • Detection of Discontinuities • Edge linking and boundary detection • Thresholding
Week 15	**Object Recognition:** • Patterns and Pattern Classes • Decision-Theoretic Methods

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Digital image Representation • Reading, Displaying, Writing Images using MATLAB • Data Classes, Image Types using MATLAB
Week 2	Lab 2: Digital image Representation (cont.) • Introduction to M Function Programming using MATLAB
Week 3	Lab 3: Image Enhancement in the Spatial Domain: • Intensity Transformation Function (MATLAB)
Week 4	Lab 4: Image Enhancement in the Spatial Domain (cont.): • 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.

MODULE DESCRIPTION FORM

نموذج وصف المادة الدراسية

اساسيات انترنت الاشياء

IoT Fundamentals

Module Information

معلومات المادة الدراسية

Module Title	**IoT Fundamentals**	**Module Delivery**	
Module Type	**Elective**	☒ **Theory** ☐ **Lecture** ☒ **Lab** ☐ **Tutorial** ☐ **Practical** ☐ **Seminar**	
Module Code	**CET3207**		
ECTS Credits	**5**		
SWL (hr/sem)	**125**		
Module Level	**3**	**Semester of Delivery**	6
Administering Department	**CET**	**College**	**IUC**
Module Leader	**Mr. Alaa Ibtrahim**	**e-mail**	
Module Leader's Acad. Title	**Lecturer**	**Module Leader's Qualification**	M.Sc.
Module Tutor	**Mr. Alaa Ibtrahim**	**e-mail**	
Peer Reviewer Name	**Prof. Hamza Abbass Al-Sewadi**	**e-mail**	
Scientific Committee Approval Date	**29/10/2023**	**Version Number**	1.0

Relation with other Modules

العلاقة مع المقررات 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	6. To understand the basic principles of the Internet of Things. 7. To study the relationship between IoT and M2M. 8. To deal with using Arduino for IoT implementation. 9. To deal with using Raspberry Pi for IoT implementation. 10. To apply IoT solutions in different fields.
Module Learning Outcomes مخرجات التعلم للمادة الدراسية	13. Understand the basic concepts, architecture, and components of the Internet of Things (IoT). 14. Identify and describe the various networking technologies and protocols used in IoT systems, such as Wi-Fi, Bluetooth, Zigbee, and MQTT. 15. Explain the role of sensors, actuators, and embedded systems in IoT applications. 16. Gain knowledge of different IoT platforms and frameworks for developing IoT solutions. 17. Demonstrate proficiency in designing and implementing simple IoT applications using Arduino boards. 18. Gain knowledge of using Python with the IoT platforms. 19. Demonstrate proficiency in designing and implementing simple IoT applications using Raspberry Pi boards. 20. Understand the principles of data communication and data management in IoT systems, including data collection, storage, and analysis. 21. Evaluate the impact of IoT on various industries, such as healthcare, transportation, agriculture, and smart cities. 22. Develop skills in integrating IoT devices and systems with cloud platforms and web services. 23. Apply IoT technologies to solve real-world problems and develop innovative IoT applications. 24. Collaborate effectively in teams to design and implement IoT projects or case studies.
Indicative Contents المحتويات الإرشادية	Indicative content includes the following. Part A - IoT concepts [14 hrs]

	Introduction to the Internet of Things, Characteristics of IoT, Physical design of IoT, Functional blocks of IoT, Sensing, Actuation, Basics of Networking, Communication Protocols, Sensor Networks. Part B – IoT using Arduino [16 hrs] Machine-to-Machine Communications, Difference between IoT and M2M, Interoperability in IoT, Introduction to Arduino Programming, Integration of Sensors, and Actuators with Arduino, Part C – IoT Using Raspberry Pi [16 hrs] Introduction to Raspberry Pi, Interfacing Raspberry Pi with basic peripherals, Implementation of IoT with Raspberry Pi, Introduction to Software-defined Network (SDN), SDN for IoT, Data Handling, and Analytics. Part D – IoT Applications [20 hrs] Sensor-Cloud, Smart Cities and Smart Homes, Connected Vehicles, Smart Grid, Industrial IoT, Case Study: Agriculture, Healthcare, Activity Monitoring.

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

Student Workload (SWL)

الحمل الدراسي للطالب محسوب لـ ١٥ أسبوعا			
Structured SWL (h/sem) الحمل الدراسي المنتظم للطالب خلال الفصل	64	**Structured SWL (h/w)** الحمل الدراسي المنتظم للطالب أسبوعيا	4.26
Unstructured SWL (h/sem) الحمل الدراسي غير المنتظم للطالب خلال الفصل	61	**Unstructured SWL (h/w)** الحمل الدراسي غير المنتظم للطالب أسبوعيا	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, 13	LO #1-5 and 6-10
	Assignments	1	10% (10)	10	LO # 1-9
	Projects / Lab.	2	10% (5)	Continuous	
	Seminars	1	10% (10)	Continuous	
Summative assessment	**Midterm Exam**	2 hr	10% (10)	7	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 the Internet of Things
Week 2	IoT and M2M
Week 3	Introduction to Arduino Programming and Interfacing
Week 4	Implementation of IoT with Arduino
Week 5	Introduction to Raspberry Pi and Interfacing
Week 6	Implementation of IoT with Raspberry Pi
Week 7	Mid Term Exam
Week 8	Data Handling and Analytics

Week 9	Sensor-Cloud
Week 10	Smart Cities and Smart Homes
Week 11	Connected Vehicles
Week 12	Smart Grid
Week 13	Industrial IoT
Week 14	IoT Security
Week 15	IoT Case Study: Agriculture, Healthcare, Activity Monitoring

Delivery Plan (Weekly Lab. Syllabus) المنهاج الاسبوعي للمختبر	
	Material Covered
Week 1	Lab 1: Led Control Using Arduino Board
Week 2	Lab 2: Potentiometer And Ir Sensor Interfacing With Arduino
Week 3	Lab 3: Controlling Two Actuators Using Arduino
Week 4	Lab 4: Creation of Things Speak Account
Week 5	Lab 5: Actuator Controlling Through Cloud
Week 6	Lab 6: Dht11sensor Data To Cloud
Week 7	Lab 7: Iot Based Air Pollution Control System
Week 8	Lab 8: Tds Sensor Interfacing With Arduino
Week 9	Lab 9: Actuator Controlling by Mobile Using Arduino

Learning and Teaching Resources مصادر التعلم والتدريس		
	Text	**Available in the Library?**
Required Texts	• "The Internet 'of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press) • Vijay Madisetti, Arshdeep Bahga, “Internet of Things: A Hands-On Approach”	
Recommended Texts	• Beginning Sensor networks with Arduino and Raspberry Pi – Charles Bell, Apress,	

Websites	Cisco Netacad course " Introduction to IoT" Learn Key Concepts With Introduction To IoT Course | Networking Academy (netacad.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.

Iraq University College

Computer Engineering Technology Department

Fourth Stage

2025/2026

4

أسم المقرر: Computer Networks

رمز المقرر (ان وجد):

أسم التدريسي: م. سيف الدين مصطفى كمال

المرحلة: الرابعة

وصف المقرر

مقرر دراسي يهدف إلى تزويد الطلاب بالمعرفة والمهارات الأساسية لفهم وتصميم وبناء شبكات الحاسوب .يغطي المقرر نظريات ومفاهيم الشبكات مثل أنواع الشبكات، وبروتوكولات الاتصال (مثل OSI و TCP/IP)، وطبقات الشبكات، وتصنيف وسائط النقل. كما يتضمن التطبيق العملي لتصميم الشبكات المحلية، وربطها، ومعالجة مشاكلها التقنية الشائعة، واستخدام الأدوات اللازمة لذلك.

1. المؤسســـــة التعليمية	كلية العراق الجامعة
2. القســـــم العلمي	هندسة تقنيات الحاسوب
3. أســـم / رمز المقرر	شبكات الحاسوب
4. أشكال الحضورالمتاحة	دوام يومي رسمي
5. الفصل / السنة	الفصل الاول والثاني / 2025 -2026
6. عدد الساعات الدراسية	ساعتان نظري – ساعتان عملي – ساعة مناقشة
7. تاريخ أعداد هذا الوصف	2022/10/1
8. هدف المقرر	أكساب الطالب المعرفة عن اساسيات اشبكات الحاسوب بما فيها الدوائرالاساسية وطبقات الشبكات الدايودات والمقاومات والقواطع ومعرفة كيفية حساب قيم التيارات والمقاومات الضرورية لتصميم الدوائر الالكترونية.

9. مخرجات المقرر وطرائق التعليم والتعلم والتقييم

أ. المعرفة والفهم:

1. توضيح المفاهيم الاساسية في اساسيات الالكترونيك والشبكات.
2. ادراك الاساس النظري والعملي.

ب. المهارات الخاصة بالمقرر:

1. اكتساب مهارات وامكانيات مهندس الشبكات.
2. توظيف المهارات المكتسبة في تصميم وادارة الشبكات.

ج. مهارات التفكير: القدرة على التفكير في حل المسائل الخاصة بمادة شبكات الحاسوب وتنمية قدرة الطالب على التعامل مع مكونات الاتصالات وشبكات البيانات.

طرائق التعليم والتعلم

- المحاضرات الصفية الاسبوعية.
- اكتساب المعرفة من خلال المصادر الخارجية والانترنت.
- الواجبات والتقارير العلمية.

- طرح الافكار للمناقشة والحوار وتحفيز الطالب لاكتساب العلوم بشكل ذاتي.

طرائق التقييم

- أمتحان فصلي عدد 4
- أمتحان يومي غير منتظم بتوقيتات يهدف لتحفيز الطالب على المتابعة.
- المشاركة اليومية التي تعكس التقييم اليومي للطالب.
- نشاط علمي وتقارير علمية وواجبات يومية.
- التقييم المختبري (امتحانات العملي).
- أمتحان نهاية الكورس الدراسي.

10.بنية المقرر (Syllabus)

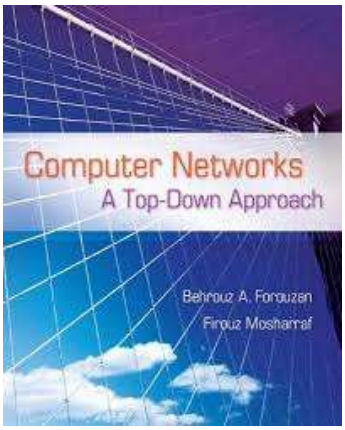
weeks	Syllabus
1	Introduction, Data representation, Data flow, Networks Criteria
2	Data flow, Networks Criteria
3	Type of connections
4	Physical topology: Mesh topology, Ring topology
5	Star topology, Bus topology, Hybrid topology
6	Network models, Layered Tasks, The OSI Model, Layers in the OSI Model
7	Physical layer, Data link later, Network layer
8	Transport layer, Session layer , Presentation layer, Application layer
9	TCP/IP Protocol
10	Midterm exam
11	Addressing
12	Transmission Media: Guided Media Twisted-Pair Cable , Coaxial Cable, Fiber-Optic Cable
13	Unguided Media: Wireless Radio Waves, Microwaves, Infrared
14	Final exam semester 1
15	Error Detection and Correction: BLOCK CODING, Error Detection & Error Correction,
16	Hamming Distance Minimum Hamming Distance LINEAR BLOCK CODES (Parity check)
17	CYCLIC CODES Cyclic Redundancy Check (CRC) & Polynomials
18	CHECKSUM
19	Data Link Control Flow And Error Control
20	Noiseless Channels &Noisy Channels
21	Network Layer: Logical Addressing IPv4 Addressing, Classful & Classless
22	Mask & Subnetting

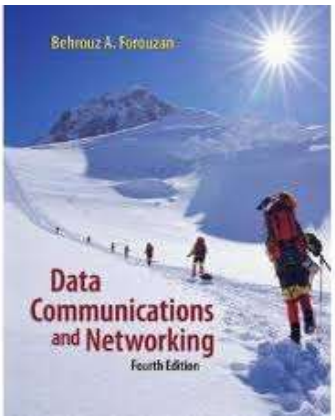
23	Network Layer: Internet Protocol Internetworking, IPv4
24	Network Layer: Internet Protocol IPv6
25	Midterm exam
26	Network Layer: Delivery, Forwarding, and Routing Delivery & Forwarding
27	Unicast Routing Protocols Optimization
28	Distance Vector Routing (RIP) Link State Routing (OSPF) Path Vector Routing (BGP)
29	Final exam semester 2

11.البنية التحتية

المراجع الرئيسية (المصادر)

a. Data Communications and Networking / Behrouz A Forouzan. – 5th edition/ 2016.
b. Computer Networks / William Stallings – 19th edition / 2016.
Computer Networking / James F. Kurose & Keith W. Ross – 6th edition/ 2010.





اسم المقرر: Artificial intelligence
رمز المقرر (ان وجد):
اسم التدريسي: أ.د. قيس شريف مجدي
المرحلة : الرابعة

وصف مقرر الذكاء الاصطناعي

يوفر وصف المقرر هذا إيجازاً مقتضياً لأهم خصائص المقرر ومخرجات التعلم المتوقعة من الطالب تحقيقها مبرهناً عما إذا كان قد حقق الاستفادة القصوى من فرص التعلم المتاحة. ولابد من الربط بينها وبين وصف البرنامج.

2. المؤسسة التعليمية	**كلية العراق الجامعة**
3. القسم العلمي / المركز	**هندسة تقنيات الحاسوب**
4. اسم / رمز المقرر	**الذكاء الاصطناعي**
5. أشكال الحضور المتاحة	**دوام يومي رسمي**
6. الفصل / السنة	**الثاني**
7. عدد الساعات الدراسية (الكلي)	**ساعتان نظري وساعتان عملي**
8. تاريخ إعداد هذا الوصف	**2022-10-1**

9. أهداف المقرر
اكساب الطالب المعرفة عن موضوع الذكاء الاصطناعي حيث ان هدف المقرر شرح قدرة النظام او الانظمة على تفسير البيانات الخارجية بشكل صحيح، والتعلم من هذه البيانات، واستخدام تلك المعرفة لتحقيق أهداف ومهام محددة من خلال التكيف المرن

1. مخرجات المقرر وطرائق التعليم والتعلم والتقييم

أ- المعرفة والفهم -1تعريف الطالب على سلوك وخصائص معينة تتسم بها البرامج الحاسوبية، تجعلها تحاكي القدرات الذهنية البشرية وأنماط عملها -2ادراك الاساس النظري والعملي لخوارزميات الذكاء الاصطناعي وكيفية عملها..... **ب - المهارات الخاصة بالمقرر.** -1اكتساب مهارات وامكانيات في برمجة خوارزميات بسيطة كترتيب الارقام تصاعديا او تنازليا -2توظيف المهارات الذاتية والفكرية المكتسبة من خلال التجارب المختبرية في برمجة خوازميات الذكاء الاصطناعي ..... **ج- مهارات التفكير** ج - 1القدرة على التفكير في حل المسائل الخاصة بمادة الذكاء الاصطناعي ..... ج - 2تنمية قدرة الطالب على التعامل مع المسائل المتعلقة بمادة الذكاء الاصطناعي ..... د - المهارات العامة والمنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي).
طرائق التعليم والتعلم
- المحاضرات الصفية الاسبوعية - اكتساب المعرفة من خلال المصادر الخارجية والانترنت - الواجبات والتقارير العلمية - طرح الافكار للمناقشة والحوار وتحفيز الطالب لاكتساب العلوم بشكل ذاتي
طرائق التقييم
- امتحان فصلي بعدد 2-3 - امتحان يومي غير منتظم بتوقيتات يهدف لتحفيز الطالب على المتابعة - المشاركة اليومية التي تعكس التقييم اليومي للطالب - نشاط علمي وتقارير علمية و واجبات يومية - التقييم المختبري (امتحانات العملي) - امتحان نهاية السنة

2. بنية المقرر	
Week	Syllabus
1	**An Introduction to A.I.**
2	**Operations on Data Structures**
3	**The List and its types**
4	**Some operator on lists**
5	**Sorting list: bubble-sort**
6	**insert-sort and quick-sort**
7	**Representing sets by binary trees and Displaying trees**
8	**Basic Problem-Solving Strategies**
9	**Depth first search strategy**
10	**Breadth-first search strategy**
11	**Uninformed Search Strategies**
12	**Informed (Heuristic) Search Strategies and Heuristic Functions**
13	**Local Search Algorithms and Optimization Problems**
14	**Searching with Nondeterministic Actions**
15	**Searching with Partial Observations .**
16	**Online Search Agents and Unknown Environments**

3.البنية التحتية	
	1- الكتب المقررة المطلوبة
1. Artificial Intelligence: A Modern Approach by Stuart J. Russell and Peter Norvig, Third Edition 2010, Pearson Education, Inc. 2. Logic Programming with Prolog by Max Bramer, 1st edition 2005, springer Inc.	**المراجع الرئيسية (المصادر)**

اسم المقرر: Smart System Modeling
رمز المقرر (ان وجد):
اسم التدريسي: أ.د. قيس شريف مجدي
المرحلة : الرابعة

وصف مقرر نمذجة النظم الذكية

يوفر وصف المقرر هذا إيجازاً مقتضياً لأهم خصائص المقرر ومخرجات التعلم المتوقعة من الطالب تحقيقها مبرهناً عما إذا كان قد حقق الاستفادة القصوى من فرص التعلم المتاحة. ولابد من الربط بينها وبين وصف البرنامج.

10. المؤسسة التعليمية	**كلية العراق الجامعة**
11. القسم العلمي / المركز	**هندسة تقنيات الحاسوب**
12. اسم / رمز المقرر	**نمذجة النظم الذكية**
13. أشكال الحضور المتاحة	**دوام يومي رسمي**
14. الفصل / السنة	**الاول**
15. عدد الساعات الدراسية (الكلي)	**ساعتان نظري وساعتان عملي**
16. تاريخ إعداد هذا الوصف	**2022-10-1**
17. أهداف المقرر **اكساب الطالب المعرفة عن موضوع نمذجة النظم الذكية حيث ان هدف المقرر شرح قدرة النظام او الانظمة على تفسير البيانات الخارجية بشكل صحيح، والتعلم من هذه البيانات، واستخدام تلك المعرفة لتحقيق أهداف ومهام محددة من خلال التكيف المرن**	

4. مخرجات المقرر وطرائق التعليم والتعلم والتقييم

أ- المعرفة والفهم

-1تعريف الطالب على سلوك وخصائص معينة تتسم بها البرامج الحاسوبية، تجعلها تحاكي القدرات الذهنية البشرية وأنماط عملها

-2ادراك الاساس النظري والعملي لخوارزميات معينة مثل خوازميات الشبكات العصبونية وكيفية عملها.....

ب - المهارات الخاصة بالمقرر.

-1اكتساب مهارات وامكانيات في برمجة خوارزميات بسيطة

-2توظيف المهارات الذاتية والفكرية المكتسبة من خلال التجارب المختبرية في برمجة خوازميات معينة .....

ج- مهارات التفكير

ج - 1القدرة على التفكير في حل المسائل الخاصة بمادة نمذجة النظم الذكية .....

ج - 2تنمية قدرة الطالب على التعامل مع المسائل المتعلقة بمادة نمذجة النظم الذكية .....

د - المهارات العامة والمنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي).

طرائق التعليم والتعلم

- المحاضرات الصفية الاسبوعية
- اكتساب المعرفة من خلال المصادر الخارجية والانترنت
- الواجبات والتقارير العلمية
- طرح الافكار للمناقشة والحوار وتحفيز الطالب لاكتساب العلوم بشكل ذاتي

طرائق التقييم

- امتحان فصلي بعدد 2-3
- امتحان يومي غير منتظم بتوقيتات يهدف لتحفيز الطالب على المتابعة
- المشاركة اليومية التي تعكس التقييم اليومي للطالب
- نشاط علمي وتقارير علمية و واجبات يومية
- التقييم المختبري (امتحانات العملي)
- امتحان نهاية السنة

5. بنية المقرر	
Week	Syllabus
1	Machine Learning and Data Mining I
2	Machine Learning and Data Mining II
3	Machine learning types, Classification and Regression
4	Machine learning process, Machine learning Approaches
5	Neural Network: An introduction
6	Training of a Single-Layer Neural Network: Delta Rule
7	SGD, Batch, and Mini Batch
8	Cost Function and Learning Rule
9	Training of Multi-Layer Neural Network
10	Back-Propagation Algorithm
11	Deep Learning
12	Deep Neural Network Activation Function: ReLU and Dropout
13	Convolutional Neural Network I
14	Convolutional Neural Network II
15	Architecture of ConvNet
16	Architecture of ConvNet

6.البنية التحتية	
1. MACHINE LEARNING: An Algorithmic Perspective by Stephen Marsland, 2nd edition 2015. 2. MATLAB Deep Learning: With Machine Learning, Neural Networks and Artificial Intelligence by Phil Kim, 1st edition 2017, SPRINGER Inc.	المراجع الرئيسية (المصادر)

اسم المقرر: Database System
رمز المقرر (ان وجد):
اسم التدريسي: م.م ولاء حسين
المرحلة :Fourth stage

وصف مقرر انظمة قواعد البيانات

يوفر وصف المقرر هذا إيجازاً مقتضياً لأهم خصائص المقرر ومخرجات التعلم المتوقعة من الطالب تحقيقها مبرهناً عما إذا كان قد حقق الاستفادة القصوى من فرص التعلم المتاحة. ولابد من الربط بينها وبين وصف البرنامج.

7. المؤسسة التعليمية	**كلية العراق الجامعة**
8. القسم العلمي / المركز	**هندسة تقنيات الحاسوب**
9. اسم / رمز المقرر	**أنظمة قواعد البيانات**
10. أشكال الحضور المتاحة	**دوام يومي رسمي**
11. الفصل / السنة	**الاول**
12. عدد الساعات الدراسية (الكلي)	**ساعتان نظري وساعتان عملي**
13. تاريخ إعداد هذا الوصف	**2022-10-1**
14. أهداف المقرر **اكساب الطالب المعرفة عن موضوع انظمة قواعد البيانات ..... الخ**	

15. مخرجات المقرر وطرائق التعليم والتعلم والتقييم

أ- المعرفة والفهم -1تعريف الطالب على المفاهيم الاساسية ..... -2ادراك الاساس النظري والعملي ..... **ب - المهارات الخاصة بالمقرر.** -1اكتساب مهارات وامكانيات ..... -2توظيف ..... **ج- مهارات التفكير** ج - 1القدرة على التفكير في حل المسائل الخاصة بمادة ..... ج - 2تنمية قدرة الطالب على التعامل مع المكونات الرقمية كاسلوب حل ..... د - المهارات العامة والمنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي).
طرائق التعليم والتعلم
- المحاضرات الصفية الاسبوعية - اكتساب المعرفة من خلال المصادر الخارجية والانترنت - الواجبات والتقارير العلمية - طرح الافكار للمناقشة والحوار وتحفيز الطالب لاكتساب العلوم بشكل ذاتي
طرائق التقييم
- امتحان فصلي عدد 2 - امتحان يومي غير منتظم بتوقيتات يهدف لتحفيز الطالب على المتابعة - المشاركة اليومية التي تعكس التقييم اليومي للطالب - نشاط علمي وتقارير علمية و واجبات يومية - التقييم المختبري (امتحانات العملي) - امتحان نهاية الفصل

16.بنية المقرر	
Week	Syllabus
1 2	• What is Data • What is a Database • What is a Database Management System (DBMS)?
3 4	• Database Life Cycle (DBLC) • Database schema • Database element o Tables o Records o Fields
5	• Creating Table Relationships o Primary Key o Foreign Key
6	• What Is Relationship? • Type of Relationship o One-to-one relationship o One-to-many relationship o Many to many relationship
7 8	• ERD diagram • How to create database in PhpMyAdmin XAMPP or WAMP server • MYSQL Queries o What is SQL? o What Can SQL do?
9	o The SQL CREATE DATABASE Statement o The SQL DROP DATABASE Statement o The SQL BACKUP DATABASE Statement o The SQL BACKUP WITH DIFFERENTIAL Statement o The SQL CREATE TABLE Statement
10	o The SQL DROP TABLE Statement o The SQL INSERT INTO Statement o The SQL DELETE Statement
11	o The SQL SELECT Statement o The SQL WHERE Clause o Operators in The WHERE Clause
12	o The SQL AND, OR and NOT Operators

13 14	○ ORDER BY Several Columns ○ The SQL UPDATE Statement ○ Get ID of The Last Inserted Record ○ SQL ALTER TABLE Statement ○ SQL Constraints ○ SQL Joins ○ Type of SQL joins ○ SQL TOP, LIMIT or ROWNUM Clause
15	○ The SQL MIN() and MAX() Functions ○ SQL COUNT(), AVG() and SUM() Functions ○ The SQL UNION Operator ○ The SQL LIKE Operator
16	• How to create a database in MySQL using PHP script • How to create table in MySQL using php script • Insert Data Into MySQL Using PHP • Insert Multiple Records Into MySQL Using MySQLi and PDO • Prepared Statements and Bound Parameters • Limit Data Selections From a MySQL Database .Exam

17.البنية التحتية	
1- الكتب المقررة المطلوبة	
المراجع الرئيسية (المصادر)	1-C. J. Date, A. Kannan and S. Swamynathan, *An Introduction to Database Systems*, Pearson Education, Eighth Edition, 2009. 2-Abraham Silberschatz, Henry F. Korth and S. Sudarshan, *Database System Concepts*, McGraw-Hill Education (Asia), Fifth Edition, 2006. 3-Shio Kumar Singh, *Database Systems Concepts, Designs and Application*, Pearson Education, Second Edition, 2011.

Course Name: Project Management
Course Code: PM
Lecturer Name: Dr. Wadhah Abbass
Level (Year): Fourth

Description of English Language Course

This model includes the academic description of the Project Management course for the undergraduate students of the Computer Technology Engineering. Through this course the students will be provided with a realistic, socio-technical view of project management.

1- Academic Organization	Iraq University College
2- Scientific Department	Computer Technology Engineering
3- Course name/ symbol	Project Management/PM
4- Available Attendance methods	E-Classes
5- Level /year	Fourth
6- Total Number of class horse	One E-Class per weak
7- Date	1/10/2022

8- Objectives

- Develop the student's intellectual, personal and professional abilities.
- Define project management frameworks, processes and tools.
- Apply different techniques that will assist in the project selection process
- Construct project diagrams, schedules and plans and use different techniques to perform an in-depth analysis on project schedules and plans
- Identify different methods for cost estimating and project budgeting
- Manage time and cost deviations.
- Employ risk management plans and apply risk response strategies to ensure successful implementation of the project

9- Course outcomes and the methods of teaching, learning, and assessment

- The overall aim of this course is to provide participants with the knowledge and skills needed to perform in-depth analysis for a project during the planning and the implementation phases. Participants in this course will learn all the critical tools and techniques required to make decisions that optimize the successful execution of a project in a dynamic environment.
- This course relies on the use of individual and group exercises aimed at helping students learn all key project management activities. The course also relies on the use of a number of case studies and presentations by participants, followed by discussions. In addition, this course incorporates pre and post testing
- Project management
- Performing project scheduling
- Developing project plans
- Managing project budget
- Developing project controls
- Risk management

*Teaching and learning methods

- Weekly E-Classes
- Individual assignments
- Projects
- Case studies
- Group assignments
- Class assignments and pop quizzes
- Individual report
- Course reports
- Interactive classes
- Pop quizzes
- Using modern technology and social media
- Videos and pdf materials
- Exchanging parts
- Encouraging Competition and team work

*Methods of assessment

- group Assignment
- Individual Assignment
- Report
- presentation
- pop quizzes
- Mid-semester exam
- Final
- Class Participation and attitude

10 - Course syllabus

15 Weeks	Syllabus
Week1	Introduction to project Management, **MODERN PROJECT MANAGEMENT (MPM)** - Explain why project management is crucial in today's world - Define a project and differentiate projects from routine operations - Establish the importance of projects in implementing organization strategy - Establish that managing projects is an act of balancing the technical and sociocultural sides of the project
Week2	**ORGANIZATION STRATEGY AND PROJECT SELECTION** - Identify the significant role projects contribute to the strategic direction of the organization - Stress the importance of establishing project priorities and top management support - Describe the linkages of strategies and projects - Write a set of hierarchical objectives for an organization - Describe a scheme for prioritizing projects that ensures top management involvement and minimizes conflicts - Apply an objective priority system to project selection. - Recognize that today's world may require a shorter range strategic plan and scenario planning is necessary.
Week3	**ORGANIZATION: STRUCTURE AND CULTURE** • Identify different types of project management structures • Understand the strengths and weaknesses of different project management structures • Appreciate the significance that organizational culture plays in managing projects • Interpret the culture of an organization • Understand the interaction between project management structure and the culture of an organization.
Week4	**DEFINING THE PROJECT** • Recognize the importance of a complete scope statement acceptable to your customer as a condition for project success • Layout guidelines for creating a WBS for a project • Demonstrate the importance of WBS to the management of projects and how it serves as a database for planning and control Demonstrate how the OBS establishes accountability to organizational units • Apply a WBS to a case or suggested project • Recognize the process for setting up a communication plan.
Week5	**ESTIMATING PROJECT TIMES AND COSTS** • Understand estimating project times and costs are the foundation for project planning and control • Have an awareness of the methods, uses, and advantages and disadvantages of top-down and bottom-up estimating methods • Suggest estimating guidelines for time, cost, and resources • Suggest a scheme for developing an estimating database for future projects.

Week6	**DEVELOPING A PROJECT PLAN** • Establish the linkage between the WBS and the project network • Diagram a project network using AON methods • Provide a process for computing early, late, and slack activity times and identify the critical path • Demonstrate understanding and application of "lags" in compressing projects or constraining the start or finish of an activity • Provide an overview framework for estimating times and costs • Suggest the importance of slack in scheduling projects.
Week7	**MANAGING RISK** • Describe the risk management process • Identify different kinds of risks • Illustrate approaches for risk identification, analysis, and assessment • Suggest approaches for responding to project risks and opportunities • Propose the use of contingency reserves to cover risk events • Recognize the need for a change control process/system for any size project.
Week8	**SCHEDULING RESOURCES AND COSTS** • Contrast the differences between time and resource constrained projects • Explain the implications for managing time and resource constrained projects • Demonstrate an understanding of one heuristic method for scheduling resource constrained projects • Explain the potential for hidden critical paths • Introduce multi-project resource scheduling • Demonstrate the ability to create a project cost baseline • Explain how costs are translated from an estimate to a time-phase baseline.
Week9	**REDUCING PROJECT DURATION** • Understand how to use the critical path to reduce project duration • Explain alternative methods for crashing activities • Explain the risks associated with compressing or crashing a project • Recognize when a project manager should try for the optimum cost-duration.
Week10	**LEADERSHIP: BEING AN EFFECTIVE PROJECT MANAGER** • Create an awareness of the network of relationships that need to be managed to be a successful project manager • Identify the "currencies" a project manager can use to influence others

	• Encourage students to engage in MBWA • Highlight the importance of maintaining positive relationships with project sponsors • Understand and discuss the importance of building trust for project success • Identify some of the qualities of an effective project manager.
Week11	**MANAGING PROJECT TEAMS** • Identify key characteristics of a high-performance project team • Appreciate the impact situational factors have on project team development • Develop strategies for developing a high-performance project team • Build skills that encourage functional conflict and discourage dysfunctional conflict • Understand the challenges of managing virtual project teams • Recognize the importance of the project manager's behavior in shaping how a team performs.
Week12	**Health, safety and Environment (HSE) management** • Identify the sources of harmful acts • Explain how safety is everybody's responsibility • Recognize that accidental injuries are caused by unsafe acts, behaviors and conditions • Prepare a job safety analysis and give job safety instructions • Conduct an accident investigation and complete a meaningful accident report • Respond to various work accidents and emergencies
Week13	**Hazard identification and risk control**
Week14	**Leadership: being an effective project manager** • **Managing versus Leading a Project** • **Managing Project Stakeholders** • **Influence as Exchange** • **Social Network Building** • **Ethics and Project Management** • **Building Trust: The Key to Exercising Influence** • **Qualities of an Effective Project Manage**
Week15	**Project Closure** • **Types of Project Closure** • **Wrap-up Closure Activities** • **Post-Implementation Evaluation** • **Retrospectives**
References	1- Project management (The Managerial Process) by Erik W. Larson / Clifford F. Gary 2- SSRG International Journal of Industrial Engineering (SSRG-IJIE) 3- Hazard Identification and risk assessment in Foundry
Lecturer	M.Sc. Ola Khalaf Assi

اسم المقرر: Optical Communication
رمز المقرر (ان وجد): -
اسم التدريسي: أ.د. قيس شريف مجدي
المرحلة : الرابعة

وصف المقرر

Teaches the principles, components, and systems for transmitting information using light through optical fibers. Key topics include light propagation in fibers, optoelectronic devices like lasers and detectors, modulation, multiplexing (such as WDM), system design for data transmission and networks, and performance limitations. The goal is to provide a solid foundation for understanding and designing advanced optical fiber communication systems and to prepare students for careers in the field.

18. المؤسسة التعليمية	**كلية العراق الجامعة**
19. القسم العلمي / المركز	**هندسة تقنية الحاسوب**
20. اسم / رمز المقرر	**Optical Communication**
21. أشكال الحضور المتاحة	**دوام يومي رسمي**
22. الفصل / السنة	**الثاني /**
23. عدد الساعات الدراسية (الكلي)	**ساعتان نظري + ساعتان عملي + ساعة مناقشة**
24. تاريخ إعداد هذا الوصف	**2022-10-1**
25. أهداف المقرر: **اكساب الطالب المعرفة عن موضوع الاتصالات الضوئية و التطبيقات العملية في هذا المجال**	

26. مخرجات المقرر وطرائق التعليم والتعلم والتقييم

أ- المعرفة والفهم

1. تعريف الطالب على المفاهيم الاساسية
2. ادراك الاساس النظري والعملي

ب - المهارات الخاصة بالمقرر.

1. اكتساب مهارات وامكانيات عملية يمكن تطبيقها في مجال الحياة العملية.
2. توظيف المهارات التي تعلمها الطالب في تنفيذ المشاريع و الأعمال الخاصة بالإتصالات و تطبيقات الالياف البصرية الاخرى في مجال العمل.

ج- مهارات التفكير

1. القدرة على التفكير في حل المسائل الخاصة بمادة الاتصالات الضوئية
2. تنمية قدرة الطالب على التعامل مع المكونات الرقمية كاسلوب حل للمشاكل الفنية التي تواجه المهندس المختص.

د - المهارات العامة والمنقولة (المهارات الأخرى المتعلقة بقابلية التوظيف والتطور الشخصي).

طرائق التعليم والتعلم

- المحاضرات الصفية الاسبوعية
- اكتساب المعرفة من خلال المصادر الخارجية والانترنت
- الواجبات والتقارير العلمية
- طرح الافكار للمناقشة والحوار وتحفيز الطالب لاكتساب العلوم بشكل ذاتي

طرائق التقييم

- امتحان فصلي عدد 2
- المشاركة اليومية التي تعكس التقييم اليومي للطالب
- نشاط علمي وتقارير علمية و واجبات يومية
- التقييم المختبري (امتحانات العملي)
- امتحان نهاية الفصل

27.بنية المقرر	
Week	**Syllabus**
1	Introduction
2	Li-Fi (Light Fidelity) and its Applications
3	The Basics of Fiber Optics
4	
5	Fiber Optic Loss Calculations
6	
7	Fiber Optic Cables
8	Dispersion
9	
10	Fiber Optic Sources
11	
12	Fiber Optic Detectors
13	Fiber Optic Couplers
14	Fiber Optic Sensors
15	

28. البنية التحتية: تنزيل فديوهات على المنصة الالكترونية و ملفات pdf تخص المادة العلمية للمقرر وعرض المحاضرات العملية بإستخدام الباوربوينت على الداتاشو في التطبيق العملي في المختبر على تجارب عملية ، و رفع فديوهات و ملفات pdf عن المادة العملية.	
29. الكتب المقررة المطلوبة و المراجع الرئيسية (المصادر)	**1. Fiber-Optic Communication Systems, Third Edition. Govind E. Agrawal, 2002** **2. Optical Fiber Communications Principles and Practice, Third Edition. John M. Senior and M. Yousif Jamro, 2009.**

اسم المقرر: Computer Architecture
رمز المقرر (ان وجد):
اسم التدريسي: أ.د حمزة عباس السوادي
المرحلة :الرابعة

وصف المقرر

It explains how computer hardware is organized and interconnected to meet performance, cost, and functional goals, focusing on the interaction between hardware and software. Students learn about the fundamental principles of computer design, including components like the CPU, memory, and I/O systems, as well as advanced topics such as pipelining, superscalar, execution, virtual memory, and multiprocessing. The goal is to understand how design choices impact a system's performance and how programmers can write high-performance code by knowing the underlying hardware.

30. المؤسسة التعليمية	**كلية العراق الجامعة**
31. القسم العلمي / المركز	**قسم هندسة تقنيات الحاسوب**
32. اسم / رمز المقرر	**معمارية الحاسوب**
33. أشكال الحضور المتاحة	**دوام يومي رسمي**
34. الفصل / السنة	**الاول والثاني**
35. عدد الساعات الدراسية (الكلي)	**ساعتان نظري وساعتان عملي**
36. تاريخ إعداد هذا الوصف	**2025-10-1**

37. أهداف المقرر

- يهدف هذا المقرر الى اكساب الطالب معلومات عن المفاهيم الاساسية لمعمارية الحاسوب والتي هي علم وفن تصميم وأختيار وربط مكونات الهاردويروالسوفت ويرلإنشاء نظام حوسبة يلبي الوظائف والأداء واستهلاك الطاقة والتكلفة وغيرها من الأهداف المحددة الأخرى.

38. مخرجات المقرر وطرائق التعليم والتعلم والتقييم

أ- **المعرفة والفهم**

1- تعريف الطالب على المفاهيم الاساسية لمادة معمارية الحاسوب

2- ادراك الاساس النظري والعملي

ب - المهارات الخاصة بالمقرر

اذا اتم الطالب هذا المقرر بنجاح فانه يكون قادرا على ان:

- يعرف بشكل تفصيلي مكونات الحاسوب وكيفيه تركيبها ووظيفة كل جزء منها وطريقة عمله
- صيانة الحاسوب برمجيا وتحسين اداءه
- تصميم الدوائرالمنطقية واختبار عملها باستخدام لغات وصف الهاردوير

ج- مهارات التفكير

1- القدرة على التفكير في حل المسائل الخاصة بمادة معمارية الحاسوب

2- تنمية قدرة الطالب على التعامل مع المكونات الرقمية كاسلوب حل

طرائق التعليم والتعلم

- المحاضرات الصفية الاسبوعية
- اكتساب المعرفة من خلال المصادر الخارجية والانترنت
- الواجبات والتقارير العلمية
- طرح الافكار للمناقشة والحوار وتحفيز الطالب لاكتساب العلوم بشكل ذاتي
- مناقشات جماعية صفية.
- اسهام الطالب في القاء المحاضرة من خلال قرائته لنص او تعريف والقاءه صفيا على مسامع باقي الدارسين او حل سؤال.
- المحاضرات المختبرية بأستخدام المكونات الفعليه للحاسوب والبرامج الخاصه المنصبه على كل حاسبه و بوردات ال FPGA
- تقسيم الطلبة الى مجاميع مكونة من 3 الى 4 طلاب وتكليفهم كتابة تقرير عملي.

طرائق التقييم

- امتحان فصلي عدد 4
- امتحان يومي غير منتظم بتوقيتات يهدف لتحفيز الطالب على المتابعة
- المشاركة اليومية التي تعكس التقييم اليومي للطالب
- نشاط علمي وتقارير علمية و واجبات يومية
- التقييم المختبري (امتحانات العملي)
- امتحان نهاية السنة

Week	Syllabus
1	Introduction • What is computer Architecture? • The Computer System • The Computer Hardware □ CPU □ Memory □ Input/Output Unit
2,3	Adders • Half Adder • Full Adder • Ripple- Carry Adder • Carry Look-Ahead Adder
4,5	Design of General Purpose Register • A Basic Cell for Designing A GPR • Functions □ Left and Right Shift Operations (Logical, Arithmetic, Rotate) □ Retain Present Value □ Parallel Load □ Clear □ Set □ Increment
6,7	Design of Arithmetic Logic Unit • Arithmetic Unit • Logic Unit • ALU
8,9,10	Control Unit • Micro Operation □ The Fetch Cycle □ The Indirect Cycle □ The Interrupt Cycle □ The Execute Cycle

	▫ The Instruction Cycle • Control Signals • Control unit design approaches ▫ Hardwired implementation ▫ Microprogrammed implementation
11	Cache Memory • Introduction to Cache Memory • Memory Hierarchy • What will happen when the CPU initiates a memory access? • How to calculate the overall memory access time? • Cache/Main Memory Structure
12,13, 14	Cache Organization • Direct mapping • Fully associative • Set associative
15,16	Cache replacement policy and Updating main memory • Cache replacement policy ▫ Least recently used (LRU) ▫ First-in-first-out (FIFO) ▫ Least frequently used (LFU) ▫ Random selection • Updating main memory ▫ Write-through ▫ Write-back (copy-back)
17,18, 19	Parallel Processing (Parallel Computing) • What does parallel processing mean? • Classification of Computer Architectures • Flynn classification ▫ Single Instruction Single Data (SISD) ▫ Single Instruction Multiple Data (SIMD)

	▯ Multiple Instruction Single Data (MISD) ▯ Multiple Instruction Multiple Data (MIMD) • Array Processors ▯ Systolic Array Processor ▯ Wave front Array Processor
20	Pipelining

10. البنية التحتية	
1- الكتب المقررة المطلوبة	
2-المراجع الرئيسية (المصادر)	- Modern Computer Architecture by Rafiquzzaman - Computer organization and architecture: design for performance (8th edition) by William stalling

Short Biographies

Head of the Department

Prof. Hamza Abbass Ali Al-Sewadi
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https://scholar.google.com/citations?user=Kkr6J8wAAAAJ

Hamza Al-Sewadi is currently a full professor and chair of the Computer Technology Engineering Department at Iraq University College (IUC), Basrah, Iraq. He received his B.Sc. degree in 1968 from Basrah University (Iraq), then M.Sc. and Ph.D. degrees in 1973 and 1977, respectively from the Electrical and Electronic Department, King's College, University of London (UK). He worked as a professor at various universities, including Basrah University (Iraq), Zarqa University, Isra University, Princess Sumaya University for Technology, and Middle East University (Jordan), and as a visiting professor at the University of Aizu (Japan). His research interests include Cryptography, Data hiding (Steganography and watermarking), Information and Computer Network Security, Authentication, Discrete Algorithms, Digital Signature, Artificial Intelligence and Neural Networks.